

Human Wildlife Conflict Study Namibian Case Study

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Cover picture by Hertha Nakathingo of an elephant drinking at a water point close to a settlement in Kunene Region, Namibia; photo on this page, elephant damaged water installation in the Nyae Nyae Conservancy by Chris Weaver



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LIST OF ACRONYMS

ACP	Africa, Caribbean, Pacific countries
CBNRM	Community-based Natural Resources Management
CDC	Constituency Development Committee
CITES	Convention on International Trade in Endangered Species
CLB	Communal Land Board
ENP	Etosha National Park
EU	European Union
GEF	Global Environment Facility
GFU	Grootberg Farmers' Union
GNI	Gross National Income
GPTF	Game Products Trust Fund
HACSIS	Human Animal Conflict Self Insurance Scheme
HWC	Human Wildlife Conflict
IRDNC	Integrated Nature Conservation and Rural Development
IRR	Internal Rate of Return
KAZA TFCA	Kavango/Zambezi Transfrontier Conservation Area
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
MLR	Ministry of Lands and Resettlement
NACSO	Namibian Association of CBNRM Support Organisations
NGO	Non-governmental Organisation
RDCC	Rural Development Coordinating Committee
TOR	Terms of Reference
VDC	Village Development Committee
WWF	Worldwide Fund for Nature

EXECUTIVE SUMMARY

Successful sustainable development requires the harmonisation of both environmental and human development goals, and resolving human wildlife conflict is central to this aim. Human wildlife conflict is defined as any event in which animals injure, destroy or damage human life or property (including the destruction of crops) and are killed, injured, captured or otherwise harmed as a result – i.e. both humans and animals suffer from the interaction with each other. Retaliatory killing and loss of habitat are threats to the survival of many species around the world. This study focuses on Human Wildlife Conflict (HWC) in Namibia in southern Africa.

Unlike many other countries, Namibia has increasing wildlife populations including such species as elephant and black rhino. Namibia's large predator population (including lions) is stable if not increasing. Conservationists agree that Namibia's Community-based Natural Resource Management (CBNRM) Programme has played a major role in these increases. Under the CBNRM programme rural communities that form local natural resource management institutions called conservancies gain rights to manage wildlife and tourism from government. As a result of the income from sustainable use of wildlife and from ecotourism in conservancies, rural communities have generally positive attitudes towards wildlife. However, partly as a result of this conservation success, increasing wildlife is leading to increased HWC. There is thus a need to ensure that the successes to date are maintained and that local communities receive sufficient benefit from wildlife relative to the losses associated with wildlife to maintain their commitment to its conservation.

This study considers the economics of HWC and the contribution of wildlife to local livelihoods. HWC has a high impact on rural households especially those in hotspots such as close to protected areas or in Caprivi (a region of Namibia in the North East of the country) where elephant numbers continue to increase annually. The government does not pay compensation for HWC losses but uses CBNRM as an approach to try to internalise the costs and benefits of living with wildlife at the community level. The economic analysis concludes that CBNRM can be an important mitigation strategy for HWC because at the conservancy level and with regard to regional and national economies, CBNRM generates more income than there are losses to HWC. However, it is clear that the level of damage from HWC differs considerably between individual households and more needs to be done to ensure that those households that suffer the most receive appropriate benefits to offset these losses.

This study considers a number of drivers and key issues regarding CBNRM at the micro (local), meso (regional/district) and macro (national and international) levels. At micro level communities face a number of constraints to dealing with HWC due to gaps in policy and legislation. Conservancies may design excellent management planning and zoning that is designed to reduce HWC, but then struggle to enforce this planning on the ground. Government departments implement development schemes at local level that do not take HWC into account and thus lead to increased HWC. However, conservancies provide important institutional mechanisms through which to channel benefits, implement prevention measures and for communities to articulate with other levels of society and across sectors.

At meso and macro level, government departments, regional councils and land boards are driving development projects and land allocation without giving consideration to

HWC issues. The land boards sometimes ignore the management plans of conservancies that they are legally bound to take into account. Extensive small-scale commercial farming schemes are being developed by the Ministry of Lands and Resettlement adjacent to protected areas and within conservancies, which will lead to increased HWC, increase costs to the economy as a result, and have negative impacts on some species. There is little recognition of HWC in most government sectors and a lack of appropriate assessments of development schemes. A lack of planning to mitigate HWC leads to increased conflict and ultimately increased costs to the economy.

International trade agreements potentially have important consequences for driving land use preferences in Namibia towards livestock rather than wildlife leading to the disappearance of some large predators from cattle ranches. International conservation agreements such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) impact the international trade in specimens of species such as elephant. The “elephant problem” in southern Africa is one of over-population, not a decline in numbers with elephants now migrating into the north eastern parts of Namibia from Botswana. Transboundary management efforts are required that involve local communities and aim to reduce conflict while also enabling elephants to expand their range.

A wide range of measures to prevent or reduce HWC have been tried in Namibia. These are analysed in terms of their effectiveness and reasons for success. Often these measures, such as protection of water installations, or provision of alternative drinking places for elephants away from settlements are technically sound, but are not successful due to institutional failures resulting in inadequate maintenance and/or upkeep. There are however several innovative approaches to mitigation being developed, one example of which is a self-insurance scheme run by conservancies, initially with donor support. Conservancies make payments to individuals who have lost livestock to predators in order to offset the losses, but under conditions aimed at improving livestock management and preventing further incidents. Eventually conservancies will take over the funding of these schemes themselves.

The overall conclusions of this report are as follows:

- I. *The effective mitigation of HWC requires integrated coordination between macro, meso and micro levels. Such coordination can reduce the costs of HWC by increasing the efficiency of planning and implementation of development projects and ensuring that HWC prevention and mitigation measures are integrated as part of a coordinated and systematic programme.*

This report has shown that HWC at the local level is impacted by processes and events at the meso and macro levels. Attention needs to be given to the provision of supportive international and national policies, efficient national and regional decision-making frameworks and local institutions that have the capacity to address HWC.

- II. *The costs of HWC to communities and governments can be outweighed by the economic benefits generated by CBNRM that devolve rights over wildlife and the right to benefit from its sustainable use to local communities. This provides a sustainable long-term solution to the problem and reduces the need for continual government interventions.*

This report has shown how in Namibia CBNRM brings a number of livelihood benefits to rural communities. While the financial benefits to households are currently low, these can be increased in various ways providing a direct means to off-set the losses caused by HWC. At the same time, CBNRM provides a number of other intangible benefits that help to increase tolerance of wildlife that causes problems such as elephants and predators.

- III. *For HWC to be effectively mitigated, it is essential to implement cross-sectoral coordination that ensures all relevant ministries take existing and potential HWC into account in land-use and development planning. This will prevent financial losses to farmers and other land-users, and reduce losses to regional and national economies.*

This report has shown how national and regional planning by ministries in non-conservation sectors can lead to increased HWC and increased costs to the government and the economy. Planning of agricultural developments, resettlement schemes and other rural development projects, including provision of water, need to assess potential HWC and incorporate methods to prevent damage and losses.

Clearly all countries have different contexts but it is possible to draw conclusions about the principles and approaches from the Namibian experiences that are likely to be of use for other countries. Some of these key findings are as follows:

- All levels: HWC differs spatially and temporally. There are considerable environmental differences between parts of Namibia, and such spatial and temporal variations are likely to occur in other countries. This indicates the need for HWC management policy and approaches to be flexible so that local solutions can be found to local problems.
- Micro level: A variety of linked approaches is often required in order to deal with HWC. Technical solutions may appear ideal, but might not be implemented because of institutional failure. Attention needs to be given to who will implement the technical solution, who will maintain the infrastructure if necessary, and whether there are sufficient incentives for implementation and maintenance to be carried out.
- Micro and meso levels: The CBNRM programme in Namibia has demonstrated the effectiveness of devolving management authority over wildlife to land holders as a conservation mechanism. Results from the programme indicate the need to ensure that devolving rights over wildlife to local communities should also include the authority to deal with problem causing animals. Where communities perceive that they derive sufficient benefit from wildlife, providing them with decision-making authority over problem causing animals is unlikely to lead to the disappearance of those animals.
- Micro level: The role of conservancies points to the need for effective local level institutions that can be used to internalise costs and benefits of living with

wildlife, channel benefits to villagers, carry out local level HWC management, and interact with other sectors and levels of decision-making.

The report also makes some specific recommendations for addressing HWC in Namibia. The key findings are as follows:

- Micro level: Due to the considerable variation in socio-ecological conditions in Namibia, HWC policies and strategies need to be sufficiently flexible to allow different approaches to be applied in different areas, at different times of the year and for different species.
- Micro level: Much more focused attention is required on monitoring the effectiveness of various measures to prevent or reduce conflict and on disseminating the results. Some indications of possible successful models for protecting water points are emerging in the Kunene Region and these need further monitoring to assess their effectiveness.
- Micro level: More attention needs to be given to the monitoring and assessment of the costs of HWC particularly with regard to crop damage. Various methods have been used which differ in their approach. There is a need for ongoing research that also aims to assess the impact and hardship caused to households so that conservancies can support those hit the hardest.
- Meso and micro levels: The HACSIS self-insurance scheme is one means of ensuring that conservancies provide targeted support to households. However, more attention needs to be given to expanding the benefits reaching households if CBNRM is to be a successful mitigation mechanism. This requires further policy changes at national level such as further devolution of authority to local communities and increased security of land tenure.
- Meso level: Key Ministries such as Lands and Resettlement need more exposure to and training in the means of avoiding increased HWC through appropriate planning processes. The use of Environmental Assessments for key ministerial and development projects would assist in identifying potential problems and the establishment of appropriate prevention, reduction or mitigation measures.
- Macro level: Removal of the domestic and international disincentives to investment in and use of wildlife could be expected to considerably enhance the economic benefits of wildlife relative to the HWC costs. There is a need for a detailed study on the effects of trade barriers, restrictions, taxes, subsidies, property rights, and similar factors on the value of wildlife in Namibia. This could be combined with a study on incentives and disincentives in the livestock industry.
- Macro level: Change is required in international trade agreements that potentially negatively affect wildlife as a land use, and within the CITES system where means need to be found to enable Namibia to increase economic benefits to local communities from regulated trade in elephant products that will not pose a threat to other more threatened elephant populations.

1. INTRODUCTION

1.1 Human Wildlife Conflict – why is it important?

For the purposes of this study, human wildlife conflict is defined as any event in which animals injure, destroy or damage human life or property (including destruction of crops), and are killed, injured, captured or otherwise harmed as a result – i.e. both humans and animals suffer from the interaction with each other. The damage and destruction caused by a variety of animals to human property – and sometimes human life – is a real and significant danger to many human communities. Likewise, retaliatory killing is a major threat to the survival of many species around the world for which there is global community interest and commitment to their conservation (such as elephants, big cats, bears and wolves.) As human populations increase and encroach further into wildlife habitat, conflicts between humans and wildlife are set to increase in both frequency and geographic spread.

Successful sustainable development requires the harmonisation of both environmental and human development goals, and resolving human wildlife conflict is central to this aim, bringing together the two perspectives in order to create a sustainable future for both wildlife and rural communities.

1.2 Background

This study on Human Wildlife Conflict (HWC) in Namibia has been commissioned by the WWF Macroeconomics Programme Office and the WWF Global Species Programme. It is part of a wider study of HWC issues that spans three countries covering both Africa and Asia. The study aims to assist WWF in better understanding HWC issues so that it can generate political will and funding for HWC prevention and mitigation measures. It also aims to provide useful background information to assist the Namibian Government and other relevant stakeholders in their current efforts to develop a national HWC policy and strategy.

The study examines the dynamics of HWC, examines the root causes of the conflict and identifies opportunities and positive models for preventing and/or mitigating HWC. The study focuses on three levels: a) the macro level of international and national policies including international conventions, trade agreements, national Poverty Reduction Strategies and sectoral policies; b) the meso level of regional (i.e. within Namibia) institutions, development activities, and land use planning; and c) the local level of communities, farmers and Non-Governmental Organisations (NGOs). Attention is given mainly to conflicts between elephants and people, but some consideration is also given to conflicts between predators and people. The full Statement of Work is attached as Annex 8.

The study aims to answer the following key questions and examine the following hypotheses:

- 1) Question: What are the links between the macro, meso and micro drivers and solutions of HWC and what does this mean for truly strategic and effective mitigation of HWC in the long term?

Hypothesis: A strategically coordinated programme that tackles HWC at all of these levels and promotes the devolution of decision-making to the lowest appropriate levels of government and civil society will be the most efficient and cost effective way to address the impacts of HWC.

- 2) Question: What is the rationale for taking current and potential HWC into account in all land use and development planning?

Hypothesis: By considering how all planned developments will impact on current and potential HWC, appropriate land use planning can be ensured that minimises HWC and ensures more successful development.

1.3 Methodology and Format

There has been a considerable amount of research into HWC issues in Namibia and a considerable amount of experimentation with prevention and mitigation methods (see the annotated bibliography provided as Annex 7). This report therefore draws heavily on existing material and data in the form of a desk study. A number of interviews were carried out with key informants to fill gaps and a short field trip was undertaken to develop a case study on local level problems and solutions and community institutions as appropriate mechanisms for dealing with HWC. A list of persons consulted is provided in Annex 6.

The report is divided into an introductory section setting out the aims of the study and the methodology, an overview of the Namibian HWC context, analysis of the main issues and drivers of HWC at different levels, discussion of the potential solutions and implications and a set of conclusions. Some detailed information such as data on wildlife trends and conservancy income are contained in Annexes.

2. NAMIBIAN COUNTRY CONTEXT

2.1 Background on Namibia

Namibia has a total land area of approximately 825 000 sq km and a population estimated at 1,8 million, with an annual growth rate of 3%. Namibia is the driest country south of the Sahara with about 92% of the country classified arid or semi-arid. Rainfall is extremely variable temporally and spatially. Drought is a regular occurrence. Only 1% of the land area has soils with a medium to high potential for rain-fed or irrigated arable production (Kruger 2002). As a result, the main agricultural activity over most of the country is livestock production, although in the higher rainfall areas of the north and north-east, communal farmers practice agro-pastoralism.

Land distribution in Namibia has been skewed by the country's colonial history. At independence from South Africa in 1990, 40.8% of the land had been allocated to the black homelands as communal land, which supported a population of about 1.2 million, while 43% had been allocated under freehold title to white commercial farmers. 13.6% was allocated to conservation and a small percentage was unallocated land. This situation has been modified only slightly since independence through the government's land reform policies with a small number of wealthy black farmers purchasing freehold

farms, and a small number of freehold farms being purchased by government for resettlement purposes. Another important part of the land reform policy is the drive to open up “unutilised” communal land to small-scale individual commercial farmers. The State owns communal land and residents have usufruct rights over the land and its resources such as pasture. In general much of the communal land is only marginal for livestock and dryland crop farming.

The majority of Namibians, particularly those in rural areas, are poor. Per capita income in 1996 was N\$ 14 519 (US\$ 2 080) and 85% of consumption-poor households are found in the rural areas, making their living primarily from subsistence farming which contributes 51% of rural incomes (GRN 2004). The dependence of rural people on subsistence farming makes them particularly vulnerable to Human Wildlife Conflict where this takes place as they have little else to fall back on if crops are destroyed or livestock killed by wild animals. Generally, rural livelihoods are mainly based on a combination of livestock production, crop-based agriculture and gardens, natural resource use and various forms of income generation including employment. However, the opportunities to enhance livelihood security and for off-farm diversification of livelihood activities are limited due to a lack of economic opportunities in the remote rural areas (Long 2004). Vulnerability is caused by frequent drought, lack of secure land tenure, poor access to markets, limited alternative sources of income and health risks associated with HIV/AIDS, malaria and other diseases.

Two of the regions most affected by HWC in Namibia are the Kunene Region in the arid north-west and the Caprivi Region in the higher rainfall north-east. A study on conservancies in these two regions provides considerable background on livelihood issues (Long 2004). It found that in the large and sparsely populated Kunene Region more than a third of respondents in a household survey had no formal education and only 43% lived within 5 km of a school. This is a reflection of people living long distances from schools and a lack of schools in the region. The household survey showed that 12% of households had children out of school because of an inability to afford school hostel fees or other school-related costs. Life expectancy in the region is one of the highest in the country largely due to low HIV/AIDS infection rates, and low incidences of malaria and TB. However, access to health care is generally poor with only 46% of the population enjoying access to a clinic within a 10 km radius of their homes. There are few tarred roads in the communal areas of the region, but there is a well-maintained network of graveled roads, and all major villages and some small settlements are connected to the national telephone system. The main household assets are access to communal grazing land, livestock, draught animals and donkey carts (with a few wealthier people owning cars). The main skills are in livestock farming, keeping small gardens, craft making, hunting and tracking and increasingly in providing tourism services.

Caprivi has a relatively high population density compared to other parts of Namibia with around 80 000 people living in an area of about 20 000 km². About 30% of correspondents over 20 years of age in a household survey had no formal education, but access to schools is good (Long 2004). The survey showed that 22% of households had children of school age not at school because of an inability to afford hostel fees or other school-related costs. While infant and child mortality rates have declined across Namibia since Independence in 1990, in the North-East, these rates have not declined as much. This is ascribed to greater poverty, poorer access to medical care, the presence of malaria and one of the highest HIV/AIDS infection rates in the country. Long 2004

concludes that poverty is more widespread in Caprivi than for the country as whole. Main household assets tend to be access to communal grazing land, land allocated to the household for crop growing, access to wild fruit trees, livestock, draught animals, wooden canoes and sledges. Some wealthier people own cars. Main skills include livestock and crop farming, wood carving, fishing, thatching, hunting and tracking and as in Kunene, increasing provision of tourism services.

Namibia is divided into 13 administrative regions each with a regional government of elected councilors. All major line ministries have regional offices which are responsible for government service delivery with varying levels of decentralized decision-making.

2.2 General status of wildlife in Namibia

The general trend in wildlife on freehold land in Namibia and in large areas of communal land is an increase in numbers. Since the late 1960s wildlife numbers on freehold land have increased by some 70% and species diversity (large mammals) increased by 44% (Barnes and de Jager 1996, cited in Krug 2001). Approximately 80% of the numbers of larger game mammal species are found on privately owned commercial farms (Richardson, 1998 cited in Krug 2001) and freehold farmland in Namibia hosts the largest cheetah population left in Africa (Krug 2001).

Namibia's elephant population doubled between 1984 and 2003 when there were an estimated 11,262 animals, most of which were in the north-east of the country³ (MET 2004). A 2004 survey estimated a further increase to an estimated 16,397 animals (Martin 2005). Increases in the north eastern populations have been mainly due to immigration. These populations are linked to the large northern Botswana population of more than 100,000 animals (see sub-section 2.3 below for more details about the regional context regarding elephant numbers). The combined Etosha National Park/North West population has been growing without signs of immigration into the overall area, although there is movement between Etosha and the surrounding communal areas. The lion population is estimated at between 562 and 894 with lions found on communal land as well as in protected areas (Stander 2005). The overall population is stable with increases in numbers and range in specific areas, such as the communal lands of Kunene Region where people farm mostly with livestock. Data from Stander (2006) shows that in 1999 there were 15 lions on the Palmwag tourism concession with a range of around 4,000 km², but by 2006, there were 85 lions covering a range of 24,000 km².

There are a number of reasons for the general upwards trend in wildlife numbers. As indicated above, elephant numbers in the North-East are increasing mainly due to immigration. In the North-West better rainfall over most years since the major drought of the early 1980s has contributed to well-documented increases of large mammals such as springbok, oryx, kudu, mountain zebra and giraffe (See Annex 1). Better monitoring and increased patrols by government and NGOs have also assisted the recovery of rhino and elephant populations in the North-West.

³ The population trend and current estimate of numbers are based on aerial surveys and estimates derived from partial aerial and ground surveys. Although survey methods have changed over time, estimates since 1990 are all based on similar sample aerial surveys.

However, these factors have been underpinned by major policy and legal changes that have been the main driving force for conservation in Namibia. In 1967 white freehold farmers were given use rights over wildlife on their land by the South African colonial government. Prior to this the wildlife was controlled entirely by the state and many farmers viewed wildlife as competing with livestock for grazing and as a cost rather than a benefit. Wildlife was shot illegally by farmers and numbers were declining. Due to the provision of use rights and the right to benefit from use many commercial farmers began to view wildlife in a new light (Barnard 1998, Van der Walt 1987, de Jager 1996). They now had the opportunity to develop wildlife as a sustainable income-generating resource. Gradually a wildlife industry developed on commercial farmland based on consumptive uses such as sport hunting, culling for meat, trophy hunting, live sale, and on non-consumptive uses such as photographic tourism (Van der Walt 1987). By 1996 the estimated net value added to national income from commercial wildlife use on freehold land was N\$129.1 million (US\$18.5 million) (Barnes and Ashley 1996 cited in Krug 2001). The new policy approach applied in the late 1960s reversed the declines in wildlife and led to a situation where many freehold conservancies⁴ are over stocked with wildlife (Jones 2005).

Similar trends are being experienced on Namibia's communal land. In the North-West, drought and heavy poaching decimated wildlife including elephant and black rhino prior to the mid-1980s. In Caprivi some species such as giraffe became locally extinct and red lechwe numbers declined from 12,000 to 1,200 in a decade. Following pioneering community-based conservation work by NGOs and individual conservation officials in the North-West and in Caprivi game numbers began to recover gradually (Long and Jones 2004). Partly based on these early successes, the government developed policy and legislation that gave communal area residents the same rights over wildlife as white freehold farmers, provided they formed collective common property resource management units also called conservancies⁵. A national Community-based Natural Resource Management (CBNRM) programme supported by government, donors and local and international NGOs assists the formation and operation of communal area conservancies.

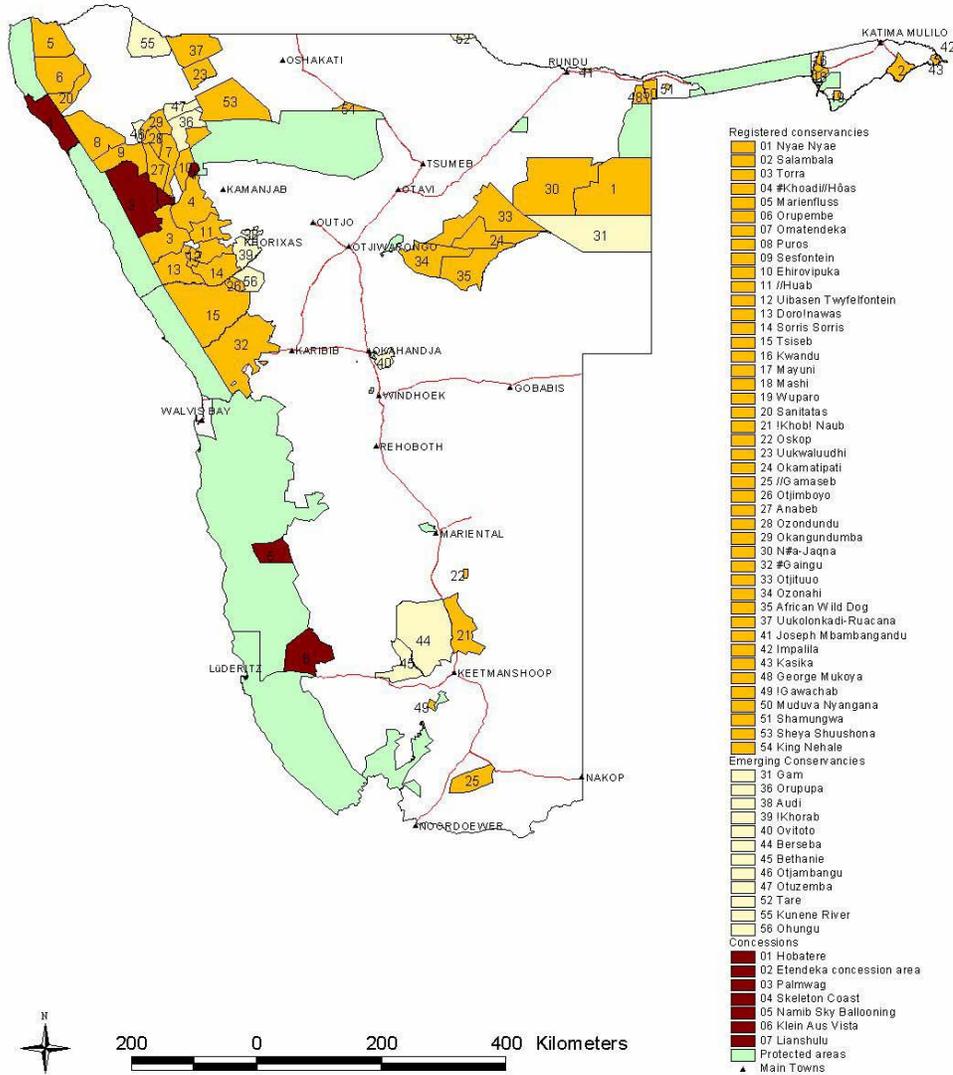
The legislation was passed in 1996 and in 1998 the first four communal area conservancies were registered. There are now 44 registered Communal Area Conservancies covering more than 10,500,000 ha. across a range of habitats from desert in the North-West to floodplains in the North-East. Within conservancies communities carry out their normal livelihood activities such as livestock and crop farming, but with wildlife and tourism as additional forms of land use. Many conservancies have set land aside exclusively for wildlife and tourism, but wildlife also often ranges across the whole conservancy area. Conservancies employ their own game guards who carry out regular wildlife monitoring and the conservancies collaborate with government officials and NGOs to carry out annual game counts.

⁴ Conservation units where freehold farmers combine their land and resources to manage wildlife collectively across larger landscapes

⁵ In order to be registered as a communal area conservancy and gain rights over wildlife, communal area residents need to have a representative committee, have defined boundaries, have a legal constitution, defined membership and a plan for the equitable distribution of benefits.

Figure1. Communal area conservancies and protected areas in Namibia

Registered and Emerging Conservancies August 2006



The general trend for wildlife in conservancies in the North-West over the past 15 years or more has been upwards (see Annex 1.) with major increases in species such as black rhino, elephant, lion, leopard, cheetah, giraffe, oryx, kudu, springbok and Hartmann's mountain zebra (NACSO 2004). Conservationists agree that community commitment to conservation has played an important role in these increases (Stander 2006), and that species such as black rhino would not survive in the area if not protected by local people (Durbin *et al* 1997). Wildlife has also been increasing in key conservancies in Caprivi (NACSO 2004, C. Weaver *Pers. Comm.* 2006). At the same time wildlife as a land-use has brought increased incomes to local communities through the conservancies. Total income to these conservancies in 2005 was N\$20.1 million or around US\$2.9 million (C. Weaver *Pers. Comm.*). Annex 2 provides data on the income to conservancies from wildlife and tourism and sub-section 3.1.4 considers the value to livelihoods of maintaining wildlife.

The past 40 years of experience on freehold land in Namibia and the past 20 years of experience on communal land in Namibia have demonstrated that providing land holders with the appropriate levels of decision-making authority over wildlife and the appropriate economic incentives has been a successful conservation strategy by the state. Wildlife numbers have increased, including those of key species such as elephant and black rhino, wild habitat is being maintained, and wildlife and tourism have become productive forms of land use contributing to the local and national economies.

3. DESCRIPTION OF THE PROBLEM

3.1 HWC status in Namibia

3.1.1 HWC incidents and species involved

HWC occurs throughout Namibia on communal as well as freehold land and involves a variety of species. The main problems occur on the communal land where the most elephants and large predators are found outside protected areas and where people are least able economically to bear the costs of damage and losses. For these reasons this report focuses mostly on HWC in the communal lands, and in particular the Kunene and Caprivi Regions where HWC is caused by both elephants and predators. The majority of the HWC prevention and mitigation measures in Namibia are being developed and applied in these regions and both regions have a number of existing and emerging conservancies.

There is a general perception by communities and other stakeholders that particularly in certain parts of the country, there has been an increase in the number of HWC incidents over the past few years. This increase is generally ascribed to the increase in wildlife brought about by the conservation policies and strategies described above. NACSO (2004:24) suggests for example, that "Living with wildlife often carries a cost, and increased populations and expanded ranges have resulted in more frequent conflicts between people and animals in many areas". According to Murphy *et al* (2004:116) in Kunene and Caprivi regions "Rural people and MET report an increase in wildlife numbers, resulting in increased HWC, due to conservancy activities". Data from the Kwandu conservancy regarding the number of problem animal incidents annually involving elephants shows a stable level of incidents from 1993 to 2000 at around 50 (with an exception in 1998) and then a sharp increase in 2001, 2002 and 2003 to more

than 100 incidents annually. Data from the two main monitoring systems in Namibia, the conservancy Event Book System⁶ and the Ministry of Environment and Tourism (MET) data base (see sub-section 5.4 below), indicate a considerable increase in human wildlife conflict incidents overall (Stander 2005).

There is a possibility that the increases reflected by the available data are partly due to improved monitoring. When Stander corrected the data for the Event Book system (which operates in communal area conservancies) for sampling effort, the results showed that the frequency of HWC was stable between 2001 and 2004 (Stander 2005). Regarding data indicating an increase in elephant incidents in Caprivi he also cautions that due to the difficulty of reporting HWC incidents in remote areas, the interpretation of the number of incidents is problematic. However, he suggests that there has perhaps been a sudden increase in HWC over the past two years (P. Stander, *Pers. Comm.*). Further the reports and data regarding increased problems with elephants in Caprivi appear to be logical when considered against the increase in elephant numbers in the region (from an estimated 3 000 in 1980 to an estimated 8 726 in 2004), the fact that these elephants are not confined to protected areas by fences and that there is a relatively high human population close to protected areas in Namibia and bordering wildlife management areas and protected areas in neighbouring Botswana. Stander's analysis shows an expected significant linear increase in HWC in areas of higher human population density.

A number of individuals and organisations have collected data on HWC in Namibia particularly since independence in 1990. Stander (2005) analysed the existing data from these different sources. He found that elephants and large carnivores are responsible for most HWC incidents in Namibia and these species live permanently on communal and freehold land where they regularly come into contact with local communities. In most of the northern regions of Namibia, with the highest densities of wildlife, carnivores collectively are responsible for most incidents, mainly followed by elephants. According to NACSO (2006), a total of 3 194 problem incidents were reported country-wide in conservancies during 2005. The species involved were as follows: elephants (23%), hyena (17%), jackal (10%), leopard (10%), cheetah (9%), bushpig (6%), hippopotamus (5%), crocodile (5%), various antelope (5%), lion (4%), baboon (2%), porcupine (2%) and caracal (1%).

The data presented in Table 1 below reflect incidents in only those conservancies using the 'Event Book' monitoring system and thus do not reflect all such incidents in the country. The use of the Event Book system was expanded and the quality of monitoring improved over this period, thus the increase in the number of incidents is at least partly due to a larger area being covered and better monitoring (NACSO 2006).

	2003	2004	2005
Human Attacks	17	14	15
Livestock Attacks	1733	1684	2658
Crop Damage	1098	1084	1470
Other Damage	171	154	139

⁶ The Event Book system is a simple colour-coded, image-based monitoring system for use by conservancy game guards – see Annexe 3

Table 1. The number of incidents of human-wildlife conflict caused by all species in Namibian conservancies using the Event Book system over the past three years. (Source: NACSO 2006). "Other Damage" mostly refers to damage to water points caused by elephants.

Stander's analysis of data reveals considerable regional differences in HWC incidents. For example spotted hyenas, lions and leopards are important throughout the northern regions, while problems with cheetah occur mainly in the west, and with wild dogs in the North-East. From the event book data and reports from local residents, there are increased cheetah sightings in the North-West and there seems to be an increase in problems caused by cheetah. Analysis of the event book data for 2005 for the 12 conservancies in northern Kunene Region (Peters 2006) indicates that cheetah were the third highest cause of problems (22%) after hyena (23%), and leopard (23%). Elephant in northern Kunene were responsible for 9% of all incidents.

There are also considerable regional differences in the frequency of HWC incidents. The frequency of HWC incidents in Kunene Region (expressed as a ratio of the number of incidents per 100 km²) is 2.8 compared to 41.3 in Caprivi (Stander 2005). Caprivi has the highest frequency in the country mainly due to human elephant conflict and to higher human population densities than areas such as Kunene. Proximity to protected areas also appears to be important. For example, according to NACSO (2004) in 2003 the greatest number of problem animal incident reports from conservancies came from three conservancies adjacent to protected areas, the Kwandu Conservancy (488 reports), Mayuni Conservancy (269) and Ehrovipuka Conservancy (204). Kwandu and Mayuni Conservancies in Caprivi suffer mainly from elephant problems and both are adjacent to the Bwabwata National Park which is known for large concentrations of elephants. Ehrovipuka Conservancy in Kunene Region suffers from lions leaving the neighbouring Etosha National Park.

Cumming and Jones (2005) noted the different types of problems caused by elephants in different parts of the country. In north-eastern Namibia where there are the highest numbers of elephants and relatively high human densities, elephants provide a physical threat to people and destroy crops. In conservancies such as Kwandu and Mayuni in Caprivi, conflict is exacerbated when settlements are placed across well-used elephant paths to and from the Kwando River (Beytell *Pers. Comm.*, cited in Cumming and Jones 2005). This is dangerous for people, particularly when walking at night, and leads to a higher likelihood of crop damage by elephants. In the more arid North-West elephants also pose a physical threat to people traveling at night on donkey carts or walking and when elephants come close to settlements to visit water points. There is some damage to crops where these are grown under local irrigation from boreholes, and elephants damage small gardens at settlements. However, the main form of damage caused by elephants in the North-West is to infrastructure for water provision and to fences (on both communal and freehold land). Elephants damage wind pumps and rip up pipes in search of clean water. Larger groups might consume most of the contents of a small reservoir resulting in additional expenditure by people who have to pump more water for themselves and their livestock. Elephants sometimes kill livestock at water points.

Stander's analysis indicated that for most wildlife species the incidence of conflict is not seasonal (Stander 2005), with elephants being the exception. In Caprivi elephant conflict occurs mostly in the late wet season when crops are maturing. Although there was no seasonal pattern for the whole of Kunene Region, two areas reported increased levels of

conflict in the dry season. In one of these areas the problem is crop destruction, while in the other elephants mainly damaged infrastructure.

3.1.2 Impact of HWC on wildlife populations

In many other countries, particularly in Asia, retaliatory killing and removal of problem causing animals as a result of HWC is a major threat to the species concerned. In Namibia HWC does not appear to have a negative impact on the main species involved, largely due to the commitment to conservation of Namibian land holders including local communities (and much lower human population densities). Stander's analysis showed that for the leopard, the combined annual removal of problem causing animals and trophy hunted animals will remain within acceptable off-take limits at 6,1% a year. Further, at an estimated 8,039 animals, the leopard population has remained stable since 1988. The Namibian cheetah population (the largest in the world) is stable, if not increasing, despite removal of problem causing animals. The lion population is stable despite the removal of around 30 problem causing animals a year. Elephants continue to increase and expand their range and the levels of illegal killing are low. The total number of animals killed illegally between 1990 and 2003 is 83, giving an average of almost six per year (MET undated a).

Although HWC is currently not a threat to most problem-causing species (with the exception of the wild dog⁷), the increased level of HWC perceived in regions such as Kunene and Caprivi remains a potential future threat to these species by jeopardising the currently positive attitudes of local communities towards wildlife. Ironically, although the conservancy approach was partly developed to provide local communities with income from the use of wildlife that could offset HWC losses, conservation success has led to increased and unforeseen HWC problems. This perceived increase in problems and costs, as well as the lack of devolution of decision-making over HWC to community levels, have resulted in growing frustration in some parts of the communal areas. The problem is to ensure that the current gains that have been made in generating positive perceptions of conservation within communities are not lost. MET recognises that "The involvement and empowerment of rural people in natural resource management, in combination with economic and financial incentives through sustainable use, and linked to skills development and capacity building, have been the driving forces behind changes in attitudes towards wildlife on communally-owned land in Namibia" (MET 2004: 1). However, this could change if HWC is not adequately dealt with and frustration over HWC leads to increasingly negative attitudes towards wildlife.

The key to the populations of these species remaining stable or continuing to increase lies in continued community commitment to conservation. This will only be achieved if communities continue to see the benefits of maintaining wildlife on their land. Sub-section 3.1.4 considers the economics of HWC and of wildlife as a land use in conservancies.

⁷ Stander (2005) suggests that wild dog population density and range are declining due to changes in land use and human population density, possible competition with lions and hyenas and disease. There are few data on wild dog HWC incidents and the impact of mortalities due to HWC on the overall population.

3.1.3 Political management of HWC

A number of different ministries are involved in land-use planning and land management including the MET, the Ministry of Lands and Resettlement (MLR), the Ministry of Agriculture, Water and Forestry (MAWF), and the Ministry of Regional and Local Government and Housing and Rural Development (MRLGHRD). However, only MET deals directly with HWC issues, while planning by other ministries mostly does not take HWC into account and often leads to increased conflict. As a result, the MET is coming under increasing pressure to deal with HWC, yet without the cooperation of the other Ministries whose decisions and policies may be causing the conflicts, the MET is unable to fully resolve the situation in a sustainable way. This is a situation that needs to be rectified urgently, and is dealt with in sections 4.2.1 and 5.6. The MET is under particular pressure in certain parts of the country where residents believe they are being hit harder than others. In his opening remarks at the National Workshop on Human Wildlife Conflict Management held in Windhoek in May 2005, the MET Permanent Secretary observed that “MET offices across Namibia have reported intensifying problems and incident reports relating to human wildlife conflict. Measures are urgently required to mitigate the conflict and increase the benefits of living alongside wildlife” (MET 2005a:9). Particular pressure has come due to loss of life or injury to local people.

3.1.4 Economic Analysis of HWC

This section considers the costs and benefits of living with wildlife in Namibia, drawing on some specific research findings. In terms of costs, the State does not pay compensation to mitigate damage and losses caused by HWC. The direct costs to government of HWC are therefore not high, and consist of the person-hours, travel costs and subsistence costs involved in investigation of problem animal complaints, and removing identified problem animals. It is not possible to extract this information from the budget of the Ministry of Environment and Tourism as no budget lines exist specifically for addressing HWC. Namibia does not have large-scale government-run agricultural schemes affected by elephant damage.

The main costs as a result of HWC occur at the household level. As a result there are clear livelihood losses at the household level from HWC, and there are clear economic losses to the country. The following subsections provide an indication of losses at the household level, and the negative impact of HWC on the national economy, while also showing that Namibia’s CBNRM approach is a means of addressing these negative impacts. The main thrust of government policy has been to promote a system where wildlife pays for itself, and to enable local communities to internalise the costs and benefits from wildlife. We show how a conservancy, considered as an economic enterprise, remains profitable despite the impacts of HWC, and how the contribution of CBNRM to GDP outweighs the losses caused by HWC. The data show however, that at the household level CBNRM in Namibia still needs to do more to ensure that losses suffered by individuals are adequately offset by different forms of benefit.

We also consider the broader livelihood impacts of HWC and some of the problems in accurately measuring impacts, due to the existence of many variables for which data is not readily available and for which assumptions need to be made.

An Economic Analysis of HWC impacts in Caprivi

Research to establish the economic value of HWC impacts in Namibia has been limited to that of Barnes and Nhuleipo (2005), who conducted a specific study in Caprivi Region, analysing the impacts of HWC on household livelihoods, communities and the national economy. Caprivi contains several state-controlled protected areas, and, itself, borders on designated wildlife land in neighbouring Botswana. It also contains some of Namibia's more important CBNRM initiatives, most of these adjacent to protected areas. HWC is common, mostly within CBNRM conservancies, but also in communities outside these.

Barnes and Nhuleipo attempted to synthesise the available data on wildlife damage to crops and livestock in Caprivi to develop average household values for these costs in 2004 prices. The physical crop and livestock losses, and the value of these losses, represent the amount by which HWC reduces the gross income of crop and livestock producing households. They represent the first step to understanding HWC costs. The next step is to see how much HWC damage reduces the net income or profits of these producers. Further, it can be seen what the effect of HWC damage is on the returns to investment that households make in crop and livestock production. A further step might be to examine how HWC damage affects the net contribution that the household crop or livestock enterprise makes to the national economy. All these are different measures but all provide an understanding of the nature and impact of HWC. Lastly, one can examine the extent to which the costs of wildlife damage for households and communities outweigh the benefits that households and communities derive from wildlife.

To estimate some of these values, Barnes and Nhuleipo applied estimates of the average household crop and livestock losses to household crop and livestock production models which have been developed from empirical data for Caprivi and adjacent northern Botswana. The aim was to measure the impact that wildlife damage has on the private net benefits, or profits, associated with household crop production and livestock keeping. The study also simulated the effect of aggregate wildlife damage costs on the financial and economic returns to community investment in CBNRM conservancies. The aim here was to compare the average costs of wildlife damage being experienced in conservancies with the net benefits accruing to conservancies from wildlife use.

It is important to note at the outset that the estimates below are aimed at providing an indication of the private and economic impacts of HWC damage. Care should be taken not to read too much into the values arrived at. As described elsewhere in this report, the physical and monetary extent of HWC damage, is extremely difficult to measure, and use had to be made of a wide range of estimates, made with varying rigour by various workers. While the enterprise models used are considered to be fairly robust, they are in a continual process of refinement as new empirical data becomes available. The Barnes and Nhuleipo (2005) study is thus a preliminary one.

The household production and conservancy models used to measure the impact of HWC are standard tools, which have been in use in the environmental economics unit of the Namibian Ministry of Environment and Tourism since 1994. These are budget and cost-benefit enterprise models for natural resource use activities set out in detailed spreadsheets. The models are aimed at measuring the returns for private investors and society as a whole generated by activities in wildlife use, natural plant resources use, fisheries, livestock production and crop production. Turpie et al (2000), LaFranchi (1996), and Barnes et al (2001) described examples of these enterprise models. Similar, more complex models have been developed for community level investments in

conservancies (Barnes et al, 2002). The models are based on empirical physical and financial information, derived mainly from surveys of households and enterprises, and they include the initial capital costs⁸, variable and fixed recurrent costs and the gross income or turnover. They measure the annual net profit/loss for the enterprise, as well as (in some cases only) the internal rates of return (IRR)⁹ and net present values¹⁰ for the investment after five and ten years. Not all models are exactly the same and not all provide the full range of values.

In addition to the profits and returns to the private or community investor, some of the models also measure the returns that these activities generate for society as a whole, or the contribution they make to the national income. They measure the economic benefits, less the economic costs, to society as a whole, associated with the activity. Getting to these economic measures involves some revaluation where the true values of costs and benefits to society differ from the actual financial transaction values encountered by investors. Specifically, changes are made in determining the costs of labour, the value of tradable goods, and the effects of taxes and subsidies. In this way, some models measure the annual net contribution, in terms of gross national income, made by the enterprise or conservancy. Some of these models also measure the economic internal rate of return and net present value for the activity after ten years of operation.

Average crop and livestock HWC damage values for Caprivi were calculated from several data sources. One was a series of estimates of crop and livestock losses along the Kwando River for the years 1991 to 1995, based on MET data (O'Connell, 1995; O'Connell-Rodwell et al. 2000). Another was a series of estimates of losses in crops and livestock from Caprivi as a whole, between 1996 and 2001, derived from MET data by Mulonga, et al. (2003). More estimates on crop losses were obtained from Suich (2003), who had survey-derived estimates for 2002, from Kwandu and Mayuni Conservancies in the Kwando River area. Evans (2004), had crop loss estimates from Kwandu and Mayuni for 2003, based on both survey and government (MAWF) data. These data are highly variable temporally, spatially, and depending on the sources and methods used. They required some manipulation to derive average values with some validity.

An important HWC study was conducted by Sutton et al (2004) who surveyed households across Caprivi gathering a series of data on household characteristics and human-wildlife interaction. Sutton's work involved econometric analysis (the measurement of relationships between economic and other factors using statistical analysis) and allowed for estimation of crop loss values at the 'farm gate', rather than at the central market town of Katima Mulilo (ie. the dollar value of crop loss directly incurred by the household.) Barnes and Nhuleipo used this to adjust the values of crop losses for all the other studies from Katima Mulilo market prices to 'farm gate' prices. Mulonga et al (2003) and Suich (2003), showed that the MET data on wildlife damage were likely to be incomplete, and suggested adjustment of these values. Thus, after various adjustments, crop damage values, for the period 1991 to 2003, and livestock loss values, for most

⁸ **Capital costs** are costs incurred on the purchase of land, buildings, construction and equipment to be used in the production of goods or the rendering of services.

⁹ **The IRR** is the return rate which can be earned on the invested capital, i.e. the yield on the investment.

¹⁰ **The net present value** is the value of the investment after a period of time, another measure of yield on the investment

years in the period 1991 to 2000, were inflated and used to calculate average annual values at 2004 'farm gate' prices.

The average annual value for crop damage per crop-producing household across Caprivi was estimated to be N\$269 (US\$37). This is a blended average, including both dryland and floodplain crop producers. The average value for livestock loss per livestock producing household was N\$274 (US\$38). The values represent the average amounts by which rural household gross incomes are reduced by HEC. For rural Caprivi, there are no current estimates of total household income, which take both home-consumed income, as well as cash income into account. Based on a survey of 1,115 households in conservancies in rural Caprivi, Long (2004) provided an estimate of average total annual household *cash* income, which when inflated to 2004 prices is N\$7,540 (US\$1,080). Thus the average household crop and livestock loss due to wildlife (N\$543, US\$78) amounts to some 7% of total household cash income.

Although there are no detailed data on spatial variation in impact, the values in the extremely exposed parts of Caprivi appear from rough calculations to be commonly between 2 and 4 times the regional average. These most exposed parts of the region are mainly in CBNRM conservancies, and adjacent to protected areas, along parts of the Kwando and Chobe river frontages.

Aggregate estimates of the cost of human-wildlife conflict in Caprivi on the national economy were made. Here the average HWC-induced loss in the contribution that each household makes to the gross national income (GNI) was multiplied by aggregate household numbers for Caprivi. The estimate of Mulonga et al (2003) was used for the number of crop and livestock producing households that exist in Caprivi (13,200 households).

The average household crop loss value for Caprivi was included as a cost in floodplain and dryland household crop production models derived from LaFranchi (1996) and Turpie et al (2000), respectively, to determine the effect on private net incomes, private rates of return, and the impact of HWC on the contribution of the enterprise to the National economy (gross national income). These represent typical examples of small-scale rainfed production of maize, sorghum and millet, as it occurs in Caprivi. Similarly, average household livestock loss value for Caprivi was included as a cost in two household livestock production models, one for Caprivi derived from LaFranchi (1996), and the other from adjacent land in Ngamiland, Botswana, derived from Barnes et al (2001). These represent typical examples of small-scale livestock production for meat, transport, milk and as a means of investment, as it occurs in communal rangeland conditions in Caprivi. Once again the impact of this on private net incomes, private rates of return, and the impact of HWC on the contribution of the enterprise to the economy (gross national income) were measured.

It is noteworthy that the crop and livestock enterprise models used are empirically based, and thus implicitly already include the impacts of wildlife induced loss. The average losses derived as explained earlier were included as *additional* costs to determine the impacts on profits and welfare. Thus, the resulting change in profits/welfare effectively measures the impact a *doubling* of the base level of HWC damage would have. Similarly, including two times the average damage costs to the models measures the impact that a tripling of the base level damage costs would have.

Using this approach, sensitivities were performed to see the impact that different levels of damage have on profits and welfare.

Given that Namibia's approach to managing HWC has been to promote a system where wildlife pays for itself, and local communities can internalise the costs and benefits from wildlife, it is important to compare the costs of HWC with the benefits obtained by communities through the CBNRM programme. To measure this, average costs of HWC, as they would apply in aggregate to conservancy membership, were included in the models for two CBNRM conservancies in Caprivi. These models already implicitly include base level HWC damage costs, so the impact of a doubling of the base level HWC costs on conservancy profits and welfare was measured. Similarly the impacts of higher levels of damage (four and eight times base levels) were measured. Models for the Mayuni and Salambala conservancies (Barnes et al, 2002), representing resource rich and resource poor sites, respectively, were used.

Table 2 shows the results of the analysis as it applies to floodplain and dryland crop production in Caprivi. Figure 2 depicts some of these basic impacts graphically for floodplain crop production. Table 3 shows the results of the analysis as it applies to livestock production in Caprivi and Ngamiland (Botswana). Figure 3 depicts some of these basic impacts graphically for Ngamiland. Table 4 shows the effects of the average impacts of wildlife damage to crops and livestock as measured per household, on community income and economic returns associated with two conservancies (Mayuni and Salambala). Figure 4 shows some of these results graphically. In all cases the base column depicts the enterprise or conservancy values as they are with base levels of HWC damage. The sensitivity analysis columns show the impact of increases in these damage costs on the enterprise or conservancy values.

	Base	Sensitivity analysis		
	Losses x 1	Losses x 2	Losses x 3	Losses x 5
Floodplain crops enterprise				
Gross income	2,220	1,950	1,410	340
Net income (profit)	930	670	130	-950
Net income drop (%)		28%	86%	202%
Profit/investment (%)*	24%	17%	3%	Negative
Value added to GNI **	550	390 (a drop of 29% from base value)	75 (a drop of 83% from base value)	-560
Dryland crops enterprise				
Gross income	4,270	3,600	2,240	-460
Net income (profit)	2,250	1,570	900	-460
Net income drop (%)		30%	60%	120%
Profit/investment (%)*	43%	30%	17%	Negative
Loss in gross national income/household***		160		
Aggregate loss in GNI for Caprivi****		2,112,000		

* Annual private profit as a proportion of initial capital costs – a crude measure of return on investment

** The annual net contribution of the activity to the gross national income (GNI), measured in economic prices – a different measure from private profit (see text)

*** Loss in annual GNI due to HWC damage per household for floodplain crops only, as no measure of GNI loss for dryland crops was available.

**** Aggregate calculated, using GNI loss for floodplain crops only, and rural household population for Caprivi

Table 2: Costs of various levels of wildlife damage on household crop production activities in Caprivi, in terms of private returns per household, and in terms of economic value (value added to the gross national income) (N\$, rounded to nearest 10, 2004)

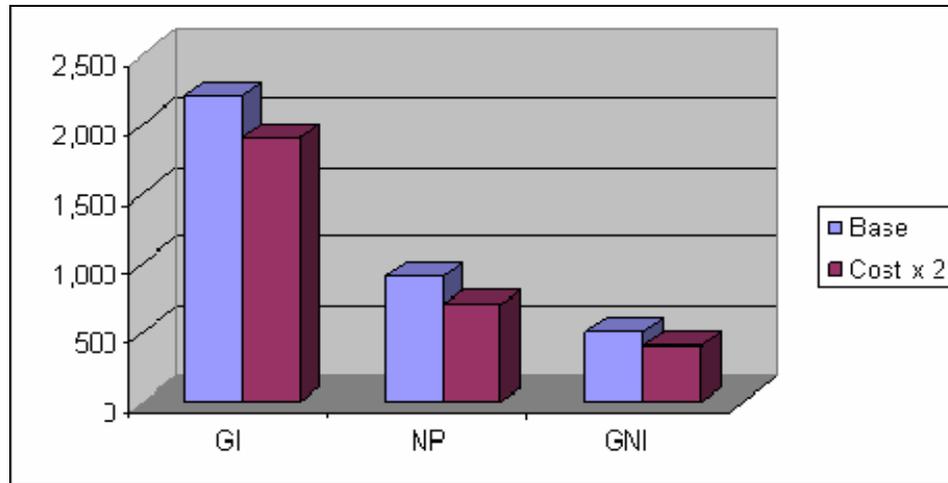


Figure 2: Impact of wildlife damage on Caprivi household floodplain crop production enterprise, in terms of gross income (GI), net profit (NP) and rounded contribution to gross national income (GNI) (N\$, 2004)

	Base	Sensitivity analysis		
	Losses x 1	Losses x 2	Losses x 3	Losses x 5
Ngamiland livestock enterprise				
Gross income	17,260	16,990	15,890	13,710
Net income (profit)	5,170	4,900	4,080	2,990
Net income drop (%)		5%	21%	42%
Private IRR (%)*	12%	11%	9%	7%
Value added to GNI**	1,010	750 (a drop of 26% from base value)	-60	-1,130
Caprivi livestock enterprise				
Gross income	20,920	20,290	17,780	12,760
Net income (profit)	18,080	17,460	15,580	13,060
Net income drop (%)		3%	14%	28%
Profit/investment (%)***	31%	30%	27%	22%
Loss in gross national income/household ****		260		

Aggregate loss in GNI for Caprivi *****	3,432,000		
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* Internal rate of return (IRR) to the household's investment in the enterprise over ten years – a relatively sophisticated measure of return on investment

** The annual net contribution of the activity to the gross national income (GNI), measured in economic prices – a different measure from private profit (see text)

*** Annual private profit as a proportion of initial capital costs – a crude measure of return on investment

**** Loss in annual GNI due to HWC damage per household for Ngamiland enterprise only, as no measure of GNI loss for Caprivi enterprise was available.

***** Aggregate, calculated before rounding of table figures, using GNI loss for Ngamiland enterprise only, and rural household population for Caprivi

Table 3: Costs of various levels of wildlife damage on household livestock production activities in Caprivi and Ngamiland,, Botswana, in terms of private returns per household, and in terms of economic value (value added to the gross national income) (N\$, rounded to the nearest 10, 2004)

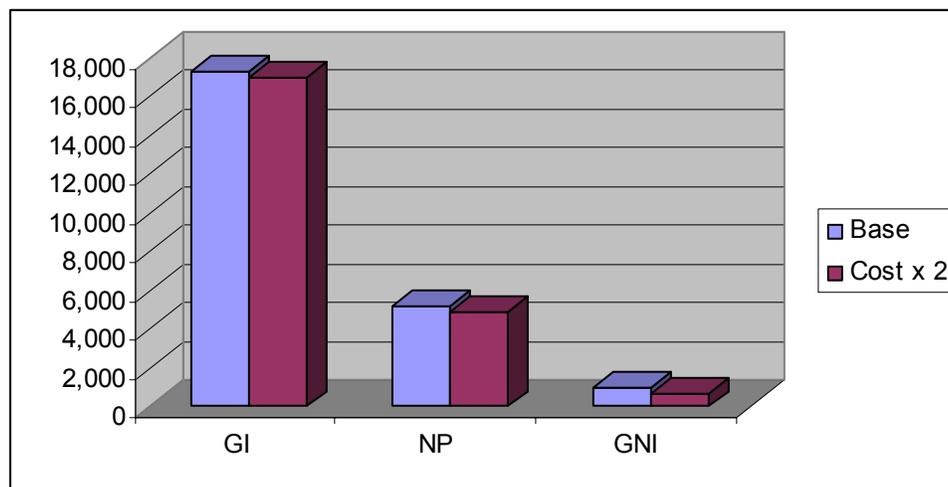


Figure 3: Impact of wildlife damage on Ngamiland, Botswana household livestock production enterprise, in terms of gross income (turnover), net profit and contribution to gross national income (N\$, 2004)

	Base	Sensitivity analysis		
	Losses x 1	Losses x 2	Losses x 4	Losses x 8
Mayuni conservancy				
Gross income	1,605,620	1,349,290	676,050	-830,980
Net income (profit)	521,420	265,080	-151,820	-985,610
Community income*	1,146,880	729,990	313,090	-520,710
Comm. Income drop	-	36%	73%	145%
Community IRR**	220%	123%	38%	Negative
Value added to GNI***	1,346,430	975,880	605,320	-135,800
Salambala conservancy				
Gross income	1,197,640	873,390	383,440	
Net income (profit)	209,440	-114,810	-280,500	
Community income*	666,900	342,640	18,390	
Comm. Income drop		49%	97%	
Community IRR**	40%	0.6%	Negative	
Value added to GNI***	823,080	534,870	246,660	

* Community income is a measure of total annual net benefits to community members in conservancy, including conservancy net income (profit), salaries and wages, conservancy dividends

** Internal rate of return (IRR) to the community's investment in the conservancy over ten years – a relatively sophisticated measure of return on investment

*** The annual net contribution of the conservancy to the gross national income (GNI), measured in economic prices – a different measure from net income or profit (see text)

Table 4: Costs of various levels of wildlife damage to crops and livestock in two community-based conservancies in Caprivi, in terms of impact on conservancy net income and community returns, and in terms of economic value (value added to the gross national income) (N\$, rounded to the nearest 10, 2004)

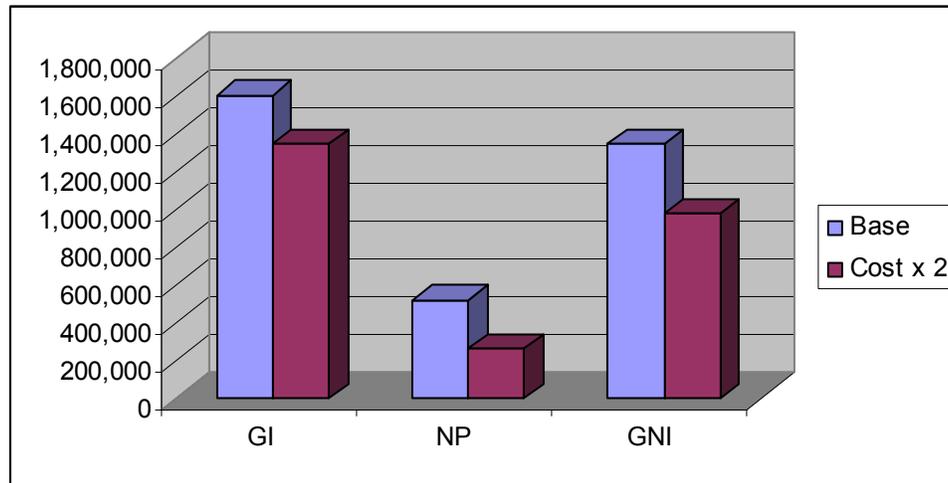


Figure 4: Impact of wildlife damage on Mayuni community-based conservancy in Caprivi, in terms of gross income (GI), conservancy net income or profit (NP), and contribution to gross national income (GNI) (N\$, 2004)

Household Level Costs and Benefits from Wildlife

The analysis of the impact of levels of HWC damage on average household crop production enterprises, provides an indication of the costs of HWC at household level. It is clear, from Table 2, that if current wildlife damage costs are doubled, then the private net income or profit enjoyed by a household crop enterprise drops by some 30%. If the wildlife damage costs are multiplied five times, as might well be the case in those areas of Caprivi which suffer extreme damage (see above), then household crop enterprises become entirely non-viable in terms of private net returns.

Table 3 and Figure 3 show the impact of average HWC damage on the average household livestock enterprise. Here, the impact on household welfare of a doubling of livestock losses caused by wildlife is smaller than it is with the crop enterprises. The private net income enjoyed by a livestock-keeping household in Caprivi drops by some 3% to 5% and damage can multiply some 5 times before private returns to livestock keeping become marginal.

It is difficult to measure the impact of HWC losses on total household income, since, as has been mentioned above, the data on household income in Caprivi are poor. It was estimated, above, that crop and livestock losses reduce household gross income by an

average amount of N\$543 (US\$78). This amounts to some 7% of the estimated average *cash* income of households. Another approach, albeit incomplete, is to determine the degree to which average net income (profit) losses due to HWC reduce the average total net income (profits) that households derive from natural resources use. This is possible for the eastern floodplain area of Caprivi, where Turpie et al (2000) measured the average net incomes that households derive from use of natural resources. Households in the floodplain area produce net income from natural resources including livestock (40%), crops (21%), fish (22%) and wild plants (17%). Average HWC losses to net incomes for livestock (5%) and for floodplain crops (28%) would reduce the households' average total natural resource-based net income by some 8%. These values include all consumed and sold natural resources production, but exclude household income from pensions and employment, which although not measured accurately, can make up some 25% to 40% of total household income.

There are no data to estimate accurately the benefits currently accruing to *households* (as opposed to communities) from CBNRM. This appears to be highly variable spatially, and depends partly on whether conservancies disburse income directly to households or not. Direct comparison of household costs and benefits from wildlife is not possible at present. The value to livelihoods of maintaining wildlife is considered in more detail below.

Community Level Costs and Benefits from Wildlife

The analysis above provides an indication of the relative values of wildlife costs and benefits for Caprivi communities. The community project (conservancy) models used in the analysis above (Table 4 and Figure 4) measure the net contribution that a typical conservancy investment makes to community income. 'Community income' in Table 4 is the total net income received annually by conservancy members, and it includes net income (conservancy profit), salaries and wages, as well as dividends paid to conservancy members. If communities suffer double the average base level of HWC damage, then their net incomes could drop by between 35 to 50%. If they suffer more than four times average HWC damage levels, their conservancy incomes are likely to become negative. This also applies to the internal rate of return (IRR) enjoyed by the Mayuni community as a result of its investment in the conservancy. However, the IRR enjoyed by the Salambala community drops below an acceptable level with only a doubling of HWC costs.

Community income in Table 4 measures the net benefits that communities derive from wildlife through CBNRM. Thus the impact of a doubling of the average levels thus amounts to some 35 to 50% of the private benefits that wildlife brings to communities. The impact that average HWC costs have on the community's return on investment in wildlife use is particularly useful in showing whether Namibia's policy of internalising HWC costs is viable. While both community wildlife use conservancies earn positive returns on investment with base levels of HWC, a doubling of these costs has a different effect, depending on how resource rich the conservancy is. Mayuni, with a rich stock of wildlife resources, can withstand up to four times the average levels of HWC, while Salambala, with poor wildlife resources cannot withstand even a doubling of HWC costs. Generally the results of this analysis suggest that, at the community level, wildlife income through conservancies outweighs the costs of HWC. The policy of internalising HWC appears to have economic merit.

Regional and National Level Costs and Benefits from Wildlife

The analysis above provides measures of the impact of HWC damage on crop and livestock incomes in terms of gross national income (GNI). From Table 2 it can be calculated that the average impact of crop damage per household for floodplain crops results in a loss of some N\$160 (US\$ 22) in terms of gross national income. If the wildlife damage costs are multiplied five times, as might well be the case in those areas of Caprivi which suffer extreme damage (see above), then the household crop enterprise becomes entirely non-viable economically. The aggregate economic impact of crop damage by wildlife in Caprivi is some N\$2.1 million (US\$ 294,000).

From Table 3 it can be deduced that, in terms of contribution to gross national income, average loss per livestock-keeping household amounts to some N\$260 (US\$ 36) per annum. The aggregate impact of HWC damage to livestock enterprises in Caprivi, amounts to some N\$3.4 million (US\$ 476,000).

The conservancy models applied in Table 4 and Figure 4 provide measures of the contribution that CBNRM conservancy initiatives make to the gross national income, as well as the impact of HWC damage on this contribution. Thus it is possible to directly compare the costs of wildlife (HWC) with the benefits of wildlife (CBNRM) in terms of national income (GNI). Although a doubling of HWC costs reduces the contribution of conservancies to the gross national income by some 35 to 50%, conservancy economic viability is retained even under conditions of up to four times base HWC cost levels.

Measuring the Differential impacts of HWC

The economic analysis above provides useful data on the general impact of HWC on households in Caprivi and the local economy. However, there will be differential impacts according to the status of individual households that are not captured by such analysis. Elephant damage to the crops of poor small producers will have a higher impact than similar damage to the crops of a more wealthy family with larger crop lands. Crop damage will also have a higher impact on all families affected during drought years. Murphy *et al* (2004) point out that not all crops would necessarily be sold, and many people in Caprivi depend upon crops for consumption. This means that crop losses to elephants therefore have important implications for household food security. Despite ambiguities and problems with the data, it is clear that elephants do cause significant economic losses to many households in Caprivi every year and this causes hardship. However, the extent of this hardship is also not well documented and is difficult to measure. For example, a family might claim to a researcher that it will starve because elephants have destroyed their crops for the year, but in reality social networks are likely to ensure that the family does not starve. Clearly though, the family will become more vulnerable to events such as drought, will need to find more cash from other sources to pay for things such as school hostel fees and will suffer other hardships. There is a need for more detailed, systematic and nuanced research on these issues.

It is difficult to place a value on injury or loss of life and in Caprivi the number of injuries and deaths has risen from one in 2001 to seven in 2005.

Data from other regions

Data is available from different sources on economic losses to farmers from HWC in communal areas north of the Etosha National Park (ENP) and in Kunene Region. Mfuno *et al* 2005 estimated the economic loss to farmers of livestock killed by predators north of the ENP in a 270 km long and more or less 30 km wide stretch from January to July 2005. Values for stock losses were based on local livestock prices. Farmers lost 169 cattle, 249 goats, 17 sheep, 59 horses/donkeys, and the total cost of the losses was N\$275 050 (around US\$ 39 404).

In 12 conservancies in northern Kunene Region in 2005 the number of livestock killed by predators as recorded by the event book system was 1 437, most of which were probably small stock. The value of the animals killed is estimated at between N\$1.5 million (US\$ 214 890) and N\$2 million (US\$ 286 520) (Peters 2006). The type of damage to water points and the extent of damage to crops were not recorded so it is not possible to assign a value to this.

Value to livelihoods of maintaining wildlife

There is sufficient evidence to suggest that despite the problems caused by elephants and predators, rural people in conservancies value wildlife. The reasons are varied and for most people the decision to tolerate wildlife is based not only in terms of financial costs and benefits but also includes aesthetic values, and sense of ownership and empowerment (Jones 2001, Jacobsohn 2003). Clearly financial considerations play an important role, particularly where households and individuals are benefiting in this way. In the Nyae Nyae Conservancy in the North-East for example, people (amongst the poorest in the country) said elephants damaged infrastructure, compete with people for bush foods and are dangerous. However, “despite widespread fear, people said they wanted to live with elephants because they represented income and employment through tourism and trophy hunting. Most people said that, given the choice, they would prefer to live with elephants than without them” (Matson 2005).

The following data from NACSO (2006) shows the overall level of direct benefit to households in 2005 excluding employment: In 2005 cash disbursements to conservancy members totalled N\$450,217 (US\$ 64,498) and were made in five conservancies. The payments were made directly to members or to villages in areas where the number of members was too large to make individual payments viable. Nyae Nyae Conservancy paid out N\$300 (US\$ 43) to each of its 750 members, while Salambala made cash payments to 19 villages totalling N\$28,500 (US\$ 4,083) in 2005 from funds generated by its trophy-hunting contract. Twyfelfontein Uibasen made its first cash payment to members, disbursing N\$157,377 (US\$ 22,546) to the households of its approximately 60 members. Mayuni distributed a total of N\$24,000 (US\$ 3,438) to the three main villages in the conservancy while the King Nehale Conservancy paid out a total of N\$15,340 (US\$ 2,198) to members involved in the production of crafts and Kalahari Melon seed.

In addition, 17 conservancies that are covering between 85% and 100% of their own costs employ and pay 141 full-time and 26 part-time positions, while donor support covers the salaries of another 68 full time staff. Conservancy funded jobs have increased more than threefold from N\$480,906 (US\$ 68,895) in 2003 to N\$1,660,758 (US\$ 237,920) in 2005. There are 355 full-time and 1,029 part-time people employed by joint ventures and community-based campsites, other tourism enterprises, and trophy-hunters in conservancies.

It is difficult to provide a complete analysis of the value of wildlife to livelihoods at the household level because not all conservancies make direct payments to households, many of the benefits are provided through social projects and many are intangible (such as empowerment and capacity building). Existing research on the impacts of HWC on livelihoods (e.g. Murphy *et al* 2004) indicates that while some households suffer considerably, the income generated by wildlife through conservancies does not always reach the affected households (see also sub-section 5.3.4 below). This is partly because the full potential for generating income from wildlife is not being realised and partly because the conservancies themselves do not necessarily target the people most affected by HWC.

This situation also poses a potential threat to existing conservation gains. Attitudes could change if some of the constraints to generating more income from wildlife are not adequately addressed. In Caprivi for example, the benefits that rural people receive from elephants are small and the number hunted as trophies and problem animals is low. Although, as stated above, HWC costs are not more than between 35% and 50% of the benefits that wildlife brings to these communities, the benefits reaching certain individual households subject to severe HWC are insufficient to off-set losses caused by elephants. But given the elephant numbers there is potential for much greater income to be derived from elephants through increased off-take on a fully sustainable basis. Martin (2005:38) suggests that this situation is a potential 'time bomb' with conservancy members adopting a wait and see attitude: "The recent rapid increase in the number of elephant in the Caprivi is probably due to a temporary tolerance of elephants while the conservancies are in their formative stage. But these communities will be evaluating whether a commitment to wildlife as a land use is worthwhile and, unless elephants contribute a great deal more to livelihoods, the present forbearance is likely to disappear."

Although the direct financial benefits to households from CBNRM in Namibia are relatively low and hard to determine, at a conservancy level financial benefits are substantial and easy to calculate. In 2005, the total income generated in Namibia's conservancies was N\$20.1 million (~US\$2.9 million) (C. Weaver *Pers.Comm.*) This income, as well as the governance and other structures developed as part of the CBNRM approach have generated the following positive impacts in poverty reduction in Southern Africa (Jones, 2004):

- generating discretionary income at community level for social welfare or other purposes such as infrastructure development
- providing jobs and additional income for some residents
- increasing household and community assets
- providing land use diversification options in semi-arid and arid areas
- providing livelihood diversification options for some residents
- building skills and capacity
- empowering marginalised rural people through devolved decision making, fiscal devolution, improved advocacy, institutional development
- supporting local safety nets
- promoting sustainable natural resource management (i.e. building up the resource base as natural capital)
- strengthening or building local institutions for common property resource management and driving local development.

The WWF report *Species and People: Linked Futures* (WWF 2006) indicates how CBNRM in Caprivi is contributing to increasing community assets, and delivering on four of the eight Millennium Development Goals (MDGs), the framework by which the international community intends to halve global poverty by 2015. The MDGs that CBNRM is demonstrably delivering on in Namibia are:

- Eradicate extreme poverty and hunger
- Gender equity
- Environmental sustainability
- Partnership for development

The conservancy committee members are learning to adhere to general accounting procedures, to develop budgets, and are learning a variety of different skills. Developing resource management and utilisation skills is helping the communities to maintain effective governance of natural resources and to build social cohesion and networking. Local people are learning a variety of enterprise skills and how to negotiate with the private sector over forming joint venture tourism operations.

General Conclusions

The analysis above leads to several important conclusions. While it is not possible to measure the financial cost of HWC to the government, it is possible to estimate the costs to the economy, to conservancies and to households. We do not have data that can give an indication of the value of total crop and livestock losses to HWC annually. It is also dangerous to make extrapolations nationally as the problems are different in different parts of the country. However, the data presented above suggests that the costs of HWC to communal area farmers in Namibia (Kunene, North of Etosha and Caprivi) could be around N\$7 million (US\$1million) annually. The economic analysis above indicates a number of important points regarding human wildlife conflict in Caprivi.

- The impacts of such conflict on household welfare and livelihoods can be severe in the extreme situations where people are most exposed. This points to the need for continued research and development of local mitigation mechanisms, including physical deterrents, as well as insurance. It also points to the need to ensure that benefits reach the households that are affected.
- There are real costs to conservancies as enterprises, but the overall income to conservancies is greater than the losses due to HWC.
- It is generally apparent that the private and economic benefits associated with wildlife in Caprivi (as measured in the returns to CBNRM) tend to outweigh the private and economic costs in terms of crop and livestock losses. Thus the Namibian government policy of promoting a system of CBNRM where wildlife can pay for itself, and communities can internalise both the costs and benefits from wildlife appears to be economically sound.

While CBNRM makes *economic* sense at conservancy level or the level of the regional and national economies, more needs to be done to ensure that it makes *financial* sense at the household level. The ways in which this can be done are considered in sub-sections 5.3.4 and 5.3.5.

4. DYNAMICS AND DRIVERS OF HWC

This section considers Human Wildlife Conflict at three different levels, the micro (local), the meso (regional) and the macro (national and international levels). Although HWC occurs at the local level, it is influenced by a number of factors at the meso and macro levels. These factors include regional land use planning that does not take into account the potential for HWC, national economic policies, and international conventions and trade policies. These and other factors are analysed in terms of their effect on the local level.

4.1 Micro level

At the local level, rural people have to live with wildlife and their ability to deal with problems caused by wildlife is shaped by national laws as well as local circumstances. This sub-section considers some general issues regarding HWC at the local level, the constraints facing conservancies in addressing HWC and issues affecting people living outside conservancies.

4.1.1 Key issues at the local level

Although legally farmers are able to kill predators, including lions, that threaten people or livestock, in practice, many rural people cannot afford firearms or cannot meet the legal security requirements for the safe storage of firearms (Jones 2002, Mfune *et al* 2005). Furthermore, whilst wildlife that is posing a threat to crops may be killed if the crops were fenced, specially protected species such as elephants are exempt. In some conservancies community game guards have been appointed and issued with firearms and they try to deal with problem causing predators on behalf of the community. However, there is usually a time delay before the game guards can reach the scene and the problem causing animal might have gone.

The legislation does make provision for the Minister of Environment and Tourism to declare a particular elephant or lion as a 'problem animal' that may be destroyed either by MET or by a professional hunter¹¹. However, the process takes too long to be effective. A villager in Caprivi might have to travel long distances to report the problem animal at a MET office. The information has to be relayed from the local MET office to the Regional Head office and from there to a director in Windhoek who then has to make a submission to the Minister. By the time permission is given and the message relayed back to Caprivi the problem causing animal is long gone, and in the case of elephants, could even be in a different country (Jones 2002). Mfune *et al* 2005 suggest it may take from a few weeks to six months for such a problem animal to be declared by the Minister.

Another important feature of HWC at the local level is the significance of perceptions. Although Stander (2005) suggests that the increase in HWC incidents could be due to better monitoring and reporting systems, there is a clear perception among key stakeholders (communities, NGOs, MET, and politicians) that HWC is increasing and that "something needs to be done". At local level, perceptions may reflect the 'catastrophic' nature of incidents rather than a true perception of the overall levels of

¹¹ The idea of using a professional hunter is so that in the case of a conservancy, the shot animal can bring some income and help offset losses caused by wildlife.

damage. Most of the sometimes bitter complaints about HWC from the Ehirovipuka Conservancy to MET HQ in Windhoek concern lions, yet according to Stander (2005) lions only account for about 11% of incidents whereas hyenas account for around 50%. Stander explains this by suggesting that even occasional conflict with species such as lions and elephants can be devastating and that “the psychological and emotional impact on the local communities during conflict involving these two species may be extensive and overrule all statistics” (Stander 2005:12).

Another possible explanation for the depth of feeling against lions in Ehirovipuka is that people are angry with the MET because they gain no benefits from the neighbouring Etosha National Park and a neighbouring wildlife and tourism concession area where most of the lions come from. People were removed from the park in the past, feel hemmed in by the park and the concession area and want the park boundaries to be moved. Lions could be a useful political stick with which to beat the government with regard to a larger land issue. Situations such as this point to the need for HWC research that not only looks at the behavioural ecology of problem causing species, but also takes into account underlying socio-political issues.

Similarly some observers believe that the extent of crop damage by elephants is often exaggerated by villagers, frustrated largely because they feel powerless to take any action that will solve the problem (G. Owen-Smith *Pers. Comm.*). It is unlikely that the losses are exaggerated in order to claim greater compensation as the Namibian government does not provide compensation for crop or livestock losses. It is more likely that people are making a political point.

4.1.2 Conservancies

Although established under legislation to enable local communities to manage wildlife, conservancies face a number of constraints with regard to HWC. The current MET policy of having to request the Minister to declare a problem animal has a number of implications for conservancies themselves. Jones and Butterfield (2001) suggested that communities in Caprivi were increasingly starting to view wildlife as belonging to the conservancies rather than to the state. As a result they expected the conservancies to deal with problems caused by the conservancies' animals. However, conservancies do not have the authority to shoot an elephant if necessary and have to wait for permission from MET for the elephant to be destroyed. As a result of their inability to shoot an elephant and at that time to provide the means to offset the losses caused by the elephant, this situation was undermining the support of the conservancies by their members. The innovative self-insurance scheme introduced in some Caprivi conservancies has helped to restore support for conservancies (see sub-section 5.3.5 below) in this regard, but conservancies still need to be able to take measures themselves rather than waiting for MET permission.

Another problem faced by conservancies is lack of secure land tenure. Although the National Land Policy makes provision for groups of people such as cooperatives and conservancies to become land holders, this approach is not strongly backed up by the legislation, which followed, the Communal Land Reform Act. When conservancies develop local land use plans and zone specific areas for wildlife and tourism, it becomes difficult for them to exclude other people from outside the conservancy from moving into these zoned areas. If outsiders move their livestock into areas zoned by conservancies

for wildlife, this is likely to lead to conflict with predators in these areas. Within conservancies, with the support of local traditional leaders who have some authority over local residents, it is generally easier to enforce such zones and reduce such conflicts.

However, without support from government levels above, even internal enforcement of management plans and zoning can be problematic. In Caprivi the Salambala Conservancy on the Chobe River bordering Botswana has set aside about 14 000 ha as a core wildlife area where there should be no livestock and no settlement. The majority of people living within this area agreed to move out but three families have remained. They complain that lions moving in from Botswana kill their livestock. In this case a mixture of local tribal and party politics and competition between individuals made it difficult for the conservancy to enforce its zonation. The conservancy appealed to MET and other government agencies for support, but although government officials requested the three families to move, they did not follow up on these requests.

National legislation does provide conservancies some degree of protection against undesirable land uses being introduced by outsiders. The Communal Land Reform Act requires Communal Land Boards (CLBs) to take into account any management or utilisation plans developed by conservancies when allocating land leases. The CLBs may not grant a lease for a purpose that would contradict such plans. There is also provision in the Act for conservancies to be represented on land boards. Some land boards have been acting in accordance with this legislation and have taken into account conservancy management and zonation plans, while others have ignored this provision because of a lack of information or a lack of understanding of the law (Jones and Kakujaha-Matundu 2005). Measures are being taken to address this situation through the provision of training and information to land board members.

4.1.3 Outside Conservancies

Although conservancies now cover most of the main wildlife areas on communal land, there are still communities which suffer from HWC, but which have not formed conservancies. Currently these communities are able to make use of existing provisions in legislation that allow them to defend their property and persons against predators and elephants (see sub-section 4.1.1 above). As in the conservancies, if there is a persistent problem causing animal that is a threat to people or livestock, then the MET can declare it a “problem animal” and it can be destroyed. However, communities that are not formed into conservancies do not have the same institutional platform for dealing with HWC more comprehensively. Neither do they have access to the benefits that come from conservancies that can act as mitigation of HWC.

The MET’s draft national policy on HWC management recognises that conservancies cannot be the only vehicles for addressing the problems on communal land. It makes provision for other institutions and organisations that meet certain conditions to develop local HWC management plans and to apply to MET for authority to deal with certain problem animals themselves and derive benefits from the use of products from these animals. However, the main vehicle for gaining significant benefits from wildlife will still be through conservancies. This is because one of the incentives to form conservancies will be the opportunity to gain these benefits.

4.2 Meso Level

4.2.1 Regional development and Land Use Planning and coordination between regional and other levels

Regional development planning is the responsibility of the 13 Regional Councils through Regional Development Coordinating Committees (RDCCs) but lack budgets for implementation. Regional Land Boards administer communal land titles and allocation. They endorse and register allocations by traditional leaders for residential and crop growing land and allocate leases for commercial forms of land use such as irrigated crop growing, tourism etc. Apart from municipalities in urban areas there are no government bodies with decision-making authority below the regional level. There are Constituency Development Committees (CDCs) and Village Development Committees (VDCs), but these have advisory functions only and no means of generating income.

As indicated above, land use planning at the national and regional levels do not take into account issues of HWC. Plans are made without considering whether there are existing uses of the land based on wildlife, or whether proposed agricultural developments will increase the level of HWC. Insufficient consideration is given to the economic benefits of different land uses and to the optimum use of land given the prevailing environmental conditions.

An example is the programme of allocating “unutilised” communal land to small-scale commercial farmers developed by the Ministry of Lands and Resettlement (MLR). A large block of such land has been designated for individual farmers to the west of the Kaudom Game Reserve in Kavango Region. This allocation has been approved by the Communal Land Board for the region and was originally made by the land and farming committee of the local traditional leadership. The farms will be 2 500 ha in size and allocated to individuals under leasehold rights. The game reserve is unfenced and there is considerable movement of wildlife (particularly of elephants) westward along drainage lines during the wet season. According to Jones and Kakujaha-Matundu (2005:23): “There is thus considerable potential for increased human-wildlife conflict in this area including the destruction of crops and infrastructure by elephants and livestock losses to predators. Further, the allocation of this land as farms considerably diminishes the opportunity to develop economically viable wildlife and tourism enterprises using the Kaudom Game Reserve as a core wildlife area and tourism attraction”.

For some years the MET has allocated hunting concessions in the communal land west of Kaudom and the new farming developments will considerably diminish the future viability of these concessions. Further, there have also been moves to develop a conservancy in the same area where the land has been allocated for small-scale commercial farming.

According to a consultant’s report on unutilised land suitable for small-scale commercial farming in Kavango (IDC 2002, cited in Jones and Kakujaha-Matundu 2005) another block of land has been designated for commercial farming to the north east of the Kaudom Game Reserve and along the Botswana border. This area of land is adjacent to the Muduva Nyangana registered conservancy and adjacent to an emerging conservancy. It is possible that part of Muduva Nyangana falls within this designated commercial farming area.

The impacts of the “small-scale” commercial farming alongside Kaudom Game Reserve could be considerable. The area is one of the last strongholds of the wild dog in Namibia. These animals roam over vast territories and are not contained within the park. Wild dogs could come into increased conflict with new livestock farmers and their numbers could be considerably reduced.

In addition to all the above reasons why the establishment of commercial farms next to unfenced wildlife habitat is inappropriate, the most critical factor to note is that there is no economic justification for this kind of land-use planning. As also stated in section 3.1.4, agricultural enterprises based next to unfenced wildlife reserves can be expected to suffer HWC losses 5 times higher than base levels. For dryland crop enterprises, this would result in a 120% drop in net income, and make the enterprise economically unviable.

An option to reduce HWC losses and ensure economic viability of the farms would be to fence the Kaudom reserve. However this could cost in the region of US2 million that probably would have to be paid by either the government or an International donor. It is not clear what the impact of this would be on the elephant population of around 4,000. As this population has been growing mainly through migration from other areas, the impacts could be considerable.

Therefore, both in terms of economics and environmental sustainability, it is entirely inadvisable to establish commercial farms in the vicinity of wildlife habitat. These enterprises would have far greater economic success if they were established in other areas further removed from unfenced wildlife areas. In order to avoid inappropriate land use planning such as this, it is critical that the government bodies with a remit for land-use planning at all levels take current and potential future HWC into account in their decision making. This will ensure increased potential for income generation from wildlife, and increased economic success for new agriculture developments. Section 5.6 outlines a proposed mechanism to secure these important changes.

4.3 Macro level

4.3.1 International Agreements

HWC must to some extent be driven by any forces which result in the enhancement of wildlife damage on crops, livestock, water facilities, or human security. The EU/Coutonou livestock protocol, which gives some access for Namibia and other ACP countries to the protected EU beef markets, artificially enhances the economic viability of the livestock sector. Similarly, in the past, livestock sectors in southern Africa have received domestic subsidies which have enhanced their competitive advantage relative to the natural resources and wildlife sectors. This has been measured in Botswana where both the external benefit of EU market access, and domestic subsidies on inputs and prices have been shown to be substantial (Barnes et al 2001). The details of such subsidisation in Namibia have not been examined in this way. This would require a detailed analysis of past and present livestock subsidies and taxes in both the commercial and communal land settings, in the context of a study on the economics of livestock production and the livestock sector as a whole.

Wildlife use activities, and investment in wildlife production have in contrast tended to receive no subsidisation in southern Africa. On the contrary, the tendency for the central state to retain ownership over wildlife resources has acted to provide disincentives to the investment in and use of wildlife. Custodial rights to wildlife resources are currently bestowed selectively on private and communal landholders in Namibia, but these are only partial, as landholders are still required to obtain permits for many transactions. Delays and inefficiencies in government permit allocation mean that many domestic bureaucratic obstacles reduce the competitive advantage for wildlife relative to livestock. International regulations affecting trade in wildlife products play a similar role. Given that elephants are a major contributor to HWC, the case of elephants and the Convention on International Trade in Endangered Species (CITES) is illustrative.

Elephants in Namibia have the potential to generate economic value through four main uses: as a primary attraction for wildlife viewing tourism, as a target for sport hunting (trophy hunting), as the basis of cropping or culling activities for ivory, hides and meat, and to a limited extent in sale of live animals. Namibia is a signatory to CITES by which legal international trade in certain wild species including elephants is regulated. After massive illegal trade in ivory in the 1970s and 1980s caused dramatic declines in elephant populations throughout most of Africa, in 1990 African elephants were placed on CITES Appendix I, which prohibits all international trade of (in this case) elephant products, for primarily commercial purposes. Namibia's elephants have since been transferred to CITES Appendix II (which means that limited trade in products is allowed, pursuant to CITES requirements). Additional restrictions on trade in elephant products were adopted by the CITES Parties, and more recently, particularly for Namibia, there has been some lifting of restrictions on international ivory trade, while others are still pending. In the case of Namibia, the CITES Parties have approved the non-commercial (not for re-export) export of individually marked and certified "ekipas" - traditional ivory carvings by two ethnic communities - as well as the commercial trade in elephant hair and leather goods. Furthermore, Namibia, Botswana, and South Africa were conditionally approved at CITES CoP12 in 2002, to sell specified registered stocks of raw ivory through a one-off sale to approved "trading partners", once certain conditions were met. These conditions are intended to ensure that resumed ivory trade does not negatively impact on the threatened elephant populations of Asia and West and Central Africa, where significant unregulated domestic ivory markets exist. The conditions have been met for the African countries, and the realization of the sale is pending approval of the trading partners (Japan, and possibly China), and verification of certain data from the MIKE (Monitoring of Illegal Killing of Elephants) database system.

Hunting trophies in Namibia can be exported, and this is consistent with CITES requirements. At present sport-hunting quotas are relatively low because the safari industry would not be able to effectively and economically utilise a bigger quota, as quotas for other species limit the possible number of hunting packages available. These quotas are set by the government of Namibia (not by CITES). Although the industry also feels that increased quotas would threaten the desired trophy size, the possibility of an increase while remaining within acceptable limits on trophies should be tested.

CITES regulates international trade, but does not regulate activities involving wildlife management within Namibia, and it is therefore possible for Namibia to undertake management practices such as culling, cropping, translocation and sport-hunting of elephants without the approval of the Convention. However, as CITES regulates the international trade in elephant products, and internal markets within Namibia are limited,

CITES does in effect limit the consumptive use of elephants in Namibia. Although the sale of hides has been profitable in the past, the current profitability of this, given the high recovery costs and uncertain markets, is not known. A study in Botswana (Barnes 1996) provided evidence to show that the effect of CITES controls has been to halve the potential economic use value of elephants. It is possible that similar results would be found for Namibia.

4.3.2 Transboundary issues

Elephants in north eastern Namibia are part of a much larger population that ranges across several countries and are part of what is seen in the region as an increasing problem of over-population. According to Cumming and Jones (2005: i) both human and elephant populations in southern Africa have increased 20-fold over the last century resulting in “compressed and fragmented elephant ranges, increasing human-elephant conflict and an escalating elephant overpopulation problem”. Overall elephant numbers have increased from a few thousand in 1880 to around 300,000 in 2005. Botswana, with approximately 150,000 elephants, carries the largest elephant population in the world, followed by Zimbabwe with more than 100,000 elephants. Half of the Zimbabwe elephant population lives in 22,000 km² in the north western region of the country, which is contiguous with Botswana. The combined population of about 250,000 elephant spills over into the Caprivi Strip in Namibia, into southwestern Zambia and southeastern Angola. This population is growing at about 5% per annum (Cumming and Jones 2005). Elephants from the Chobe National Park in Botswana move regularly onto the eastern floodplains of Caprivi in increasing numbers as communities have become more tolerant based on expectations of income through conservancies. This has led to increased crop damage in this area and an increased likelihood of injury or death to humans. Due to the transboundary nature of wildlife movements, there is a critical requirement to address HWC problems across international boundaries.

4.3.3 National policies and legislation

National policies and legislation do not adequately cover Human Wildlife Conflict issues and in some cases serve to exacerbate the problem. The following is a brief summary of the links between policy and legislation and HWC in Namibia across relevant sectors.

Wildlife:

In some respects the policy and legal framework allows farmers considerable leeway to deal with problem animals. The current legislation, the Nature Conservation Ordinance 4 of 1975 (GRN 1975) allows farmers themselves to deal with a wide range of animals that potentially cause livestock or crop losses. Predators such as hyena, jackal and caracal may be killed by farmers without a permit. However, a permit is required to kill predators such as lion, leopard, cheetah, wild dog and crocodile, all of which are protected species. A person may kill protected game without a permit in defense of human life to prevent a person from being injured or to protect livestock while the threat is occurring. The person, must, however, report the killing to the nearest police station of Ministry of Environment and Tourism office within 10 days. Farmers may kill wildlife that destroys crops without a permit, provided the area of land is adequately fenced. However, specially protected species such as elephant, rhino and hippo may only be killed without a permit if threatening human life. If the MET declares a particular animal to be a "problem" animal it may be destroyed, but in practice this takes too long to be effective. The specific problems encountered by local people in addressing HWC under the MET policy and legislation were considered in sub-section 4.1 above.

The policy of the Namibian government is not to pay direct compensation from state funds for livestock and crop losses. It has however, come under increasing pressure politically to provide some form of financial assistance to families who lose a family member to wild animals. In a few cases the MET has arranged for families to receive some funds to cover funeral and related expenses.

Agriculture:

Past direct and indirect government subsidies to agriculture have tended to promote livestock over wildlife as a land use in the absence of similar subsidies for wildlife. Direct subsidies have been phased out although cheap loans for black farmers wishing to acquire freehold farms perhaps also act as a livestock subsidy. As indicated above, more research is required to demonstrate the results of such subsidies and links to increased HWC. A substantial wildlife industry has developed on freehold land despite livestock subsidies and some support to farmers interested in wildlife (e.g. supply of game) has been provided by the state. It would be useful to compare the extent of subsidies in each sector and model what might have happened with wildlife as a land use if the playing field had been level.

Land:

The Ministry of Lands and Resettlement does not consider HWC issues prominently in its land use planning approaches if at all. In general, many politicians and government decision-makers do not recognise wildlife as a legitimate form of land use that can be economically productive, particularly in drylands such as Namibia. Land use planning therefore appears to be driven by the desire to promote crop farming and livestock as land uses, without necessarily considering the existing use of land for wildlife in conservancies and without considering the most economic forms of land uses based on land capability and climatic conditions. This leads to increased conflicts at the regional and local levels. Consideration of the impacts of these policies and recommendations to address them are provided in sub-section 5.6 below.

Water:

Under recent policy and legal changes local communities are now responsible for water point maintenance, whereas in the past government took this responsibility. Water point committees must be formed to manage and maintain pumps and other infrastructure and to consider how water can be allocated to local users. This approach means that in areas such as the North-West, water point committees are expected to pay for repairing damage by elephants. The water point committees are expected to raise their own funds from water users to carry out such repairs, but often local residents cannot afford this. In many cases local residents will approach the water authorities for assistance, but will be referred to MET if the damage was caused by elephants. However, as indicated above, the MET does not pay compensation for HWC losses and damage. Where conservancies have been formed and are generating sufficient income, there is potential for them to use funds generated by elephants and other wildlife to address water-related problems caused by elephants. Examples of how conservancies can and are doing this are provided in Section 5 below.

National Development policies

Namibia's National Development Goals as articulated in national Development Plan II (NDP II) are as follows:

- To revive and sustain economic growth,
- To create more employment opportunities
- To reduce inequalities in income distribution; and
- To reduce poverty

The following are the strategies to achieve these goals:

- ✓ Sustainable provision and strengthening of enabling environment for economic growth and development
- ✓ Promoting environmental and ecological sustainability
- ✓ Developing Namibia's Human Resources, promoting, expanding and strengthening participatory development and equity
- ✓ Promoting, strengthening and sustaining good governance and democracy

✓ Expanding and strengthening Namibia's international role

Although NDP II recognises the ecological and climatic constraints to development in Namibia, implementation of plans for expansion of land under high value crops could lead to increased HWC. This is likely to occur if there is agricultural expansion in regions such as Caprivi and sufficient planning for reducing and preventing HWC does not take place.

Although HWC issues are not directly considered or addressed in national development policies, CBNRM is recognised as being able to contribute to national development goals. For example, The Namibian country report to the 2002 World Food Summit (MAWRD 2002) emphasised the need for environmental and sustainable development policies to take a stronger food security focus. It suggested that Community-based Natural Resource Management, agriculture and off-farm diversification approaches should be tested and need to be multiplied.

The role of tourism, community-based tourism and conservancies are recognised in the government's Poverty Reduction Strategy for Namibia. Action 25 of the National Poverty Reduction Action Programme (2001-2005) reads as follows: "The MET shall continue its efforts to establish conservancies. Through this programme, some 25 new conservancies will be established by 2005 (i.e. five each year) with 175 000 people benefiting individually and collectively. The MET, along with non-government stakeholders, will assist in the registration of conservancies, as well as with the provision of training in game and conservancy management" (GRN 2002).

According to Action 26: "The MET will assist rural and disadvantaged communities to establish community-based tourism projects, such as businesses and joint ventures".

These targets in the Poverty Reduction Action programme have already been met through activities funded by government and donors and implemented by government and NGOs.

The key provisions of national policies, how they affect HWC or intersect with wildlife policy, status of implementation and suggested changes are summarised in a matrix in Annex 4.

5. POTENTIAL SOLUTIONS AND THEIR IMPLICATIONS

The following sub-sections provide a variety of potential solutions for addressing HWC. Not all are applicable in all circumstances, or to all species. However, it is important that they are not applied in isolation. It is particularly important to ensure that prevention measures on the ground are linked to appropriate local level institutions, which in turn are nested within broader national policy and implementation frameworks.

5.1 Prevention measures

Local level land use planning

Conservancies carry out local level land-use planning (LUP) which is partly aimed at minimising HWC. Experience from Caprivi indicates that such planning, if effectively implemented, can be very effective in reducing the frequency of crop damage caused by elephants. Data from NACSO (2006) shows markedly different trends in two neighbouring conservancies – Kwandu and Mayuni. Kwandu (the conservancy with the highest frequency of incidents in Namibia) has continued to register increasing incidents over a number of years, but its immediate neighbour, Mayuni, recorded a dramatic decline in crop damage between 2003 and 2004 (see Figure 5). According to NACSO (2006): “The reduction in incidents in Mayuni Conservancy was probably due to the implementation of its zonation plan, which led to the relocation of people away from the Kwando River floodplains. While this case study needs further investigation, it suggests that the implementation of land-use plans is a key strategy for reducing incidents of wildlife damage”. The implementation of the zonation plan in Mayuni Conservancy has been facilitated by the strong traditional leadership under Chief Mayuni. The experience in these two conservancies indicates the need for traditional authorities and Communal Land Boards to take HWC into account when allocating and approving allocations of land for residential and agricultural purposes.

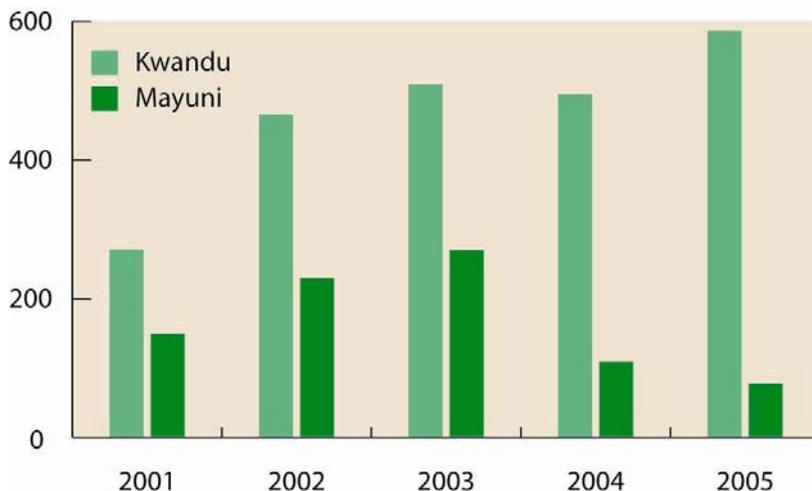


Figure 5. Changing trends in the number of incidents of crop damage (y axis) by wildlife in two neighbouring conservancies in east Caprivi between 2001 and 2005. (source: NACSO 2006)

Local HWC Management Plans

Many Namibian stakeholders have recognised the need for local HWC Management Plans that take into account local conditions and problems, identify local HWC management objectives, identify management strategies and actions, involve all relevant stakeholders, assign responsibility for actions and allocate funding. This need has been recognised in MET's draft national policy on HWC management and the policy aims to promote and support the development of such plans. There is much hope that such plans can provide the necessary framework to integrate different approaches and coordinate inputs of different stakeholders. With such a planning process, communities can begin to see the links between prevention and mitigation and understand the need to take a multi-faceted approach to HWC management including such actions as improved livestock management. Esterhuizen (*Pers. Comm.*) suggests that if livestock losses can be reduced through improved management, then this can reduce the burden on conservancy self-insurance schemes. A pilot process in line with the draft national policy proposals has begun with the Ehirovipuka Conservancy in Kunene Region. After an initial meeting between MET and the conservancy committee and conservancy members a draft set of actions has been developed that includes the following:

- Improved monitoring of lions and elephants in the conservancy and the neighbouring tourism concession and the neighbouring Etosha National Park
- Training of conservancy personnel in lion and elephant monitoring
- Conduct regular joint patrols of boundary fences (western ENP fence, concession fence) and upgrade the fences
- Expand the existing self-insurance scheme to include damage to gardens and establish a livestock herd to replace animals lost to predators
- Establish some reinforced cattle pens (kraals) in most vulnerable places
- Waterpoints vulnerable to elephants to be protected efficiently and conservancy to supply water to game to reduce conflicts
- Introduction of game species to enhance the tourism experience and increase numbers of natural prey species of predators
- Improve communication with the MET through agreed protocol so that problem animals can be declared quickly and offered to a trophy hunter or dealt with by MET
- Delegation to conservancy of authority to destroy problem animals (conservancy will use trained hunters)
- The conservancy to receive an elephant quota for trophy hunting and to benefit financially from any predators captured and removed
- Expand tourism enterprises in EC to increase income to EC and capacity to deal with HWCM issues

The MET will hold a further series of meetings with the conservancy committee and assist the committee to hold consultations with members to further develop and agree on the plan.

Artificial barriers

a) Fences

Electric fencing can provide a useful barrier to elephants around crop fields and gardens (O'Connell 1995, Hart and O'Connell undated). However, experience in Namibia so far indicates that while electric fences can successfully deter elephants from entering a specific area, they fail mainly for institutional reasons. In Kunene Region for example, the NGO IRDNC assisted conservancies to erect nine electric fences, none of which are currently functional. The main reasons for this failure are as follows (Esterhuizen, A. *Pers. Comm.*):

- i. Issues of ownership – the conservancy did not take responsibility for the fences, and expected the NGO to maintain them even though the fences had been signed over to the conservancy as their property
- ii. Issues of maintenance – due to the conservancy not taking responsibility for maintenance, key equipment was not cleaned and kept functional, breaks in the fences were not properly repaired, fences were not dismantled and stored properly at the end of the rainy season
- iii. Other issues - one conservancy wanted a longer fence to surround its gardens and as the NGO could not supply additional fencing, the conservancy never erected the fence.

In Caprivi the success of electric fencing also depended on the institutional commitment and capacity of the community to maintain the fence and equipment. O'Connell (1995) found that elephants usually found their way around the fences if they were not closed or narrowed at the ends as much as possible.

Stander (*Pers. Comm.*) suggests that electric fencing rarely works even in game reserves because of a lack of capacity to maintain them. He suggests that they only really work well in areas where intensive management can be applied such as in some private game parks. They could also work where a small fence is erected around a house to protect the house and garden. Owen-Smith (*Pers. Comm.*) has suggested that such small fences could work if powered by a solar panel that could provide electricity for the house, giving the inhabitants an even stronger incentive to maintain the fence and equipment.

For electric fences in Kunene Region the cost to cover an area of 5km² was approximately N\$ 15 000 (US\$ 2,149) including double wire, alarm, energiser, one solar panel, battery, regulator, insulators, protection box and tester Esterhuizen (*Pers. Comm.*).

Wire fences have also been used in the Kasika conservancy in Caprivi to keep crocodiles out of areas where livestock drink and where people use the river. The wire fences cost about N\$2 000 (US\$ 287) each, are easy to build and are more effective than traditional thorn fences. The result has been a reduction in livestock losses (R. Diggle *Pers. Comm.*) although because the area is subject to flooding, the method can only be used seasonally.

b) Protection of water points

Experience from the #Khoadi //hoas Conservancy and from the work of IRDNC in Kunene Region suggests that well-constructed walls using appropriate specifications can effectively protect water installations from elephant damage (Guibeb *Pers. Comm*; Esterhuizen *Pers. Comm*). Walls need to be at least two large rocks in width, and 1.8m high, to prevent elephants knocking the wall down or climbing over. The walls need to be a sufficient distance from water tanks and pumps to prevent elephants reaching the installations from outside the wall. If well constructed it can be possible to erect a wall without cement that can still keep elephants out.

The most successful model used in #Khoadi //hoas is where the walls meet the above specifications, and where the wall does not completely surround the main water tank, but allows elephants access to drink from the outside (see Figure 6). At the same time, there needs to be a separate tank for domestic water provision that is protected completely within the wall along with the water pump. Leaving a small gap in the wall for human access can work if the wall is sufficiently strong, but if the wall is weak elephants will enlarge the gap and gain entry. Human access can also be effected by using a ladder.

One of the problems with this model of humans and elephants sharing access to water at the same source, is that elephants might consume large quantities of water that have been pumped at the expense of the residents where a diesel pump is used. Esterhuizen (*Pers. Comm.*) suggests that if permanent springs with strong flow are located nearby it might not be necessary to allow elephants access to the water at the main tank¹². Further, a solar pump could be used to avoid the need to pay for diesel. The #Khoadi //hoas Conservancy provides diesel to households where elephants have stayed at the water point for several days, consuming large quantities of water, and sells diesel at a subsidised price for households to pump water for livestock and domestic consumption.

Elephant protection walls are probably one of the cheapest and most effective ways to protect any type of infrastructure in the North West due to the abundance of stone in most of the areas (Esterhuizen *Pers. Comm.*) The cost for protection walls varied greatly as it depended on the availability of stone close to the infrastructure, transport cost of stone, cement and labour. The cost varied between N\$ 5000 (US\$ 716) to N\$ 10 000 (US\$ 1,433) per site.

c) Chilli pepper fences

In Caprivi fences lined with a mixture of grease and chilli peppers are still being experimented with. Initial indications from Kasika Conservancy (see Kasika case study above) indicate that they can be effective¹³. In Kunene Region the NGO IRDNC and a number of conservancies will begin testing the use of chilli peppers shortly.

¹² However, there have been instances where solar panels for water provision have been stolen in Kunene and other regions, indicating that such installations need to be where people can to some extent guard the equipment.

¹³ Such fences have proven effective in other countries such as Zimbabwe and Mozambique.

d) Chilli “bombs”

Ground chilli is mixed with elephant dung and compacted into a brick mould and dried. The bricks are burnt along the edge of a field and the smoke acts as a deterrent to elephants. Initial indications from Caprivi are that this method can be effective in keeping elephants away from fields. More time is required to evaluate the method and to see whether elephants become used to the smoke.



Figure 6. Successful protection wall against elephant at a water point in #Khoadi //hoas Conservancy, Kunene Region, Namibia. The wall is strong enough to keep elephants out, high enough to keep them from stepping over, and far enough from the main installations within the wall, including the plastic water tank for domestic use, to prevent elephants reaching the infrastructure. However, elephants can drink from the reservoir on the right. Photo: Olga Jones.

Alternative water points for elephants

The provision of alternative water points for elephants away from the main source of water for livestock and domestic use has been tried in #Khoadi //hoas and by IRDNC in a number of other Kunene conservancies. In both cases there have been problems with the operation of such water points and this approach is not recommended (Guibeb *Pers. Comm*; Esterhuizen *Pers. Comm*). In #Khoadi //hoas, where alternative water points were provided for elephants, the main water points for people and livestock were not sufficiently well protected so the elephants used both and caused damage to the pumps and pipes at the main water point. Another problem was the availability of diesel to pump water for elephants or if a diesel pump was broken and no water available at the elephant drinking tank, then the elephants would cause damage to the main installations while seeking water.

The following were problems identified with the alternative water point supported by IRDNC (Esterhuizen *Pers. Comm*):

- i. Issues of ownership – the conservancy did not take responsibility for the alternative water points and did not appoint anybody to maintain or care for the tanks and equipment such as pipes; the community rarely scared elephants away from the original water point to teach elephants to go to the alternative water
- ii. Issues of maintenance – due to the conservancy not taking responsibility for maintenance, leaking pipes were seldom repaired immediately so elephants ripped up the pipes in their search for water; the tanks dried up and cracked because of a lack of water
- iii. Funding issues: Conservancies did not have enough diesel to pump water for both their livestock and the elephants.

Esterhuizen suggests that for alternative water points to work, they need to be away from settlements and function with solar pumps. Communities should agree not to settle at the water point or allow their livestock to drink there¹⁴.

The cost to build alternative elephant water points in conservancies assisted by the NGO IRDNC varied between N\$ 20 000 (US\$ 2,865) to N\$ 25 000 (US\$ 3,582), which included the corrugated sheet dam, all fittings and sealants, transport cost, piping from the source ranging between one to five km, cement and labour (Esterhuizen *Pers. Comm.*).

Guarding fields

In Caprivi in the past attempts have been made to guard crop fields at night against elephants. Villagers, conservancy game guards and MET staff have deployed to protect fields in joint efforts. However, it is difficult to predict where the elephants will aim for and all fields cannot be guarded. This method can perhaps be used if it is known that elephants are in the vicinity. People tend to lose interest if they spend the night in their fields and elephants do not arrive several nights running.

¹⁴ It could be difficult to get such an agreement in a semi-arid to arid area such as Kunene Region where mobility is important for successful livestock farming and drought is a normal occurrence. Again theft of the solar panels and the pump could be a potential problem.

Elephant trip alarms

O'Connell (1995) experimented with the use of elephant trip alarms. Each alarm system comprised of a 12v, 10w car siren, a 12v, 1.6 amp gel cell battery and a 10-second timer. Fields were surrounded by polyethylene string mounted to either existing fences or onto trees and poles with U nails, allowing the string to slide in order for the alarm to be triggered by an elephant entering a field. The car siren was mounted on a tree or pole, as close to the pathway of the elephants as possible. The string was then cut at this point, and a piece of wood or plastic tied to both loose strings, providing a site for the trip switch to be mounted. The trip switch was constructed out of a spring peg and attached to the piece of wood. Once the trip is set off, the contacts on either side of the spring peg engage, setting off the siren for ten seconds. O'Connell found that the trip alarms could work well if the area covered was not too large or elephants were not entering fields from different directions. The system worked best when deployed across a well-known route taken by elephants to reach certain fields. She also suggested that where fields are being guarded, a portable siren system could be more effective. Problems included the potential for elephants to become habituated to the sound of the siren and potential disturbance of homesteads or tourism operations from the sound of the sirens. O'Connell found that the system was easy to erect and maintain and the low cost meant that farmers could afford it, particularly if a few farmers joined together. According to O'Connell-Rodwell *et al* (2000) trip-alarms were a successful short-term measure for protecting individual farms, but did not have an impact on the overall number of conflicts.

Elephant trip alarms cost around N\$800 (US\$ 115) at 1995 prices (O'Connell 1995).

Improved livestock husbandry

Improved livestock management practices are crucial for reducing HWC involving predators. In many areas there is a tendency to allow livestock to wander untended or unguarded and this leaves animals particularly vulnerable to predation. The use of a person and/or dogs to walk with the livestock can have a significant positive impact (Stander 2005). Herding of livestock was a management practice used in the past but has been in decline, particularly as young boys who would normally be used as herders now go to school. The #Khoadi //hoas conservancy actively encourages its members to revert to herding livestock as much as possible. Anatolian Shepherd dogs have been shown to be particularly effective in guarding against cheetah (Stander 2005) but have high maintenance costs compared to village dogs which can also be effective.

Kraaling the cattle at night in strong enclosures is another important method of reducing predation and can be encouraged and financially supported as part of local HWC Management plans in conservancies.

Stander (2005) suggests that active management by controlling breeding times and grazing areas can lead to synchronised births, which aid the protection of cows and calves against carnivores.

Re-location

With regard to elephants, re-location is technically possible, but there are some key problems. These include the very high costs of moving large numbers of elephants, a lack of areas where elephants could be moved to, and the possibility that elephants would return to the original sites (Cumming and Jones 2005). This method would also be problematic in dealing with HWC in an area such as Caprivi where the elephants are not part of a stable resident population. Removing a herd of elephants would not stem the movement of others from Botswana into the eastern flood plains of Caprivi for example.

Stander (2005) suggests that re-location can be very effective for lions that can be described as “occasional raiders” rather than “problem animals” that habitually prey on livestock. It was important to be able to identify the category which an individual lion falls into. Of 35 occasional raiders that were relocated, only two returned to the conflict area, while of 19 lions categorised as “problem animals” all returned to the conflict area and/or continued killing livestock. The problem animals consisted of a preponderance of sub-adult males. Stander (2005:50) suggests that for re-location of lions to be successful “it requires advanced skills, sufficient resources, and a good understanding of lion behaviour-ecology and local ecological conditions”. He found that re-location could be a useful tool to deal with HWC and a useful conservation tool (instead of lethal removal). But sixteen leopards re-located in eastern Namibia to relieve HWC all returned to the area where they were captured (Stander 2005).

5.2 Reactive measures

Traditional

In Caprivi elephants have become habituated to the traditional deterrent methods of beating drums, using fire or shooting in the air. O’Connell (1995) found that in some cases elephants had become aggressive and charged the farmers trying to scare them away.

Lethal Removal

With regard to lions, Stander (2005) found that re-location did not work for animals that had become habitual livestock killers and suggests that such “problem lions” require severe management actions such as lethal removal. Lethal removal is often the only way to deal with predators, elephants, and crocodiles that repeatedly cause problems and if they kill humans. In some cases it is possible to offer identified problem animals to trophy hunters so that the local community can gain some income from animals killed. During discussions with farmers in #Khoadi //hoas Conservancy they repeatedly made the distinction between elephants from which they could derive income and predators which caused losses, but which provided no income. They did not suggest the shooting of all predators. They felt that because predator numbers (in this case mostly cheetah) were becoming too high, some animals needed to be removed (either re-located or shot) and the conservancy should get some income from this.

Esterhuizen (*Pers. Comm.*) suggests that a small number of lions could be put on trophy quotas in problem “hotspots” where lions frequently kill livestock. For this system to work he suggests there needs to be decentralisation of decision-making to the local level so that a “problem animal” can be identified and the decision taken locally for the animal to be shot as part of the conservancy trophy hunting quota. He also suggests that each

appropriate MET regional office could be given its own quota of problem lions that could be shot (based on local numbers, knowledge of the scale of conflict etc.) and should be able to take its own decision following a proper investigation. Such an approach would ensure a quick response and will increase the probability that the correct animal will be removed. According to Stander (*Pers. Comm.*) the rate of increase of lions in Kunene Region suggests that by 2007 it would be possible to establish an off-take quota.

Reaction unit

A number of stakeholders have identified the need for quick reaction when a specific problem animal needs to be dealt with. As explained above the current policy for declaring and dealing with a problem animal is impractical. One means is to improve communication and another is delegate decision-making to local levels. However, there is also a need for designated personnel to be available to react on the ground if necessary. In Caprivi in the past communities had official hunters designated by the chief who had the responsibility for dealing with problem animals. Using conservancies as the institutional base, a similar system could be applied with designated conservancy hunters acting in a team with MET officials and possibly NGO staff. If it became necessary to destroy a problem animal and no hunter was available, then this reaction unit could take the necessary measures.

5.3 Mitigation measures

5.3.1 CBNRM benefits as mitigation

Conservancies have provided the main platform for experiments in communal areas in the prevention and mitigation of HWC. In north-west Namibia, MET and NGOs have assisted communities with a number of measures aimed at preventing damage to water points and off-setting the costs to local people of sharing water with elephants. In the North-East a particular focus has been on finding ways to keep elephants away from crop fields, using various deterrent measures ranging from electric fences to the use of chilli peppers. In both the North-West and the North-East a number of conservancies have piloted a self-funded scheme for providing compensation to members who lose livestock to predators. The conservancies also provide benefits to communities in various forms that help to off-set the costs of living with wildlife. This section provides two short case studies regarding the role of conservancies in addressing HWC - one from the North-West and one from the North-East.

5.3.2 Case study on #Khoadi //hoas Conservancy, Kunene Region

The #Khoadi //hoas Conservancy was registered by the MET in mid 1998, one of the first four communal area conservancies to be established in Namibia. It was formed by the Grootberg Farmers' Union (GFU) and as a result the conservancy has a strong relationship with the GFU and places considerable emphasis on livestock farming as well as wildlife. The conservancy area of about 362 000 ha previously consisted of land owned by white farmers and bought by the South African Government to help create the Damaraland Homeland as part of an *apartheid*-style division of Namibia. Many of the residents were forcibly settled in the area from hundreds of kilometres away. There is a

scattered settlement pattern with the majority of people living on the fenced former white farms in small groups of 2-5 families close to artificial water points. Several hundred people live at the settlements of Erwee and Anker each of which has a school and a clinic.

The human population of the conservancy is estimated at 3 000 - 3 500. Most people live a subsistence existence, although there are a handful of fairly wealthy livestock owners, who farm commercially. The main form of subsistence is sedentary livestock farming at low stocking rates (however in times of drought the movement of livestock sometimes over large distances is an important coping strategy). Most farmers keep a mixture of cattle and small stock. The semi-arid conditions, poor soils, and steep slopes in the hills make crop farming extremely difficult and even livestock rearing is precarious. The sale of livestock by the more wealthy farmers and the receipt of remittances and pensions by the poorer residents are important sources of cash income. There is little formal employment.

#Khoadi //hoas has been generating its own income from trophy hunting since 2000. For a number of years it was largely dependent on donor funding, but it has now become self-reliant. By using donor funding to cover operating costs in its early years it had managed to build up a surplus of nearly N\$400 000 (US\$ 57,304). In 2004, the conservancy began using its funds to provide benefits for residents. Table 2 shows how the conservancy has benefited local residents in 2004 and 2005. In addition to the benefits reflected in the table, the conservancy employs eight fulltime personnel: a manager, a liaison and communication officer, two camp-site managers and four environmental shepherds responsible for wildlife monitoring and preventing poaching. The conservancy employs an additional 3 part-time environmental shepherds. Its wage bill in 2006 will amount to nearly N\$100 000 (US\$ 14,326), an important injection of cash into an area with few full-time jobs. Apart from social projects such as supporting local schools and providing a soup kitchen for the elderly, the conservancy has invested heavily in measures to prevent or mitigate problems caused by elephants. These problems include threats to humans, the killing of livestock at water points, damage to water point installations, consumption of water pumped for people and livestock at the cost of residents, damage to fences around grazing areas and around homesteads, and damage to small gardens.

In 2004 more than half of the amount spent on community benefits was used for elephant-related issues. In 2005 nearly all of the spending on community benefit was on elephant related issues. In both years the greatest part of the money spent on addressing elephant problems was the conservancy's contribution to a Global Environment Facility (GEF) small grant for building elephant protection walls around water points.

Benefit	2004 (Overall income: N\$133 932, accumulated surplus: N\$ 388 599)	2005: (Overall income: N\$214 245 =30 690 \$, accumulated surplus: N\$ 340 705)
Contribution to 2 schools	25 000	
Support for livestock vaccination	4 000	
Diesel for elephant water points (collected by residents to pump water)	6 235	4 580
Diesel at subsidised price to pump water for livestock where elephants consume most of water at a settlement	15 645	10 292
Payment to offset livestock losses to elephants	700	5 500
Payment to local traditional authority	2 500	2 500
Loan of breeding animals for improving farmers' small stock	20 000	
Soup kitchen for old people	7 824	6 000
Contribution to building elephant protection walls around water points	61 520	116 100
Support to Grootberg Farmers' Union		2 000
Implementation of benefit distribution plan (fuel and travel)	14 952	16 391
Total	158 376	163 363

Table 5. Spending by the #Khoadi //hoas Conservancy on community benefits in 2004 and 2005. (Data sourced from conservancy records).

Under the GEF Small Grants Project, the conservancy received N\$163 000 (US\$23 351) for protecting water points, and monitoring of elephant movements in order to assist the development of the conservancy management plan. So far seven water points have been protected and one more still has to be completed. In 2000 the conservancy received N\$300 000 (around US\$ 42 978) for building alternative water points for elephants so they would not drink at the reservoirs used by people and livestock. The funding was also aimed at providing electric fencing to protect gardens, at supporting the conservancy's monitoring of elephant movements and at building a camp site to be run by the conservancy (which would bring income from tourists and therefore - indirectly - from elephants).

These projects have provided valuable lessons for the conservancy regarding the protection of water points and the provision of water for people and elephants. Over time a model has been developed that appears to provide protection to water point installations, although it means that people and elephants share the same water point. This model works if the conservancy is able to provide diesel to those water points where water has to be pumped by engine rather than wind pump.

One resident at a settlement where the conservancy has successfully protected the water point, Mr Seth Awiseb, said he was grateful for the assistance he was getting from the conservancy. The wall around the water installations was preventing the elephants from damaging the pump and the pipes. The water point serves three households

totalling about 30 people. Mr Awiseb said the conservancy had also provided diesel, meat from hunting, and stud rams to improve his livestock. If it hadn't been for the conservancy he did not think the community would have obtained funds for the wall to keep out elephants. He said however, that although the wall worked well, there was still a problem in keeping elephants away from his garden where he tried to grow water melons, beans and maize. The elephants had also ripped out the pipe he had laid to provide water from the reservoir to his house. He added that predators were also a problem in his area and people had lost 5 goats to cheetah in the previous month. Other problem-causing predators were jackal and caracal.

With regard to protection of gardens, the conservancy manager, Mr Bob Guibeb, said the electric fences received under the GEF project were not working because of faulty equipment, and the company that had supplied the equipment had closed. In order for electric fencing to work, individual gardens needed to be consolidated into one, as it was not possible to protect all the gardens in the conservancy.

In #Khoadi //hoas elephants range across much of the conservancy. There are areas where they seldom seem to visit and areas which they seem to favour. Only a few old bulls seem to be permanently resident in the area and most elephants move seasonally into other areas and other neighbouring conservancies, depending upon rainfall and availability of food. The monitoring of elephant movements by the conservancy environmental shepherds enables the main problem areas to be identified and prioritised for protection measures.

An important feature of the #Khoadi //hoas Conservancy approach to addressing elephant problems is that it does specifically try to assist those residents who bear the most costs of living with elephants. The conservancy has targeted areas frequently used by elephants for protecting water points, and it makes free diesel available for people whose water has been consumed by elephants. It pays compensation to those who have lost livestock to elephants. In essence it has taken a similar approach to addressing elephant compensation problems that the HACSIS programme in other conservancies (see sub-section 5.3.5 below) has taken to addressing predator problems.

5.3.3 Case study on Kasika Conservancy, Caprivi Region

Kasika Conservancy in Caprivi is on the Chobe River on the border with Botswana's Chobe National Park. It has around 2 000 residents. Although it was only registered in 2005 it has been carrying out wildlife management activities for some time. The main problems from wildlife come from elephants crossing the river from Chobe and causing damage to crops and threatening people, from buffalo damaging crops, and from crocodiles which attack livestock and people. The conservancy and the NGO Integrated Rural Development and Nature Conservation (IRDNC) have initiated a series of activities to deal with these problems with N\$200 000 (US\$ 28,652) from the GEF Small Grants Fund administered by UNDP.

The main objectives are to protect crops, protect livestock and to provide a HACSIS (Self Insurance Scheme) fund that can be used to pay residents for livestock losses. In order to protect crops, the conservancy is using chilli peppers in different ways. Chillies grow well in Kasika and the residents have established a chill pepper plantation. A mixture of chilli and elephant dung is used to make "chilli bombs" which are placed around fields and burnt to produce an unpleasant smelling smoke. Chilli is also mixed

with diesel oil to make chilli grease which is put on fences around the crop fields. So far these measures have been successful in keeping elephants away from houses and crops. However the materials for making the chilli grease fences can be hard to come by, the fences require regular maintenance and use of fresh ingredients, and there are environmental implications of using old car grease for the fences (R Diggle, *Pers. Comm.*). The conservancy is hoping to sell surplus chilli.

In order to deal with livestock losses to crocodiles and other predators, the conservancy has introduced the HAC SIS approach (see sub-section 5.3.5 below). It has paid out N\$15 800 (US\$ 2,264) in claims for 16 livestock and one human injury. The payments to off-set livestock losses have increased the tolerance of residents for wildlife (R Diggle, *Pers. Comm.*). Importantly the HAC SIS scheme linked payments for stock losses caused by crocodiles to use of the crocodile fences at designated drinking places. The GEF small grant funding was used to initiate HAC SIS in Kasika, but in future the conservancy intends to use its own revenue. There are two upmarket lodges in the conservancy which are expected to bring in around N\$400 000 (US\$ 57,304) a year and the current trophy hunting contract is worth around N\$500 000 (US\$ 71,630). However, Diggle (*Pers. Comm.*) suggests that there is a strong argument for the international conservation community to provide ongoing support to conservancies such as Kasika with regard to HWC. This is because the elephant problems experienced by residents of Kasika are part of a regional elephant conservation problem (see sub-section 4.1.2 above). If conservationists propose that areas such as Kasika should be used as dispersal routes for elephants from Botswana to other countries, they should be willing to assist local people to bear the costs.

5.3.4 Challenges for CBNRM as a Human Wildlife conflict mitigation strategy

The two case studies support arguments that CBNRM has the potential to mitigate HWC and could be one of the most sustainable ways to do this (Distefano undated). The conservancies bring income to local communities from wildlife use and wildlife-based tourism that can be used to address problems caused by wildlife. The conservancies are important institutions for implementing a range of other prevention and mitigation activities (see sub-sections 5.3.5 and 5.7 below). However much still needs to be done to find ways to off-set the costs of HWC to households. CBNRM in Namibia is based on a number of principles that underpin the basic premise that people will conserve wildlife if they are able to benefit from its sustainable use and if they have sufficient decision-making authority over the use of wildlife. One of these principles was developed by Murphree (1993):

Differential inputs must result in differential benefits - those communities living with wildlife and thus bearing a higher cost should receive higher benefits than those who do not bear the cost.

Within Namibia, this principle is being applied at the conservancy level. Those communities that live with wildlife gain the income from the use of wildlife in their conservancies. They do not have to share this income with people in areas with little or no wildlife. In general, the communities that suffer the highest costs from wildlife are gaining the most benefit from the use of wildlife. However, this principle is not necessarily applied within conservancies at the household level.

It is clear from the NACSO data presented in sub-section 3.1.4 that the proportion of overall conservancy income going to households is low and only affects a few conservancies. Even if employment is included, the number of households gaining direct benefits compared to the number of residents in conservancies remains low. Further these benefits are given to all members in the conservancy and do not differentiate between households that suffer more costs of living with wildlife than others. Neither do social projects specifically target people who suffer the most costs. This issue has been framed as a conflict between community benefits from wildlife and household losses and has become one of concern for Namibian conservationists. Stander (2005:60) notes for example that "Policies relating to HWC and CBNRM Programmes need to address the fact that individuals bear the cost of the human-wildlife conflict and that benefits from using wildlife are usually shared out equally amongst the whole community". Permanent Secretary Lindeque notes in his keynote address to the 2005 national HWC workshop that: "It appears that, in most cases, the benefits from wildlife cannot be easily used to offset the often dramatic costs suffered by individual households in a way and time that truly meets the needs of the affected household."

There are some ways that this can be done. In some instances conservancies have the potential to considerably increase their incomes and to make larger amounts available for direct household benefits. Currently one of the main constraints to fulfilling this potential is a lack of capacity to manage more business partnerships and enterprises.

There are also ways to specifically increase the income raised by problem causing animals for communities. Stander (*Pers. Comm.*) suggests there is good potential in developing predator tracking safaris linked to tourism lodges in conservancies. Part of the income from these safaris could be put into a special conservancy fund that can be used to offset livestock losses.

Conservancies could, in their benefit distribution plans, specifically target households that suffer high HWC costs. Another means of addressing the issue of household losses has been developed by CBNRM implementers in which a conservancy self-insurance scheme specifically targets the households who bear the direct costs of livestock losses. This scheme is described below.

5.3.5 Insurance/compensation

The Namibian NGO, Integrated Rural Development and Nature Conservation (IRDNC), has worked with conservancies in Caprivi and Kunene Region to develop the Human Animal Conflict Self Insurance Scheme (HACSIS). Essentially the scheme provides funding to off-set the livestock losses caused to individual farmers by predators under certain conditions. The scheme was piloted in two Caprivi and two Kunene Conservancies with a third Kunene conservancy operating the scheme on its own. The aims of the scheme were to (Esterhuizen 2004):

- a) Increase community tolerance towards problem causing animals
- b) Create an incentive for farmers to manage their stock better
- c) Encourage conservancies to put in place a management strategy to mitigate problems
- d) Promote the equitable distribution of benefits so that individuals who suffer losses can benefit from wildlife income

Farmers are able to submit claims for stock losses to the conservancy. A committee consisting of conservancy representatives and the traditional authority assesses claims, monitored by MET and IRDNC. Claims are only paid out for losses caused by certain species of predator and to registered conservancy members under the following conditions:

- No payments will be made for livestock killed in a protected area or conservancy exclusive wildlife zone
- Stock deaths must be reported within one day of the incident occurring
- The cause of death must be verified by a community game guard (e.g. by checking spoor)
- No payments will be made if the livestock was killed at night without being in a secure kraal or other enclosure
- Conservancy staff and traditional leaders will inspect stock enclosures of members and advise where strengthening is required. No claim will be valid if recommended improvements are not carried out.
- Claims will not be accepted if members were warned that predators were in the area and they took no action to bring the livestock to safety
- Following a successful claim, a member can forfeit any future claim if he/she does not improve enclosures as recommended

Payments under this scheme are made to cover livestock losses at fixed rates which do not cover the full value of the animal concerned but aim to partially off-set the loss to the farmer. A payment at a fixed rate would also be made to cover funeral expenses in the case of the death of a conservancy member or his/her minor child caused by wildlife. During the pilot phase payments were made from donor funding. For the second phase it was agreed that conservancies would cover 50% of the costs themselves, but payments per year would be capped at N\$10 000 (US\$ 1,433). The aim is that eventually conservancies would fully fund the scheme themselves.

During the pilot phase in Caprivi 20 claims were paid out in 2003 totalling N\$22 600 (US\$ 3,238). Eleven were for livestock losses caused by lions, eight for losses caused by crocodiles and one payment was for the funeral of a young child killed by an elephant. In Kunene region for the three participating conservancies, 99 claims were paid out totalling N\$72 940 (US\$ 10,449). All these payments were for livestock losses, most of which were caused by hyena and cheetah.

Although a number of problems were identified in managing the scheme, the results of the pilot phase were sufficiently encouraging for IRDNC to expand the scheme in each region. In Caprivi, two additional conservancies joined the scheme and three additional conservancies joined the Kunene scheme. In 2007 Kwandu Conservancy in Caprivi will pilot the use of the scheme for addressing crop damage. There is some indication that the scheme could become a drain on conservancy finances if total annual payments are not capped, or if conservancies are not able to increase their incomes (Roman *Pers. Comm.*, Tjiho *Pers. Comm.*). Some conservancies are considering establishing livestock herds that can be specifically used to replace animals lost to predators instead of making payments.

Overall it can be considered that the cost of insurance schemes would potentially be around N\$ 13,960 (US\$2 000) a year per conservancy, depending upon number of incidents and whether a cap is placed on the total amount of payments.

5.3.6 Government funding support from sale of ivory

Another means used by the MET to offset losses through income derived from wildlife is the establishment of the Game Products Trust Fund (GPTF). Income for the fund is sourced from the sale of ivory allowed under CITES approval and other income to the state from the use of wildlife and wildlife products. Funding from the GPTF is ploughed back by the Ministry into conservation management and also to support conservancies and others in addressing HWC. For example, GPTF funds have been allocated to five conservancies in Kunene Region to address elephant-human conflicts, to assess elephant damage to water points in the Omusati Region and to minimize elephant-human conflicts in the Nyae Nyae conservancy in the North-East (MET undated). However, the process for applying and gaining approval to access funds from the GPTF is time-consuming and in the past some conservancies have waited for up to a year to receive a response to an application.

5.4 Support systems

Monitoring and evaluation

Information is crucial for good decision-making regarding HWC management. Information is required by managers at the macro, meso, and micro levels to inform land-use and development planning, assist in developing appropriate HWC management strategies and in order to adapt strategies and actions over time as data indicates what works and why.

According to Stander (2005) formal and structured monitoring of HWC in Namibia is a relatively recent development and there are two main national sources of data, the Event Book system which operates within communal area conservancies and the MET data base with information going back to 1997. There are a number of smaller data sources, that cover certain species only and/or certain parts of the country only. According to Stander (2005), of the two main monitoring systems the Event Book is the more robust and systematic (see Annex 3 for a summary of the Event Book Monitoring System). The variation in the characteristics of HWC across Namibia complicates the use of one standardised monitoring system (Stander 2005). However, there is clearly a need for some consistency in approach. Stander's analysis of the MET data base and the Event Book System showed "alarming discrepancies" between the two, particularly where for some species there were hundreds of records in the one system, but none in the other. He suggests the Event Book System is the most reliable, and also notes that the data being produced by the HACSIS scheme (see above) in some conservancies is producing similar or better data than the other two systems. HACSIS data for example is able to provide a spatial perception of the impact on the community, identifying hot spots. This information can then be used to improve management.

There is also a need for more rigorous monitoring of specific activities aimed at preventing or reducing conflict. In #Khoadi //hoas conservancy for example, various "projects" have supported the development of alternative water points for elephants and

the protection of water points, but there has been no structured monitoring of the usefulness of these approaches once the projects ended and no wider dissemination of the results. It would be extremely useful to have an accessible data-base on what was tried, the technical specifications, whether it worked or failed and why.

Different types of information are required by managers at different levels. There is a need to identify these needs and develop data bases that are appropriate and accessible at each level. For example at conservancy level such a data base could be linked to the conservancy's own HWC Management Plan. The conservancy and support agencies would gather data that assisted the conservancy in developing the plan and implementing it according to local priorities. At the other end of the scale, MET at HQ level requires an overview of HWC in the country as a whole, the number of incidents, costs of damage, species involved etc.

5.5 Appropriate policies

Appropriate policies are required at the national and international levels that provide the right incentives for rural people to tolerate elephants on their land. This includes enabling land holders to benefit from elephants and other wild species that cause problems and significantly affect people's livelihoods. National legislation in Namibia goes far in achieving this objective, but could be improved to extend additional rights and opportunities to local communities. However, the extent to which local communities can benefit from international trade in wildlife is also impacted by the provisions of international treaties such as CITES (see sub-section 4.3.1 above), although this is offset to some extent by the potential benefits of trade pursuant to CITES requirements such as trophy hunting. As indicated in sub-section 4.3.2, policy changes are required at international level to enable local people to benefit fully from having elephants on their land and in order to address the "elephant problem" in Caprivi and other parts of the Kavango/Zambezi Transfrontier Conservation Area (KAZA TFCA). The EU livestock protocol is also likely to affect the way in which wildlife and livestock are perceived as economic forms of land use through providing incentives that artificially favour livestock. More detailed study on the effects of taxes/subsidies and trade restrictions/trade advantages, in both the livestock and natural resources/wildlife sectors, is recommended in order to better inform policy development and reform.

MET has recognized the inadequacies of current policy and legislation and has begun the process of drafting a national HWC management policy. There have been three consultative workshops (see annotated bibliography in Annex 7) and a second draft is being prepared. The draft policy encompasses the following main principles (MET 2005b):

- Human-Wildlife Conflict cannot be removed permanently and will always occur where people and wildlife co-exist: therefore the conflict needs to be managed
- HWC management needs to balance the needs of people with the aims of biodiversity conservation
- Government will promote self-reliance amongst farmers and other land-holders and will assist farmers who take responsibility themselves
- Government cannot provide direct compensation to farmers but can provide incentives for living with wildlife and bearing the costs

- Strategies designed to implement the policy need to be flexible, taking into account different situations in different parts of the country, recognizing that the scale and impact of Human-Wildlife Conflict changes at different times of the year, and that different methodologies are required for different species of wildlife.

Based upon the principles above, a draft policy statement has been formulated:

“To manage Human-Wildlife Conflict in a way that recognizes the rights and development needs of local communities, recognizes the need to promote biodiversity conservation, promotes self-reliance and ensures that decision-making is quick, efficient and based on the best available information. In order to achieve this, the government will devolve decision-making to the lowest appropriate institutional levels, develop appropriate mitigation and monitoring methods and develop the capacity of all stakeholders to manage Human-Wildlife Conflict”

The draft policy document includes a number of strategies for implementing the main policy statement. These include devolution of decision-making to appropriate institutions, mitigation through CBNRM, developing and implementing the best appropriate technical solutions for preventing and reducing HWC, developing appropriate monitoring and evaluation systems and data bases, and promoting self-reliance through capacity building and self insurance schemes. The policy also recognises the need for HWC to be taken into account in land-use planning at all levels, and that other Government agencies should take responsibility for considering existing and potential HWC in their planning of development projects in rural areas.

One of the key policy provisions required at national level is the decentralisation of authority to identify a problem animal and authorise its lethal removal to local level (O’Connell 1995). This is crucial to enable a quick reaction in the field and to ensure the correct animal is removed. The draft national policy on HWC Management makes provision for such decentralisation and sets out the procedures and conditions under which this would happen. The objectives of this decentralisation strategy are as follows:

- a) To devolve decision-making authority over the destruction of identified problem-causing wild animals to the lowest appropriate institution so that the correct individual animal can be speedily destroyed, providing protection to people and their property
- b) To provide sufficient safeguards to ensure that specific animals are destroyed for good reason

The policy makes provision for authority to decide on the destruction of an identified problem animal to be devolved to MET regional offices and conservancies that have HWC management plans. Where there are no conservancies, owners, or occupiers of land, private organizations or local institutions would be able to apply to MET for rights to take decisions on destruction of problem-causing animals and to use the products derived from that animal.

MET has also recently drafted other new policies that aim to increase the benefits from wildlife to local communities at least in part to help address HWC. A Policy on Tourism

and Wildlife Concessions on State Land will enable the Minister to reserve such concessions in protected areas or on other areas of state land specifically for a community resident in the area or adjacent to it. One of the justifications for awarding such a concession to a community neighbouring a protected area would be to offset losses caused by wildlife. One of the conditions for awarding a concession in a protected area to a resident or neighbouring community would be the existence of a representative, accountable and stable community institution that is a legal entity, such as a conservancy (MET 2006).

A draft policy on Protected Areas and Resident People recognises that people living in or next to protected areas often suffer costs from HWC as a result of wildlife leaving the parks and game reserves. It promotes the development of cooperative management of protected areas between MET and residents/neighbours, the development of compatible forms of land-use adjacent to protected areas based on the CBNRM approach, and the development of protected areas to maximise economic benefit, locally, regionally and nationally within the bounds of ecological and economic sustainability.

The development of the Concessions policy and the Protected Areas and Resident People policy will support the national HWC policy by increasing the financial and other benefits from these areas to local communities, thus helping to mitigate the costs of HWC in or near protected areas. By developing co-management of protected areas and awarding concessions in parks to local communities, government hopes that communities will become true stakeholders in these areas. As a result it is hoped that communities would be more tolerant of problem causing animals and that joint HWC management strategies can be developed.

A number of factors are driving these policy changes. Firstly the conservation successes of CBNRM approaches have shown government that devolution to local communities can work. Secondly, all government agencies are under pressure to demonstrate how they contribute to the Millennium Development Goals and national development goals, and there are increasing indications that CBNRM can contribute to both. Thirdly, key individuals at high levels in MET are convinced of the need for CBNRM approaches and are committed to driving their implementation. The result is a policy focus that aims to integrate biodiversity conservation with rural and national development.

5.6 Integrated approach across different levels, sectors, institutions etc.

It is clear from the above discussion on various prevention and mitigation methods that none of these are adequate on their own to address HWC. Some are very clearly linked and even dependent on others. For example, the activities proposed for the Ehirovipuka draft HWC Management Plan outlined above contain a mix of preventive, reactive and mitigation measures as well as capacity building, joint action between different stakeholders and responsibility and action by the community itself. When addressing HWC issues it is necessary to consider a suite of approaches that together help to deal with the identified problems.

It is also clear that HWC management cannot be successful if the macro, meso and micro levels work in isolation and are not articulated through appropriate policy and implementation frameworks. Namibia's draft national HWC management policy is one important step in providing the framework for creating the necessary links between

levels. However, as identified above, a national HWC policy also needs to be linked to and to inform national land-use and development planning policies and frameworks. These frameworks are still weak and need further development before HWC management will be properly taken into account. Without these links the likelihood is strong that land-use and development plans will lead to increased HWC, increased financial costs for farmers, and increased economic costs for the country.

It is also clear that there needs to be cross-sectoral integration in addressing HWC. Many governments and private agencies are involved in various forms of land-use and land-use planning. It cannot be the responsibility of the government conservation agency alone to address HWC. Other sectors need to be aware of HWC issues, be aware of the potential prevention and mitigation measures and need to include these in their planning and implementation.

The Kaudom Game Reserve example described in subsection 4.2.1 illustrates the need for links between the different levels and integration across sectors. The small-scale commercial farms being developed adjacent to the reserve required a proper assessment of the potential impact of the scheme taking into account national and regional resettlement plans as well as local plans for conservancies and the development of wildlife and tourism as land uses. This approach would have required coordinated land-use planning between different agencies, a full-consideration of the existing and potential uses of land and of the potential increases in HWC. An integrated multi-agency approach to land-use planning in this case could have investigated the best economic uses of the land and carried out a cost-benefit analysis of various options. For example, the cost of developing farming activities would need to take into account the likely costs of repairing fences and water installations damaged by elephants, crop losses to elephants and livestock losses to predators. It would also need to take into account the value of the wildlife likely to be killed as part of addressing HWC in the absence of any system (such as a conservancy) to return income from such animals to the community. Even if for political or other reasons the final decision was to go ahead with small-scale farming, then at the least HWC prevention and mitigation measures could have been identified if an appropriate planning process had been carried out.

The major problem is the lack of a national land-use and development planning system that is based on public consultation, good technical feasibility studies and environmental assessments, and links the different levels. In order to provide the necessary integration a number of steps are required. The following recommendations are adapted from those made by Jones and Kakujaha-Matundu (2005) for promoting environmentally sustainable decision-making about land use at national and regional levels. The measures proposed below should all include the consideration of HWC issues and enable HWC to be incorporated in national and regional land-use and development planning:

- Relevant ministries should develop a coordinated planning system that encompasses land-use planning, physical planning and development planning at national and regional levels, establishes clear procedures for taking environmental considerations into account in land-use decisions (e.g. Environmental Assessments) and which also identifies the roles of key stakeholders at different levels.

- The relevant ministries should develop TOR for the proposed national and regional Land Use and Environmental Boards¹⁵ and establish these boards as a priority in order to administer and coordinate national and regional land use planning systems.
- The relevant ministries and other stakeholder agencies and organisations should regularly update all land use plans and information (e.g. areas designated for small-scale commercial farming, emerging and existing conservancies and community forests, planned agricultural schemes, etc.). This information should be used to coordinate planning at national level and should also be made available to land boards and regional councils at regional level.
- Develop training programmes for regional council and regional land board members that cover basic land use planning, map reading and interpretation, basic environmental principles, economic potential of different land uses, Environmental Assessments and Environmental Management Plans, other relevant sectoral legislation, and principles of CBNRM (including community forests).
- Provide regional councils and regional land boards with the appropriate data, documentation and maps that will enable them to make informed decisions.
- Regional Councils, Land boards, and traditional authorities should be involved in the development of regional and local level HWC management plans with MET, other relevant ministries, NGOs, and community institutions such as conservancies as envisaged by the MET's draft national HWC management policy.

5.7 Integration across frontiers

The transboundary issues discussed in sub-section 4.3.2 above indicate the need to address HWC problems across international boundaries. In many ways the challenges are similar to addressing HWC within national boundaries. A key requirement is for the necessary frameworks and links to be made between systems and institutions. The development of transfrontier conservation areas is one means to try to achieve this type of integration. For example, plans are underway to develop a transfrontier conservation area (TFCA) linking parts of south-east Angola, northern Botswana, southern Zambia, and south-western Zimbabwe with Caprivi in Namibia. This Kavango/Zambezi Transfrontier Conservation Area (KAZA) will include protected areas and communal land. One of its aims is to increase economic benefits to local residents from wildlife and tourism. KAZA provides opportunities for increasing the mitigation of HWC through increased income to communities, provided that they benefit directly rather than through a “trickle down” effect. The TFCA also provides opportunities for joint approaches to elephant and HWC management, not only involving the conservation agencies and NGOs of the participating countries, but also the local communities. For example, a community trust (a similar institution to a Namibian conservancy), exists across the Chobe River in Botswana opposite the Salambala Conservancy in Namibia. Many of the people from these two areas come from the same tribal group, speak the same language and some are related. Wildlife, including elephant and lion, crosses back and forth between the two community conserved areas. There is potential for these two entities, supported by government and NGOs, to develop joint approaches to wildlife and HWC management. At the overall KAZA level, there are plans for a transboundary forum

¹⁵ Proposed in the National Land Policy

for community-based organisations and for developing various integrated plans for managing elephants, and tourism.

As elephants have begun to move out from Chobe in Botswana and into other neighbouring countries, attention has been focused on the possibility of developing “elephant corridors” that leave areas of land open to facilitate elephant movement (e.g. Chase undated). However, the main constraint to such proposals is human settlement and consequent human-elephant conflict in the potential corridors between sub-populations and the rate of dispersal along and through corridors may be too slow to relieve pressure on source populations (Cumming and Jones 2005).

It is clear that developing elephant corridors or aiming for significant range expansion of elephants would have to include large areas of the communal lands of the region that are already settled by people. If these people are to tolerate elephants they need realistic incentives which “could be generated if farmers and rural communities were able to derive the full range of benefits from elephants, including, for example, trophy hunting and the sale of elephant products from animals harvested. Range expansion will thus require shifts in national, regional and international policy regarding the conservation and management of elephants outside of protected areas, as well as policy changes relating to the sale of ivory and other elephant products. Such a strategy may also serve to assist in containing the ongoing elephant population eruption in the region” (Cumming and Jones 2005:ii).

Diggle *et al* (2005) also emphasise that the residents of Caprivi conservancies will bear the costs of large herds of elephants moving through their land, but suggest that the Botswana elephant problem can be seen as an opportunity and can become a catalyst for social and economic development in the KAZA TFCA. They believe “Caprivi Conservancies can provide the key local management structures, which if coordinated with government strategies, can result in the conservation and safe movement of elephants between Botswana, Angola and Zambia” (Diggle *et al* 2005:8).

5.8 Appropriate institutions with the necessary decision-making authority

There has been considerable emphasis within this report on technical issues such as methods to prevent or reduce HWC, methods to deter elephants and predators, and on land-use planning. However, the conservation and development worlds are full of good ideas that don't get implemented and of wonderful zoning plans that are never enforced. This is because the necessary institutional frameworks were not in place for implementation to take place or for land-use and zonation plans to be enforced. It is crucial that there are clear institutional arrangements that assign not only responsibility but also authority for management actions to be carried out. To some extent conservancies on communal land in Namibia provide this institutional framework, although as discussed elsewhere in this report there is a need to extend the existing decision-making authority over wildlife that conservancies already enjoy. Crucially conservancies need the appropriate group land tenure rights that would enable them to enforce their land use zonation with the full backing of the state at regional and national levels. They also need to be able to take decisions regarding the destruction of persistent problem causing animals, and to be able to decide on the balance they wish to keep between wildlife and livestock.

Diggle *et al* (2006) emphasise the importance of conservancies as grassroots management structures which focus clearly on issues on the ground and the needs of members. They suggest that “by Government providing a democratic mechanism for communal area residents to manage the wildlife and with experienced and professional NGOs building capacity, then community structures can become the *solution* towards balancing the conservation and wellbeing of elephants with the social and economic empowerment of rural residents” (Diggle *et al* 2006:8).

The process of conservancies reaching the stage when they can successfully fulfil this role is taking time. As indicated earlier some of the technical solutions for dealing with elephant problems in Kunene Region have not worked due to institutional failure in their implementation. Esterhuizen (*Pers. Comm.*) suggests this reluctance to take ownership and responsibility is partly due to Namibia’s colonial past under South Africa’s *apartheid* system. As a result, communities find it hard to believe that they really do have decision making authority over wildlife, and it is taking time for them to understand that they do not always need to ask someone else for permission to act. Esterhuizen thinks that this will change over time, but needs to be recognised and factored in to the way that support agencies work with the conservancies.

6. CONCLUSIONS

6.1 Main conclusions

This report has demonstrated how wildlife is increasing in many parts of Namibia partly as a result of government policies that provide economic and other incentives for land holders (including rural communities) to adopt wildlife as a viable form of land use and to live with wildlife on their land. Rural communities have become more tolerant of wildlife because they receive or perceive the potential to receive a range of benefits from wildlife. However, the increase in certain parts of the country of potentially problem causing species such as elephants and various predators is also leading to an increase in HWC.

Analysis of the key issues and drivers regarding HWC in Namibia leads to the following three broad conclusions:

- I. *The costs of HWC to communities and governments can be outweighed by the economic benefits generated by CBNRM that devolves rights over wildlife and the right to benefit from its sustainable use to local communities. This provides a sustainable long-term solution to the problem which reduces the need for continual government interventions.*

This report has shown how in Namibia CBNRM brings a number of livelihood benefits to rural communities. While the financial benefits to households are currently low, these can be increased in various ways providing a direct means to off-set the losses caused by HWC. At the same time, CBNRM provides a number of other intangible benefits that help to increase tolerance of wildlife that causes problems such as elephants and predators.

- II. *For HWC to be effectively mitigated, it is essential to implement cross-sectoral coordination that ensures all relevant ministries take existing and potential HWC*

into account in land-use and development planning. This will prevent financial losses to farmers and other land-users, and reduce losses to regional and national economies.

This report has shown how national and regional planning by ministries in non-conservation sectors can lead to increased HWC and increased costs to the government and the economy. Planning of agricultural developments, resettlement schemes and other rural development projects, including provision of water need to assess potential HWC and incorporate methods to prevent damage and losses.

- III. For HWC to be effectively mitigated, integrated coordination between macro, meso and micro levels is essential. Such coordination can reduce the costs of HWC by increasing the efficiency of planning and implementation of development projects, and ensuring that HWC prevention and mitigation measures are integrated as part of a coordinated and systematic programme.

This report has shown that HWC at the local level is impacted by processes and events at the meso and macro levels. Attention needs to be given to the provision of supportive international and national policies, efficient national and regional decision-making frameworks and local institutions that have the capacity to address HWC.

6.2 Specific recommendations for addressing HWC in Namibia

With regard to the implementation of the draft national HWC Management policy and future HWC management in Namibia the following recommendations are made:

- Much more focused attention is required on monitoring the effectiveness of various measures to prevent or reduce conflict and on disseminating the results. Some indications of possible successful models for protecting water points are emerging in the Kunene Region and these need further monitoring to assess their effectiveness.
- More attention needs to be given to the monitoring and assessment of the costs of HWC particularly with regard to crop damage. Various methods have been used which differ in their approach. There is a need for ongoing research that also aims to assess the impact and hardship caused to households so that conservancies can support those hit the hardest.
- Although the draft HWC Management policy calls for other line ministries to take responsibility for addressing HWC in the planning and implementation of development activities, mechanisms will be needed to operationalise this such as the establishment of the proposed Land Use and Environmental Boards and similar bodies.
- Key Ministries such as Lands and Resettlement need more exposure to and training in the means of avoiding increased HWC through appropriate planning processes. The use of Environmental Assessments for key ministerial projects would assist in identifying potential problems and the development of appropriate prevention, reduction or mitigation measures.

- The HACSIS scheme is one means of ensuring that conservancies provide targeted support to households. However, more attention needs to be given to expanding the benefits reaching households if CBNRM is to be a successful mitigation mechanism. This requires further policy changes at national level such as further devolution of authority to local communities and increased security of land tenure.
- Removal of the domestic and international disincentives to investment in and use of wildlife could be expected to considerably enhance the economic benefits of wildlife relative to the HWC costs. There is a need for a detailed study on the effects of trade barriers, restrictions, taxes, subsidies, property rights, and similar factors on the value of wildlife in Namibia.
- Change is required in international trade agreements (such as the EU/Cotonou livestock protocol) that potentially negatively affect wildlife as a land use.
- Working within the CITES system, the means need to be found to enable Namibia, with plentiful elephant populations, to provide economic benefits to local communities from regulated trade in elephant products. A concerted effort must also be undertaken in both consumer countries and in parts of Africa (mainly West and Central) to control domestic ivory markets. Furthermore, until this can be achieved, international support to communities in Namibia needs to be increased in the form of payment for ecosystem services (biodiversity) in order to ensure that recent gains at community level are not turned into losses because of increased conflicts with an expanding elephant population.
- Due to the considerable variation in socio-ecological conditions in Namibia, HWC policies and strategies need to be sufficiently flexible to allow different approaches to be applied in different areas, at different times of the year and for different species.

6.3 Possible lessons learned from the Namibian case study for the global conservation community

Clearly all countries have different contexts but it is possible to draw conclusions about the principles and approaches from the Namibian experiences that are likely to be of use for other countries:

- This report has shown how Namibian approaches to dealing with HWC are affected by international policy and how HWC is also affected by national policies in other sectors. This indicates the need for policy analysis and reforms to look beyond the wildlife sector in order to identify the key drivers of HWC.
- The CBNRM programme in Namibia has demonstrated the effectiveness of devolving management authority over wildlife to land holders as a conservation mechanism. Results from the programme indicate the need to ensure that devolving rights over wildlife to local communities should also include the authority to deal with problem causing animals.
- Where communities perceive that they derive sufficient benefit from wildlife, providing them with decision-making authority over problem causing animals is unlikely to lead to the disappearance of those animals.
- The report provided analytical evidence that the Namibian government's policy of approaching HWC through CBNRM development is sound economically. The economic benefits associated with CBNRM initiatives in Caprivi are higher than

the associated HWC costs. This finding is likely to hold in the context of the broader CBNRM programme. This means that even though at local level household livelihoods may be badly affected by HWC, there is a good case for communities to be allowed to internalise their HWC problems through physical mitigation measures and insurance schemes. Approaches to mitigation can be implemented by CBNRM.

- This report has demonstrated how HWC differs spatially and temporally. There are considerable environmental differences between parts of Namibia, and such spatial and temporal variations are likely to occur in other countries. This indicates the need for HWC management policy and approaches to be flexible so that local solutions can be found to local problems.
- The report also showed how a variety of linked approaches is often required in order to deal with HWC. Technical solutions may appear ideal, but might not be implemented because of institutional failure. Attention needs to be given to who will implement the technical solution, who will maintain the infrastructure if necessary, and whether there are sufficient incentives for implementation and maintenance to be carried out.
- The role of conservancies points to the need for effective local level institutions that can be used to internalise costs and benefits of living with wildlife, channel benefits to villagers, carry out local level HWC management, and interact with other sectors and levels of decision-making.

Overall the Namibian case study indicates that in order to address HWC, government policy and legislation need to enable land holders to internalise the costs and benefits of living with wildlife, rather than focusing only on ways by which external agents can reduce or mitigate conflict. Such an approach requires appropriate economic incentives for living with wildlife, appropriate decision-making authority, and appropriate skills and information for developing specific management interventions. Further, HWC management needs to be incorporated into the planning process and viability assessments of national and regional (district) development. Such an approach can reduce overall costs to government and the economy and contribute to improved local livelihoods.

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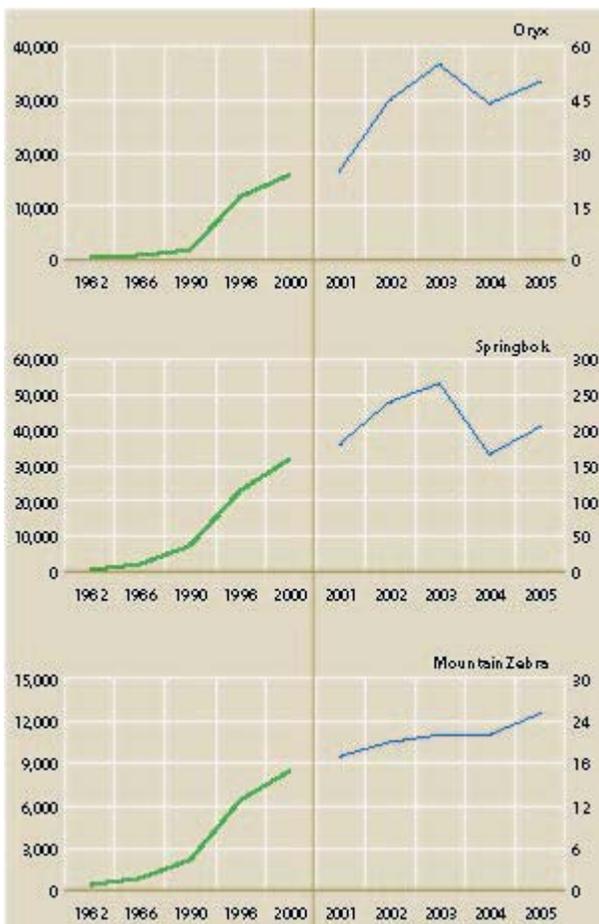
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ANNEX 1 TRENDS IN WILDLIFE NUMBERS IN NAMIBIAN CONSERVANCIES

Estimates of wildlife numbers in north-west Namibia based on the June 2006 Game Count, an area with 21 conservancies, and three tourism concession areas and the Skeleton Coast Park, covering 5.2 million ha and with rainfall ranging from around 200 mm to 25 mm per year. The method used was vehicle surveys driving fixed routes. No data was collected for one conservancy and in the Skeleton Coast Park.

Oryx	24 574
Giraffe*	2 435
Kudu	5 355
Ostrich	6 220
Springbok	139 475
Mountain zebra	17 789

The graphs below indicate the population trends showing a dramatic increase over the past 20 years. Population estimates between the 1980's and 1990's were derived from aerial surveys (left y axis) while the more recent figures are density estimates from vehicle surveys (number of animals recorded per 100 kilometres travelled, right y axis).



Source: NACSO 2006

Populations of Springbok and Oryx appear to have now stabilised in north-western Namibia. There have been no mass mortalities or poaching to account for this, and harvest quotas have been so small in relation to the total populations that they are also unlikely to have had any effect. In fact, the biggest declines were recorded in the Palmwag concession area where no harvesting took place. What appears to be happening is that carrying capacity in the conservancy areas for these species has been reached and animals are moving up into the mountains (which are not surveyed) and expanding their range eastwards outside the survey areas (NACSO 2006).

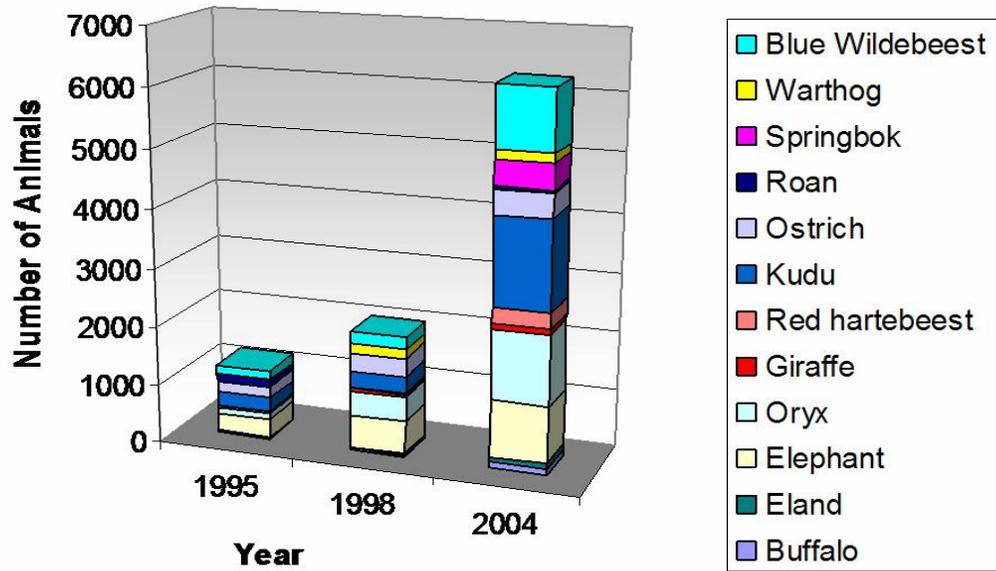
There has also been significant recovery of wildlife populations in the large Nyae Nyae conservancy in the east of the country (See the table and figure below). While this recovery has been aided by the introduction of about 2,114 animals since 1999, the latest population estimates confirm that current population growth is also due to the breeding of existing and reintroduced populations (NACSO 2006).

Estimated Changes To Game Populations For The Nyae Nyae Conservancy, Based Upon Ministry of Environment & Tourism Aerial Censuses In 1995 (Stander), 1998 (Craig), and 2004 (Stander).

Species	1995	1998	2004	Estimated Population Change (1995 – 2004)
Buffalo (<i>Syncerus caffer</i>)	30	33	90	60
Eland (<i>Taurotragus oryx</i>)	0	12	97	97
Elephant (<i>Loxodonta Africana</i>)	302	552	967	665
Oryx (<i>Oryx gazella</i>)	110	429	1,196	1,086
Giraffe (<i>Giraffa camelopardalis</i>)	6	47	89	83
Red hartebeest (<i>Alcephalus busephalus</i>)	31	18	282	251
Kudu (<i>Tragelaphus strepsiceros</i>)	249	283	1,502	1,253
Ostrich (<i>Struthio camelus</i>)	190	311	412	222
Roan (<i>Hippotragus equinus</i>)	123	0	44	-79
Springbok (<i>Antidorcas marsupialis</i>)	0	0	421	421
Warthog (<i>Phacochoerus aethiopicus</i>)	0	160	149	149
Blue Wildebeest (<i>Connochaetes taurinus</i>)	164	204	1,037	873
Total Estimated Change in Game Numbers				5,081

Source: WWF LIFE Project

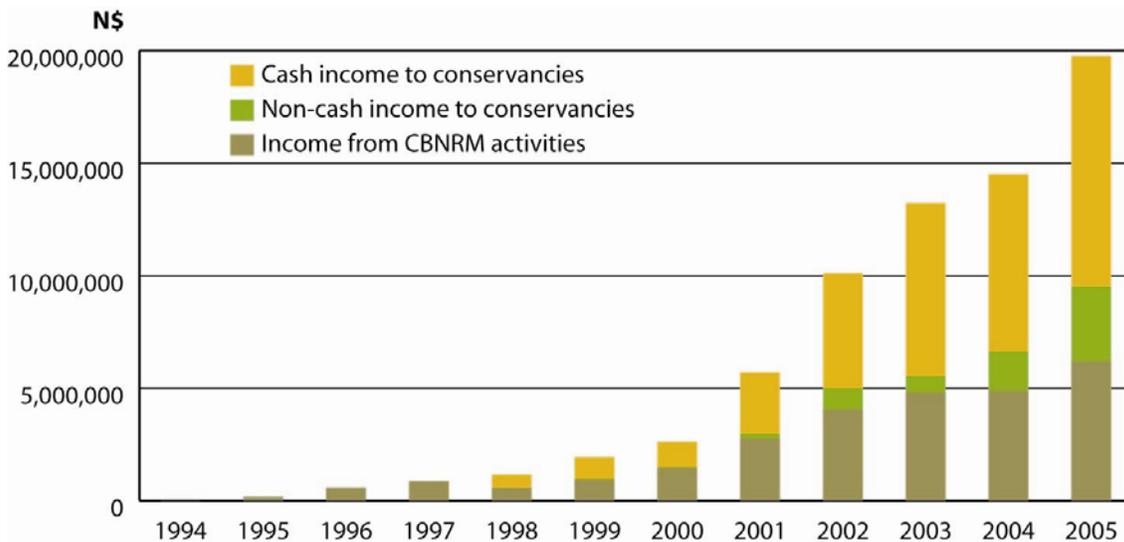
Nyae Nyae Conservancy Game Populations Trends



Source: WWF LIFE Project

ANNEX 2
INCOME DERIVED BY CONSERVANCIES
 (Source: NACSO 2006)

Income to local communities from Community-based Natural Resource Management (CBNRM) in Namibia has risen from zero in 1994 to a total of over N\$19 million (around US\$3 million) in 2005 (NACSO 2006). The graph below divides income into three categories: cash payments to conservancies, non-cash or in-kind incomes to conservancies, and income to CBNRM activities outside conservancies.



Income in the form of direct cash payments to conservancies and wages comes mainly from joint venture lodges, trophy hunting, small enterprises (e.g. campsites), craft sales and sale of game. In addition, some benefits are non-financial or 'in-kind' such as meat from hunting or other contributions (computers, education materials, equipment etc.) to local social or economic development activities primarily made by joint venture partners. Income from other CBNRM activities is generated from activities that are either outside conservancies or, in the case of those inside conservancies, there is no formal relationship between the particular enterprise and the conservancy. This can occur where the enterprise pre-dates the formation of the conservancy. The majority of this income is generated by small tourism enterprises (campsites, traditional villages and tour guiding), thatching grass and crafts.

By far the largest source of income is from joint venture tourism lodges and camps in which conservancies negotiate a levy or income sharing agreement. A total of N\$7,643,943 (US\$ 1,095,071) was earned from these ventures during 2005, representing 56% of all conservancy income. At the end of 2005 there were 10 formal joint venture agreements that were operational and generating income for conservancies. A further six conservancies were receiving income from operators for traversing or resource utilisation. In addition, there are currently 13 potential joint venture agreements under negotiation. Since 1999, more than N\$21 million (about US\$3 million) has been generated from joint venture lodge agreements.

Existing options for financial benefits from joint ventures include direct revenue as a percentage of net turnover, a flat concession fee paid annually, a monthly lease fee, or a levy for every bed night sold by the lodge. Many agreements include a combination of these options. The development of 'non-financial' social infrastructure, such as schools and clinics, has been included in several contracts. All agreements include clauses for minimum performance to protect conservancies and operators against non-performing partners. Strict clauses regarding environmental impacts are included and conservancies have ensured that contracts provide jobs and build skills of local conservancy members. At least one agreement includes community shareholding.

In terms of its contribution to conservancy income, trophy hunting increased in real terms but declined as a percentage of total income from 36% in 2003 to 26% in 2005. However, trophy hunting concessions still currently provide the second highest source of income for conservancies, in 2005 generating N\$3.44 million (US\$ 492,814), of which 77% was from concession fees and 23% from meat distribution. By the end of 2005, 12 concessions extending over 16 conservancies had been allocated to professional hunters. A further five conservancies have approved trophy quotas and will be entering into agreements with private sector hunters in 2006. The value of the meat distributed to community members from trophy hunting was N\$774,567 (US\$ 110,964) in 2005.

In 2005, the total income generated from direct wildlife utilisation was N\$4.77million (US\$683,350) or 35% of all conservancy income. There has been diversification in the form of utilisation carried out including 'premium' hunting, 'own-use' hunting, 'shoot and sell' and live game sales. Income generated from these activities totalled N\$1.34 million (US\$ 191,968). Over the years between 1999 and 2005, conservancies have cumulatively earned a total of N\$16.5 million (about US\$2.4 million) from direct wildlife utilisation.

ANNEX 3

SUMMARY OF THE EVENT BOOK MONITORING SYSTEM

Greg Stuart-Hill, WWF/LIFE Programme

Introduction

The Event Book System is a grass-roots monitoring programme. It differs from traditional monitoring in that the community dictates what needs to be monitored, they collect the data and they undertake all the analysis themselves. Most conservancies have included Human Wildlife Conflict (HWC) in their event book systems. The Event Book System began slowly in a few conservancies in late 2000. Now more than 33 of the 44 communal area conservancies in Namibia have adopted the system.

The success of the system in communal conservancies prompted the Namibian Ministry of Environment and Tourism to use the same principles in their national parks. Exchange visits to Namibia have resulted in similar systems being developed in Mozambique (including marine parks), Zambia, Botswana, and most recently Cambodia.

Initial CBNRM monitoring systems in Namibia were conventional in that experts (scientists) designed them, conservancy staff collected the data and handed in data sheets which were analysed by the experts. Communities often never received feedback or there were lengthy delays. Commonly community members were not able to understand results. The consequence was no ownership of the monitoring process or results and these early systems struggled to survive beyond a few years.

The Event Book System emerged as a result of the need to develop a system that could and would be used by the conservancies themselves. The name derives from the challenge of monitoring events that occur randomly e.g. fire, poaching, human-wildlife conflict, mortalities, etc. It also makes provision for systematic monitoring activities such as vegetation or wildlife censuses. A technically more accurate term might be Management Orientated Monitoring System (MOMS).

The "Event Book" differs from traditional monitoring in that: (i) the community decides on what they want to monitor, (ii) technicians only facilitate the design process; and (iii) data analysis is undertaken locally by conservancy members.

Description

The Event Book is a personalised A5 ring file maintained by each community ranger. The file contains a set of yellow cards, one card for each monitoring theme/topic – i.e. there is a card for poaching, a card for human-wildlife conflict, rainfall and so on. As events occur, rangers select the appropriate card and record the event. At the end of the month a line is left and the same card used in the ensuing months. At the end of the year, all of the old cards are removed, archived and a fresh set of cards inserted into the book.

Data collection, analysis and reporting are done locally. It is essential that the people collecting the data also analyse and interpret it, even if the analysis is sub-optimal. This principle emerged following failures with the conventional system (data sheets being handed over to an expert to analyse).

For each monitoring topic there is a complete modularized kit that begins with data collection, goes through monthly reporting and ends with long-term reporting. Colour coding is used to avoid confusion between these data-flow levels; with a) yellow being

for data collection; b) blue for reporting within one year (i.e. monthly/quarterly reporting); and c) red for tracking long-term trends.

In all cases the community decides on what they want to monitor apart from certain things that conservancies are obliged to report on to the government. Agreement on what to monitor is reached through a workshop involving community leaders and the community rangers. This starts with brainstorming all issues of importance. Then the task is to identifying from the overall list those issues that should be monitored – normally resources critical for livelihoods and which the community is concerned about, key threats to the community and indicators of achievement of the conservancy. To make the final selection of topics absolutely clear a 'job description poster' is constructed. Known as a mind map (or job description) it contains pictures and icons to assist semi- and illiterate members of the community to understand the responsibilities of community rangers.

To support local design, yet provide some standardized and a rigorous methodology, the system has been modularized by topic or theme. Twenty-one modules have been developed thus far.

Modules Developed:

Problem animal incidents; Poaching; Predator encounters; Rare and endangered animals; Fence monitoring; Water point monitoring; Flooding and river levels (for those conservancies that are in flood plains); Rainfall; Wildlife sighting during fixed foot patrols; Wildlife mortalities; Trophy hunting; Wildlife harvesting; Livestock mortality; Livestock theft; Livestock condition; Fishing effort; Fish catch trend; Long-term vegetation change; Seasonal grass grazing assessment; Craft resources; Wildlife re-introductions.

Once the conservancy has selected what it wants to monitor, the technical support team then develops a complete kit for each monitoring topic or module. Each kit contains the colour coded 'tools' necessary for: (i) data collection, (ii) monthly/quarterly reporting and (iii) reporting and analyzing long-term trends.

New conservancies can use these modules whilst still maintaining control in that they decide which modules they wish to use. Over time, as needs, skills and confidence increase, a community can add more and more modules eventually covering a wide spectrum of issues – all at their own pace.

Analysis

Data 'analysis' is simple in the extreme. There are three types of reporting: (i) monthly incident reports; (ii) annual reporting maps; and (iii) long term incident reports. On a monthly basis, the senior ranger gathers all the field rangers together and they collectively complete the monthly (blue) reporting charts. These charts are pre-prepared A3 templates that are housed in a large format display 'flip-file'.

The reporting principle is that one 'block' on the chart refers to one 'event'. For example, to report on poaching, one block is coloured in for each poaching incident, two incidents = two blocks and so on. In some instances one block may represent standard values, e.g. 5 mm of rainfall or 10 animals seen whilst on patrol. There are A3 reporting templates for all of the monitoring topics and to avoid confusion these are prepared on blue card.

More advanced conservancies also complete reporting maps. One map is used for each monitoring topic and lasts a year.

Incidents are recorded by hand onto the map using symbols used to differentiate between different types of incidents; e.g. for problem animals there would be different symbols on the map for say elephant, lion or hyena incidents.

At the end of each year, the totals for the year are transferred onto the long-term trend (red) reporting charts. These are similar to the monthly reporting charts and use the same method of colouring in blocks to represent number of incidents or quantities (e.g. mm of rain or animals seen).

Year-end Auditing, Reporting and Archiving

At the end of each year there is an annual audit of the system that is attended by external stakeholders (government, donors, NGOs or neighbours). The audit is based on a yes/no activity questionnaire. If the answer to any activity is 'yes, it was done', then the summary results are recorded. The completed questionnaire constitutes the conservancy's annual monitoring report and copies are circulated to stakeholders as required. The annual audit takes place in January each year. It takes approximately 2 hours to complete and this includes archiving all the previous year's data, updating the red long-term reporting charts and placing fresh unused cards in the Event Book for the new year.

Paper-based system

The entire system is paper-based, which seems to be appropriate for remote rural communities and avoids the sustainability problems of ever-changing computer technology. All papers are filed in a specialized filing box. This simple tool has proved indispensable as it formalizes the system in an environment where conservancies often have no office. The data are archived by the conservancy and any data extraction is done by copying – i.e. if someone, a researcher or government official, wants data or a report then the information is copied and only the copy can be taken away. Original raw data never leaves the community.

Copied data can easily be captured into digital format for purposes of central storage and further analysis by scientists. All event book data have a spatial element so these are compatible with GIS.

Each year data from the annual audit are captured into a national monitoring and evaluation database which aggregates results from many different conservancies to create a national view of the performance of the CBNRM programme in Namibia.

Elements of the System

1. **A visual description of the monitoring work to be done**
 - i. the 'Monitoring Poster' for the area as a whole
 - ii. 'Job Description Posters' for key persons
2. **'Data-Flow' posters**
3. **A data capture system – 'Yellow Data Cards' (e.g. 'Event Books', 'Incident Books', 'Pocket books'; Office Registers')**
4. **A monthly/annual reporting system**
 - i. 'Blue Reporting Charts'
 - ii. 'Reporting Maps'
5. **Long-term 'Red Reporting Charts' (for Trend)**
6. **An Annual 'Audit Report'**
7. **An 'Archiving and Filing System'**

ANNEX 4
KEY FEATURES OF NAMIBIAN POLICIES AND LEGISLATION RELEVANT TO HWC

Policy/legislation	Relevance to HWC	Status	Recommendations
Conservancy policy and legislation	<p>Provides the institutional framework for devolving rights over wildlife and tourism to rural communities that form conservancies. A conservancy must have designated boundaries, defined membership, a legal constitution, a representative committee, and plan for equitable distribution of benefits.</p> <p>Conservancies provide the institutional mechanism at community level for channelling benefits that can offset HWC losses, for implementing prevention measures, and for interacting with the meso and macro levels.</p>	<p>Policy passed by Cabinet in 1995. Legislation and regulations in 1996.</p> <p>New Parks and Wildlife Legislation being drafted.</p>	<ol style="list-style-type: none"> 1. Provide stronger rights over wildlife to conservancies including decision-making over problem animals 2. Assist conservancies to target benefits towards those most affected by HWC
Draft Environmental Act	EIA screening compulsory for all development projects. Should enable HWC to be considered in the planning and implementation of agricultural and other rural development projects.	Policy approved by Cabinet 1994. Legislation almost completed.	All other sectors need to be fully aware of the provisions of the Act and their responsibility to include HWC in TOR for Environmental and Social Assessments.
Community Based Tourism (CBT) Policy	Provides framework for government support for community-based tourism. Provides for conservancies to get concession rights to "lodge" development. Crucial for increasing financial and other benefits that can help to offset HWC losses.	Policy approved by MET 1995.	Intent to give tourism concessions to conservancies must be included in legislation.

Draft tourism policy and legislation	Provides framework for national tourism development. Crucial for increasing financial and other benefits that can help to offset HWC losses	Draft policy being finalised. Legislation to follow approval of policy.	<ol style="list-style-type: none"> 1. Community Based Tourism (CBT)should be defined 2. Role of communities should be defined vis a vis govt. and private sector. 3. Principles of CBT policy should be incorporated. 4. Control of tourism (e.g. planning, zoning and regulations should be devolved to conservancies)
Draft policy on protected areas and neighbours	Provides a framework for relationships between protected areas (PAs) and neighbours (including people resident in parks). Promotes benefits to neighbours from PAs and provides for co-management arrangements with regard to HWC on park borders and other issues.	Being finalised by MET.	<ol style="list-style-type: none"> 1. Role of conservancies as neighbours should be emphasised. 2. Park staff should develop joint HWC management plans and co-management agreements with neighbours, particularly conservancies
Forestry policy and legislation	Provide institutional framework for giving communities rights over forest resources. Arrangements similar as for conservancies. Compatible with conservancy approach and provides rights over a wider range of resources. Community forest committees could also provide useful institutions for addressing HWC and interacting across sectors and levels.	Forest Act passed in 2001.	<ol style="list-style-type: none"> 1. Community forest management plans should also address HWC
Land policy and legislation	Land Policy provides for categories of land holder that includes conservancies, but legislation does not clearly provide for groups such as conservancies to gain secure land tenure. This undermines the ability of conservancies to enforce their land use zoning plans, and can lead to increased HWC where people ignore this zoning Communal Land Reform Act provides that Land Boards have to take conservancy management plans into account when allocating land for leases	Policy approved by Cabinet 1998. Communal Land Reform Act passed 2002.	<ol style="list-style-type: none"> 1. Provisions for secure and exclusive group tenure should be explicitly incorporated in legislation 2. Traditional Authorities and Land Boards should take HWC into account when allocating and approving land allocations for agricultural and residential purposes. 3. Provide information and training to Communal Land Boards on conservancies, HWC and Environmental Assessments.

	<p>for commercial activities.</p> <p>Land Boards and traditional leaders rarely consider HWC in allocating residential and agricultural land.</p>		
Water policy and legislation	<p>Provides framework for cost recovery for water provision including transfer of management, operation and maintenance of water points and installations to communities.</p> <p>The approach means that local people have to pay for any repairs required due to damage by elephants.</p>	Policy approved by Cabinet. Legislation being finalised.	<ol style="list-style-type: none"> 1. As with the #Khoadi //hoas Conservancy case study, conservancies in the NW can do much to prevent and mitigate the damage to water installations 2. Conservancies should develop practical integration with water committees in particular regarding protection of water points and other forms of funding support such as provision of diesel for pumping water where elephants drink regularly
National Agricultural Policy	<p>Provides framework for Agricultural development. Calls for community empowerment and group tenure.</p> <p>Past subsidies to livestock being phased out.</p>	Policy approved by Cabinet 1995.	<ol style="list-style-type: none"> 1. Needs legislation on group tenure over rangelands (see Land Policy and legislation) 2. Carry out research on effects of past subsidies and new subsidies under the Affirmative Action Loan Scheme
Decentralisation policy	Framework for devolution of functions to regional councils. Provides for Regional and local governance structures and development committees to carry out development and land use planning.	Policy adopted by Cabinet 1997.	<ol style="list-style-type: none"> 1. Regional Councils and development committees need to take HWC into account in agricultural and rural development planning 2. Promote positive links between conservancies and regional and local governance structures and development committees 3. Provide information and training to Regional Councils and development committees on HWC, mitigation and prevention measures and environmental assessments.

ANNEX 5
KEY FEATURES OF THE HWC PREVENTION AND MITIGATION MEASURES APPLIED IN NAMIBIA

Prevention/Mitigation Measure	Area where used	Method	Effectiveness	Cost (where available)
Local level land-use planning	Mayuni Conservancy, Caprivi Region	Re-location of people away from the Kwando River floodplains which are visited by elephants from the neighbouring Bwabwata National Park	Comparison with neighbouring Kwandu conservancy indicates decrease in HWC incidents. Success partly due to strong traditional authority which was able to get people to agree to move.	Possible re-location costs: transport and construction of new dwellings
Local HWC management plans	Ehrovipuka Conservancy, Kunene Region Draft plan developed	Develop integrated HWC management plan that addresses, prevention, mitigation and roles of different stakeholders. In the case of Ehrovipuka includes co-management with staff of neighbouring Etosha National Park	Yet to be finalised and tested.	Cost of developing the plan includes transport and other logistics for meetings.
Artificial barriers 1. <i>Electric fences</i>	Used in Etosha National Park, conservancies in Kunene & Caprivi	Erection of electric fencing as a barrier particularly against elephants to prevent them from leaving a protected area or to protect crops and/or settlements	Mixed results. Can work if regularly maintained. Problems: Communities have not taken ownership and do not maintain fences; elephants find ways to break or go around fences; high maintenance costs (e.g. regular fence patrols in protected areas)	Cost to cover area of 5km ² = N\$ 15,000 (US\$2 149) including wire and other equipment such as solar panel
Artificial barriers 2. <i>Protection of water points</i>	Kunene Region Conservancies, Nyae Nyae Conservancy	Construction of protective stone wall around water installations.	Effective if at least two large rocks thick, 1.8 m high, walls a sufficient distance from installations to prevent elephants reaching over, access is left to part of the reservoir for elephants to drink and there is a separate, protected tank for domestic consumption.	Between N\$5,000 (US\$716) and N\$10,000 (US\$1,433) including materials, transport and labour.

Artificial barriers 3. <i>Chili pepper fences</i>	Caprivi	Fences lined with a mixture of grease and chilli peppers.	Initial indications (see Kasika Conservancy case study) are that this can be effective. Still being tested. Possible environmental implications of use of grease. Needs ready supply of ingredients and regular maintenance.	
Artificial barriers 4. <i>Chili bombs</i>	Caprivi Region	Ground chilli mixed with elephant dung and compacted in a brick mould and dried. Bricks are burnt along the edge of fields and smoke acts as a deterrent to elephants.	Seems to be effective, but time required for further testing and to see if elephants become used to the smoke.	
Alternative water points for elephants	Kunene Region	Provision of water point away from the settlement and where livestock drink. Usually water is drawn off from the main installation at the settlement.	Not very successful as communities have not taken ownership of the alternative water point and usually do not continue to ensure a water supply (sometimes because they cannot afford the additional diesel to pump water). Main water point needs to be completely inaccessible to elephants.	Around US\$2 870 – 3 580
Guarding fields	Caprivi Region	Villagers and conservancy game guards deploy in fields during the growing season to scare away elephants.	Difficult to predict where elephants will appear. Can be dangerous. Difficult to cover a large area.	Loss of sleep and subsequent productivity.
Elephant trip alarms	Caprivi Region	Trip alarms around fields consisting of car siren, battery, timer and polythene string mounted to existing fences or onto trees and poles.	Can work if the area is not too large and if elephants are entering fields from the same direction. Elephants can become habituated to the sound. Potential disturbance of people in settlements or tourism operations.	Around US\$115
Improved livestock husbandry	Being promoted in #Khoadi //hoas Conservancy. Kunene Region	<ol style="list-style-type: none"> 1. Herding of livestock (including use of dogs) 2. Kraaling livestock at night 3. Promoting synchronised birthing 	All can be effective but are rarely practised. Problems include young boys going to school are no longer available for herding.	

Re-location	Used for lions leaving Etosha National Park and in some communal areas	Re-location of a specific problem causing animal to another place or back to where it originated, particularly if from a protected area	Difficult for elephants due to high costs, lack of areas where they can be moved to (there is already a problem due to increasing numbers) and possibility they would return to original sites. Can work for lions if they are “occasional raiders” rather than habitual problem animals. Can be important alternative to lethal removal. Requires good understanding of lion behaviour-ecology	
Lethal removal	Kunene/Caprivi	Shooting of identified and persistent problem animals that are a clear danger to property or life.	Effective in order to protect property or life if the correct animal can be identified. Possibility for a sustainable off-take quota for lions in problem “hotspots”	
Reaction unit	Proposed	Provision of designated personnel on the ground who can react to calls for assistance from villagers. Could be designated persons from conservancy game guards and MET staff.	Would be able to provide a quick response that could identify and deal with the problem causing animal.	
Self-insurance scheme	Kunene/Caprivi	Provision of funding to individuals to off-set (not necessarily fully compensate) for livestock and crop losses.	Initially supported by donor funds, gradually conservancies are taking over the funding from their wildlife and tourism income. Effective, but could become a drain on conservancy finances.	Potentially around US\$2 000 a year per conservancy, depending upon number of incidents and whether a cap is placed on the total amount of payments

ANNEX 6
LIST OF PERSONS CONSULTED

Seth Awiseb	Community member, #Khoadi //hoas Conservancy
Richard Diggie	WWF LIFE/IRDNC Business Advisor, Caprivi
Anton Esterhuizen	NRM Coordinator, IRDNC, Kunene Region
Bernardus Guibeb	Manager, #Khoadi //hoas Conservancy
Michael Hoebeg	Senior Ranger, MET, Grootberg, #Khoadi //hoas Conservancy
Susanna Hoxobes	Community member, #Khoadi //hoas Conservancy
Albert Katsiambi	Community member, #Khoadi //hoas Conservancy
Rensia !Kharuxas	Community member, #Khoadi //hoas Conservancy
Malan Lindeque	Permanent Secretary, Ministry of Environment and Tourism
Ismael Nauseb	Community member, #Khoadi //hoas Conservancy
Caitline O'Connell-Rodwell	Stanford University
Benny Roman	Institutional Development Coordinator, IRDNC, Kunene Region
Phillip Stander	Kunene Lion Project
Eben Tjiho	NRM Facilitator, IRDNC, Kunene Region
Chris Weaver	Chief of Party, WWF LIFE Project
Frans Xoagub	Community member, #Khoadi //hoas Conservancy

ANNEX 7 ANNOTATED BIBLIOGRAPHY

Workshop Proceedings

1. Murphy, C. 2001. Reducing Conflicts between Wildlife and People. 5-7 July, 2001, Greiters Conference Centre, Windhoek, Namibia. Ministry of Environment and Tourism. Windhoek

Proceedings of a workshop bringing together a variety of stakeholders including local community representatives for the first time. The workshop aimed to develop a strategic framework for addressing human wildlife conflict. A number of presentations were given on the links between community-based natural resource management and HWC in Namibia, the value of wildlife, current government policy on HWC, lessons from the southern African Region, and lessons from Namibia. Working groups identified the main problem causing species in their regions, the types of conflicts and defined "problem animals". Main management options were identified and recorded and an action plan was developed based on the formation of a multi-stakeholder working group. 80 pp.

2. MET. 2005. National Workshop on Human Wildlife Conflict Management (HWCM) in Namibia. Safari Hotel, Windhoek, 16 and 17 May. Ministry of Environment and Tourism. Windhoek.

Proceedings of the 2nd National Workshop on HWC. Contains presentations on the policy and legal framework, economic analysis of the impact of HWC, examples of HWC from the field, a review of conflict between people and predators, a draft elephant management plan for Namibia, lessons from around the world (IUCN Human Elephant Conflict Task Force), the Namibian Human Animal Conservancy Self Insurance Scheme, and CBNRM in southern Africa. Working group results on the following: decentralisation/devolution of wildlife management, self insurance methods, alternative mitigation measures and options, a standardised monitoring and reporting system. The workshop developed a draft vision and policy framework for HWC in Namibia. 76 pp.

3. MET. 2006. Human Wildlife Conflict Management (HWCM) Policy Workshop. Kalahari Sands Hotel, Windhoek, 15th March 2006. Ministry of Environment and Tourism. Windhoek.

Proceedings of the 3rd national HWCM workshop. The main aim was to consider and comment on a draft HWCM policy for Namibia developed subsequent to the 2nd national workshop. The report contains presentations on: A situation analysis of human wildlife conflict in Namibia; the results and recommendations from the survey on Human Wildlife Conflict Characteristics on the northern Etosha National Park boundary; results and recommendations from the survey on HWC realities in Ehirovipuka and Omatendeka conservancies and on the draft policy. Working group results on the following aspects of the draft policy: HWC M&E, mitigation measures, self-reliance, capacity building and self-insurance, and protected areas and devolution of authority. 48 pp.

General HWC documents

1. Stander, P. 2005. Situation Analysis of Human Wildlife conflict in Namibia. Ministry of Environment and Tourism, Integrated Community-based Ecosystem management (ICEMA) Project. Windhoek.

Synthesis of data on HWC from a variety of sources, focusing on large predators, elephants and crocodiles. Covers frequency of incidents, nature of problems, regional differences, effects on the wildlife populations, preventive and mitigation measures and recommendations for future action. Main recommendations include zoning for different types of land use, developing localised HWC management plans, continuation of the conservancy self insurance scheme and the need to ensure that benefits from wildlife should reach households affected by HWC. 64 pp.

2. Long, S. A. 2004. (ed). Livelihoods and CBNRM in Namibia: the Findings of the WILD Project. Final Technical Report of the Wildlife Integration for Livelihoods Diversification Project. Ministry of Environment and Tourism. Windhoek.

A comprehensive report on CBNRM in Namibia from a sustainable livelihoods perspective. Contains chapters on the history, development and implementation of CBNRM in Namibia, livelihoods in conservancies in Caprivi and Kunene Regions, wildlife use, the cost of living with wildlife, livelihoods and tourism, and conservancy institutions and governance. The chapter on the costs of living with wildlife concludes that the costs of HWC contribute to household vulnerability, particularly for poorer households with fewer resources. Contains summary of prevention and mitigation measures. Recommendations regarding HWC include the need for multi-dimensional approaches to HWC, the need for a combination of monitoring and research, changes to policy and legislation, continue with the conservancy self-insurance scheme and the need to ensure that the cost of HWC does not exceed people's minimum level of tolerance. 289 pp.

3. NACSO. 2004. Namibia's communal conservancies: A review of progress and challenges. Namibian Association of CBNRM Support Organisations. Windhoek.

Provides an overview of communal area conservancies, with chapters on natural resource management in conservancies, wildlife numbers and trends, governance issues and benefits to conservancies and their members. Provides some overall data on HWC in conservancies and data for the Kwando Conservancy on the number of problem animal incidents from 1993 to 2003. 80 pp.

4. Annual audits of the Event Book Monitoring System.

Reports of audits of the Event Book Monitoring System carried out by WWF on behalf of the NACSO Natural Resources Working Group. They summarise data on HWC from the conservancy event books in specific areas of the country, including number of incidents for the year, the species involved and estimates of damage caused.

5. Sutton, W.R., Larson, D.M. & Jarvis, L.S. 2004. A new approach to assessing the costs and benefits of living with wildlife in developing countries. Research

Discussion Paper No 69, Directorate of Environmental Affairs, Ministry of Environment and Tourism, Windhoek, Namibia. 21pp.

Area specific HWC documents

1. Stander, P. and A. Esterhuizen. Undated. Detailed Survey on the State of Human Wildlife conflict in Ehirovipuka and Omatendeka Conservancies. Ministry of Environment and Tourism, Integrated Community-based Ecosystem management (ICEMA) Project. Windhoek.

Synthesis of monitoring data from different sources for the two conservancies, produced in 2005. Focuses mostly on predators but also covers elephants. Makes recommendations on monitoring HWC, zoning for different land uses, developing localised HWC management plans and suggests quotas for sustainable off-take of large carnivores in the conservancies. 35 pp.

3. Mfune, J. K. , A. Mosimane, H. Hamukuaaja, and M. Angula. 2005. A preliminary survey of human-wildlife conflict along the northern border of the Etosha National Park. Ministry of Environment and Tourism. Windhoek.

This document focuses on HWC on communal land on the northern border of the Etosha National Park. It defines the nature of the problems (caused mostly by predators and elephants and provides brief background material on land use and livelihood activities. It provides an overview of the policy and legal context for HWC and provides data on the types of problems on the Etosha northern boundary. It provides a brief assessment on the impact of HWC on livelihoods and makes recommendations for future action. It suggests MET should provide better maintenance of the park border fence, there should be clear procedures for how local people and MET deal with HWC, MET should be more proactive instead of reactive, and local people need to benefit more from wildlife through mechanisms such as conservancies. The report calls for a national HWC policy and the devolution of decision on HWC to local levels. It provides a draft HWC strategy for the Etosha northern border area.

4. Esterhuizen, A. 2004. A perspective on problem causing animals in the Kunene Region, Namibia from the Huab River north to Opuwo with regard to strategies implemented to reduce conflict between local communities and problem causing animals. Integrated Rural Development and Nature Conservation. Windhoek.

The report reviews current attitudes of people in Kunene Region to wildlife and problem animals, and concludes that generally there is greater acceptance of problem causing animals than 10 years ago due to the government's conservancy approach. The report reviews a number of existing strategies in the region for reducing conflict and makes recommendations for improvements. It reviews the implementation of the Human Animal Conflict Conservancy Self Insurance Scheme in Kunene Region, concludes that despite teething problems the scheme should continue and makes recommendations for improvements. 18 pp.

5. Mulonga, S., H. suich and C. Murphy. 2003. The conflict continues: Human Wildlife conflict and livelihoods in Caprivi. DEA Research Discussion Paper No. 59. Directorate of Environmental Affairs. Windhoek.

This paper summarises data on HWC in Caprivi from different sources, and provides new data from case study sites. It provides data on impacts of HWC on households and makes recommendations for addressing HWC including the need for a national HWC policy and the need for transboundary management of elephants in Caprivi.

6. Arnold, B. M. 2001. Predators in the Kunene Region: An overview of problems and prospects. Wildlife Integration for Livelihoods Diversification Project. Ministry of Environment and Tourism. Windhoek.

The report provides data on human predator interactions, seasonality of incidents, different forms of livestock management in the region, and responses by farmers to HWC. It provides some data on the financial impacts of livestock losses and suggests that average losses per household per year could be around US\$900 while predators bring little direct benefit to households. 25 pp.

7. Jones, B. 1994. Huab Catchment Area Conservation project: Final report. European Commission African Elephant Conservation Programme. Oxford.

The final report of a project aimed at elephant and black rhino conservation in the Huab River catchment of the Kunene Region, Namibia. One of the project objects was to remove sources of conflict between elephant and rhino and local people and to bring benefits from wildlife to residents. The project assisted local farmers to build and maintain stone walls around water installations to protect them from elephants and provided additional diesel to farmers whose water pumped for livestock was consumed by elephants. The project also built alternative water points for elephants in an attempt to draw them away from water points at settlements. The report found that despite the creation of alternative water points, elephants still approached settlements, possibly attracted by small-scale gardens. 24pp.

8. Caitlin E. O'Connell-Rodwell, C. E., T. Rodwell, M. Rice, and Lynette A. Hart. 2000. Living with the modern conservation paradigm: Can agricultural communities co-exist with elephants? A Five-year case study in East Caprivi, Namibia. *Biological Conservation* 93. 381-391. Elsevier Science Ltd.

This study considers the economic impact of elephants and predators, particularly lions, on rural agriculturists in the Kwando region of Caprivi from the years 1991 to 1995. It found that elephants were responsible for the greatest number of wildlife conflicts in the region, while lions had the greatest financial impact on farmers. Attempts were made to reduce conflicts between elephants and farmers using deterrents such as electrical fencing, trip-alarm techniques and elephant warning calls. Success of deterrents depended on the frequency of exposure to elephants, maintenance and the ecology of both humans and elephants in the region. Of the deterrent strategies explored, only electrical fencing reduced elephant damage at the community level, but the future efficacy of electric fencing was uncertain, however, if elephants did not associate it with fear and possible death. Deterrent efforts played a role in improving relations between communities and conservationists. According to the authors their results lead to the

conclusion that there are primarily two community conservation models when elephants are a part of the system. One is to commit to a comprehensive system of crop protection and the other is to eventually replace subsistence farming with an economy based entirely on wildlife related revenues.

9. Evans, K. 2004. Crop losses caused by wildlife and mitigation measures in Kwandu and Mayuni Conservancies. Unpublished Report, Namibia Nature Foundation, Windhoek, Namibia. 48pp.

Species specific documents

1. MET. 2005. Draft Species Management Plan: Elephants. Ministry of Environment and Tourism. Windhoek.

The management plan draws on data from the accompanying background study on elephants (see 2. below), shows how elephants are increasing and are not threatened in Namibia, demonstrates the economic contribution elephants could make to the state and rural communities (sufficient to offset the costs which elephants cause through damage), and provides a goal and objectives for managing elephants in Namibia. Important aspects of the proposed management plan are: The devolution of authority to landholders to manage elephants on their land; removal of the particular constraints to sustainable use of elephants in Namibia under CITES, the development of co-management institutions between government and landholders and the use of an adaptive management approach that incorporates, trophy hunting, problem animal control, population reduction, and cropping. (These management plan recommendations still need to be approved by MET). 36 pp.

2. Martin, R. B. 2005. Transboundary Species Project Background Study: Elephants. Transboundary Mammal Project of the Ministry of Environment and Tourism. Windhoek.

This document provides a background report for the draft species management plan (above). It considers the status of elephants in different regions and nationally, models population growth, considers the conservation and economic significance of Namibian elephants, briefly looks at the impact of CITES on elephant management and emphasises the need for co-management between government and landholders. It also looks at the need for transboundary management of elephants. The report has a short section on human-elephant conflicts drawing on existing data and concluding that the current level of income from elephants to conservancies does come close to providing sufficient compensation for the losses caused by elephants. 104 pp.

3. Matson, T. 2005. Human-Elephant Conflict Research Project: Nyae Nyae conservancy and Khaudum National Park. Project Update 30th October. Namibia Nature Foundation. Windhoek.

This report focuses on the Nyae Nyae Conservancy in Otjozondjupa Region in north-east Namibia and the neighbouring Khaudum Game Reserve. It provides data on HWC conflict with regard to variables such as season and herd size, documents conflict types,

estimates the financial costs of HWC and provides information on attitudes towards elephants of conservancy members. 9 pp.

4. MET. Undated. Conservation and Management of Elephants in Namibia. Ministry of Environment and Tourism. Windhoek.

This document, produced in 2002 covers distribution and numbers, population status and trends, habitat availability, law enforcement and ivory control, and data on elephant problems from Kwando conservancy in Caprivi. It gives information on the Game Products Trust Fund, which provides funding raised from the sale of wildlife products to promote the better co-existence of people and wildlife outside of protected areas. It shows that the Trust Fund supported four projects to reduce damage caused by elephants. 9 pp.

5. MET. Undated. Elephant Management in Namibia. Ministry of Environment and Tourism. Windhoek.

Produced in 2005, this document sets out the MET approach to elephant management covering distribution, numbers population trends, the importance of conservancies for elephant conservation and the need to address human elephant conflict. The document states that the main strategy to do this is to increase the value of elephants to such an extent that they become more valuable than the losses, experienced by communities.

6. MET. 2004. Proposal to amend the annotation regarding the Namibian population of *Loxodonta Africana*. Thirteenth Meeting of the Conference of the Parties, October 2004, Convention on International Trade in Endangered Species of Wild Fauna and Flora. Ministry of Environment and Tourism. Windhoek.

Namibia's proposal to CITES COP 13 to allow an annual export of 2 000 kg of raw ivory, trade in raw ivory products for commercial purposes and trade in elephant leather and hair goods for commercial purposes. It emphasises the conflicts between elephants and people, notes the changes in attitudes towards wildlife due to the MET's CBNRM approach and emphasises that more needs to be done to provide benefits from elephants to communities that suffer losses through living with elephants.

7. Barnes, J. I. 1996. Changes in the economic use value of elephant in Botswana: the effect of international trade prohibition. In: *Ecological Economics* 18 215 – 230. Elsevier Science B. V. Amsterdam.

This article in the Journal of the International Society for Ecological Economics suggested that when international trade in elephant products was effectively banned in Botswana about half of potential economic use values were lost. In Botswana poaching of elephants was low and the main threat to elephants would be the conversion of their habitat to cattle ranching unless land holders could realise high elephant use values. The article argues that total economic value of elephants should be maximised including complementary combinations of non-consumptive and selected consumptive use values,

as well as non-use values. The article has relevance for Namibia because of similar environmental and climatic conditions, and similar land use issues affecting elephant conservation. 16 pp.

8. Cumming, D. and B. Jones. 2005. Elephants in southern Africa: Management issues and options. WWF – SARPO Occasional Paper Number 11. WWF Southern Africa Regional Programme Office. Harare.

A review, commissioned by the WWF Africa and Madagascar Programme, of the status of elephant populations and management issues and options in Southern Africa with country studies from Botswana, Mozambique, Namibia, South Africa, Zambia and Zimbabwe. With regard to HWC, the report concludes that conflict between humans and elephants is reported to be a major and escalating problem in all countries in southern Africa except South Africa. The report notes that elephant and human populations have both increased twenty-fold in southern African countries over the last century. It recommends that to address the HWC problem there is, firstly, the need to devolve decision making about the conservation and management of elephants to those communities that live with elephants, and secondly, there is the need to increase the benefits derived from elephants (both live and dead) to local communities. The Namibian country study provides data on HWC incidents involving elephants and impacts on livelihoods. 98 pp.

9. Diggle, R., B. Munali, and G. Owen-Smith. 2006. Community benefits from Elephants: Examples from Caprivi. Paper presented at the workshop 'Towards Rationalizing Transboundary Elephant Management and Human Needs in the Kavango / mid- Zambezi Region' held on 23-24 May 2006 in Gaborone, Botswana.

This paper provides data on income to conservancies in Caprivi from trophy hunting of elephants and estimates of the tourism value of elephants in the region. It provides data on the value of crop damage by elephants but cautions that it is difficult to obtain a good understanding and consensus on what is a realistic financial and economic value of crop losses caused by elephants. It shows how community attitudes towards elephants have become more positive despite the problems they cause. It suggests that the most important mitigation strategy has been working with traditional leaders and establishing a community-game guard programme over a 16 year period which was the major catalyst for changing attitudes towards community conservation. 8 pp.

10. O'Connell. C. (1995) Final Technical Report: East/West Caprivi Natural Resource Monitoring Project: Elephant/human conflicts. Ministry of Environment and Tourism/USAID/WWF. Windhoek.

Results of a three-year research project to study elephant/human conflicts along the Kwando River, quantify losses and experiment with ways to reduce conflict. Data is presented on damage to vegetation along the river in the Bwabwata National Park, (then West Caprivi Game Park), trends in crop damage on communal land, costs of crop damage and livestock losses due to predators and the results of experiments with methods to deter elephants. The report made recommendations for policy changes to

deal with human-elephant problems including appointment of a problem animal control officer, decentralization of decision-making to regional level, and re-instating the appointment of a problem animal “hunter” by the traditional authorities.

11. Hart, L. A. and Caitlin E. O'Connell. Undated. Human Conflict with African and Asian Elephants and Associated Conservation Dilemmas. University of California, Davis.

This paper reviews the sources of conflicts of Asian and African elephants with people. It describes the behavioral patterns associated with crop raiding and discusses attempts to prevent and mitigate the damages. The authors suggest that in both areas the economic realities of elephant damage create a dynamic problem without a clear solution, despite the wide range of attempted methods. The paper discusses specific attempts to deter elephants from raiding crops in the Kwando area of Caprivi in Namibia. It concludes that the effectiveness of electrical fencing, trip-alarm techniques, or elephant warning calls depended on various factors, including the frequency of exposure of elephants to the deterrents, maintenance of the deterrents, and other complex social factors of both humans and elephants.

12. Osborn, F. V. and L. A. Welford. Undated. Living with Elephants: A manual for wildlife managers in the SADC region. USAID Regional Centre for Southern Africa. Gaborone, Botswana.

This manual provides an overview of human-elephant problems in southern Africa, elephant ecology and the relationship of community-based natural resource management to dealing with elephant problems. It carries brief country surveys of key issues in Botswana, Malawi, Mozambique, Namibia, Zambia and Zimbabwe. It reviews the effectiveness of various preventive and mitigation methods and templates of various reporting forms.

13. Chase, M. Undated. The Population Status, Ecology and Transboundary Movement of elephants in the Okavango Upper Zambezi Transfrontier Conservation Area (OUZTFCA). OUZTFCA Elephant Project. Maun, Botswana.

Produced in 2004 or 2005 this report summarises findings from surveys of elephant movements and of elephant numbers in the OUZTFCA area which includes Caprivi in Namibia. The project began in 2001. With regard to HWC it concludes that the large density of elephant in the area and increasing human populations and farming activities have amplified the human-elephant conflict. It argues that there is a need for the development of “safe corridors” for elephants between protected areas in the region and identifies the Kwando/Linyanti “corridor” in Caprivi which elephants use to disperse from Botswana into Namibia, Angola and Zambia. See also results of aerial surveys to count elephants in the Luiana Partial Reserve in Angola, the Caprivi Strip, Namibia, and the Sioa Ngwezi National Park, Zambia, by the same author, all of which emphasise the importance of the Kwando/Linyanti corridor for elephant dispersal in the OUZTFCA, although do not address HWC specifically.

14. Stander, P. 2006. Population ecology and demography of Kunene lions, 2006: Towards resolving human-lion conflicts with applied research and proactive management. Research Paper 2006/1. Predator Conservation Trust. Windhoek.

This paper documents the demography and population dynamics socio-ecology, behaviour and habitat utilisation, and the habitat expansion and dispersal of lions in Kunene Region. The data presented shows that lion numbers have increased from 15 in 1999 to 85 in 2006 and that lions have considerably expanded their range. The author suggests the data on the population status and demography of lions that are in line with, and complement, the upward trend in other wildlife species in the region and recent conservation achievements through conservancies and other conservation programmes. He suggests that conflict between lions and the local communities remain the most important ecological, conservation, and economic problem and presents his data as a ecological and technical foundation for developing measures to resolve this conflict.

ANNEX 8 STATEMENT OF WORK

A. Description of Work

Terms of Reference

Human Wildlife Conflict Study¹

Objective

One of the main aims of the Human Wildlife Conflict (HWC) programme being developed by the Global Species Programme is to generate political will and funding² for human-wildlife conflict prevention and mitigation measures.

This study will examine the dynamics of human wildlife conflict at the local level, and also examine the root causes of the conflict stemming from constraints to properly planned and executed conservation efforts, lack of adequate forward planning to prevent new occurrences of HWC, conditions of poverty and limits to livelihood improvement, and other drivers such as national and international trade, incentives for agriculture production and infrastructure. Furthermore, in some circumstances communities and the general public perceive that HWC is ‘owned’ by a particular Department of the State. However, when the damage caused by wildlife is significant, mitigation must be cross sectoral and multi pronged in order to be effective.

The study should be a lobbying tool that makes the case for action to change policy drivers that cause or exacerbate HWC. The information will also be important in stimulating funding, political and community commitment to conservation and development solutions.

The analysis will review:

- existing conditions of human wildlife conflict in three case sites/locations
- obstacles to implementation of a sustainable and equitable approach to preventing and/or mitigating HWC that would benefit both local communities and wildlife; and
- opportunities and positive models for preventing and/or mitigating human wildlife conflict in development and planning strategies.

¹ A Collaborative Effort Between the Global Species Program and the Macroeconomics Programme Office

² Prevention here refers to land-use planning and socio-economic development planning that ensures HWC will not occur. Mitigation refers to techniques to reduced HWC in those situations where it has not been possible to prevent it.

The analysis will identify critical issues related to human wildlife conflict in the selected countries and provide the basis for recommendations to develop an integrated planning approach for addressing the local conditions and root causes of the conflict.

Long-Term Goals:

- Highlight the rationale for ensuring that the potential to inadvertently stimulate, exacerbate, or mitigate human wildlife conflict, is taken into consideration and appropriately addressed in development planning for the benefit of both communities and species
- Provide a tool for decision makers in development policy and planning
- Identify avenues for sustainable financing of solutions

Background

Human-Wildlife Conflict – The Issue

Human-wildlife conflict is defined as any event in which animals injure, destroy or damage human life or property (including destruction of crops), and are killed, injured, captured or otherwise harmed as a result - i.e. both humans and animals suffer from the interaction with each other.

Human wildlife conflict (HWC) is one of the greatest threats today to both species and impoverished rural communities. HWC will continue to increase as the human population grows. Successful prevention or mitigation of human wildlife conflict is absolutely essential if we are to achieve our conservation goals, and a world in which ‘people live in harmony with nature’.

The impacts of HWC on humans and their livelihoods are highly significant. For example, an elephant eats around 150 kg of food per day and a single elephant can destroy a hectare of crops in a very short time; a small herd can decimate a farmer's livelihood overnight. The same goes for large cats, which have been known to kill dozens of sheep in a rampage. Often, the people who suffer these attacks are already economically and nutritionally vulnerable (the circumstances that lead them to encroach on wildlife habitat), and the loss of crops and livestock can have grave impacts on their income and food consumption. Such attacks can also cause damage to water supplies, housing, other infrastructure and in some cases can lead to human injury and/or death. For example, in India alone it is estimated that 300 people are killed annually in human-elephant conflicts.

HWC also affects significantly effects large-scale agri-business. In the largest palm oil producing province in Indonesia, Riau, losses due to elephant damage of oil palm plantations and timber estates are estimated to be around US\$105 million per year. The biggest direct driver of conflict with elephants and rhinos is the loss of habitat, combined with the attraction presented by certain domesticated crops. In the case of most big cats, the direct driver is movement of people into tiger habitat, but also prey depletion

which forces big cats to look to other sources, namely, livestock, and occasionally, humans. Root causes can include private-sector activity, government policy vis-a-vis powerful special interests, infrastructure planning and or trade.

Poverty and Vulnerability

For rural communities, consequences often associated with human-wildlife conflict are loss of life or injury, threats to economic security, reduced food security and livelihood opportunities. Due to their lack of resources, communities with limited livelihood opportunities are often hardest hit by conflicts with wildlife. Without mitigating human-wildlife conflict the results are further impoverishment of the poor, reduced local support for conservation, and increased retaliatory killings of wildlife causing increased vulnerability of wildlife populations.

Poverty is the result of a combination of socioeconomic circumstances that limit livelihood opportunities. It is now generally accepted that poverty is more than just a question of low income; poverty is a “pronounced deprivation in well-being” (World Bank 2000) resulting from a deprivation of a multifaceted set of material goods, assets, conditions and opportunities.

Methodology

The analysis will address local and root causes of HWC at the micro, meso and macro levels:

- At the micro level (local), there are conditions that may not allow local communities to deal effectively with human wildlife conflict including participating in planning.
- At the meso level (district, provincial), livelihood issues in relation to human wildlife conflict may not be fully understood by decision makers
- At the macro level (national, international), regulation and policy decisions may not plan for, or reflect the realities of, local conditions of human wildlife conflict. For example, national governments can also play a critical role in determining the location and development of factors that cause or exacerbate conflicts such (eg. agri-business, barriers to wildlife movement such as fences etc.) At the international level, subsidies can play a part in exacerbating HWC (for example, the effects of EU subsidies to the beef industry in southern Africa.)

The analysis will answer these and other key questions:

- What is the dynamic of the human wildlife conflict?
- What is the current process of HWC mitigation in terms of decision making, transparency and practices of good governance?
- What are the costs in terms of lost livelihoods from conflict and the implications for communities concerned?
- What are the costs to the state of living with (and compensating for) conflicts, and in mitigating conflict in the way it is currently practiced?

- What are the policy and market³ drivers that cause human wildlife conflict, or hinder efforts to address it?
- What are the planning mechanisms in place that are possible avenues for addressing such drivers?
- What are the opportunities and potential benefits from implementing human/wildlife solutions?
- What would the cost of implementing human/wildlife conflict solutions be (both direct and indirect⁴) and how does this compare to the cost of living with human/wildlife conflict? (To the extent possible within the scope and timing of this research)
- What is the value to livelihoods of maintaining wildlife?
- What are the case studies of best practices that can be replicated in other sites with appropriate modifications?
- Additional site specific questions for more in-depth analysis

Timeline

Overall Project Time: June-December 2006

1 month: literature search and review of relevant prior studies/information, design of the study protocol, selection of sites for data collection, collection of published or otherwise available documents, travel & meeting arrangements.

1 month: travel to key sites and set up researchers

2-4 months: work with researchers in analysis and report writing, in close collaboration with Global Species Programme and relevant field staff and experts.

³ 'Market drivers' here refer to external economic factors affecting HWC. This may include, for example,

- Subsidies which artificially inflate the real market value of the commodity concerned, resulting in the undervaluing of the benefits of the wildlife resource.
- Subsidies that otherwise influence HWC (eg. EU subsidies for beef exports from southern Africa which result in large scale fencing to ensure compliance with health protocols for EU meat imports. These fences may cut off migratory routes for wildlife, thus pushing them into areas where they come into conflict with humans.)
- Consideration of who should bear the financial burden of HWC and HWC mitigation (eg. are agribusiness involving commodities such as tea, palm oil and coffee shouldering the financial burden of HWC or is this burden borne by society/government?)

⁴ 'Direct cost' here refers to the actual cost involved in the implementation of a solution. 'Indirect costs' here refers to the loss of revenue / assets for a community that may be associated with implementation of a solution (eg. if land previously used for agriculture / resource use is turned into a wildlife corridor.)

B. Deliverables, including due dates

1. Draft Outline of Work July 17, 2006
2. First Draft of Report September 1, 2006
3. Final Report October 1, 2006

Report to include policy recommendations, one site visit, and a bibliography. An economic study and the research for the bibliography may be subcontracted by the consultant.