

WILDLIFE MANAGEMENT WORKING PAPER

Number 8

**Strategies
to mitigate human-wildlife conflicts
Mozambique**

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ACRONYMS

AWF	African Wildlife Foundation
CITES	Convention for International Trade in Endangered Species.
DNAC	National Directorate of Conservation Areas
DNFFB	National Directorate of Forests and Wildlife
HEC	Human-elephant conflict
KfW	Kredianstalt fur Weideraufbau
IUCN	International Union for the Conservation of Nature and Natural Resources
MAP	Ministry of Agriculture and Fisheries
PAC	Problem Animal Control
PPF	Peace Parks Foundation
USAID	United States Agency for International Development

1 EXECUTIVE SUMMARY

1.1 Background

The people of Mozambique are steadily lifting themselves up from one of the lowest levels of poverty in the world. In 2002, the national per capita income was \$210 and more than 70% of the population are rural and rely on subsistence and small-scale agriculture for their livelihood.

While the country's wildlife resources have been plundered over the last 30 years, they are still very significant. Wildlife still represents a very valuable opportunity for the country and, properly managed, it can benefit the people that share the same area of land through sustainable utilization and tourism.

National Parks and Reserves have been created, yet people continue to live within them (e.g. Banhine, Zinave). There are also significant wildlife populations in some Coutadas and game ranches and in some areas occupied by resident communities.

As both the human and wildlife populations increase, and people occupy new land, the level of conflict is also increasing. This unresolved human-wildlife conflict is creating negative attitudes towards both the Government and proposed new wildlife related developments. In view of this, the national Government understands the urgent need to reduce the levels of human-wildlife conflict to ensure that where people do live with wildlife the benefits are greater than the costs.

Unresolved human-wildlife conflict is creating negative attitudes towards both the Government and proposed wildlife related developments.

This report is the first step in the Government's actions to understand the problems and then to mitigate them.

1.2 Conclusions and recommendations

The TOR called for short, medium and long term strategies. In view of the urgency of the problems, both the short and medium term strategies have been combined. It is envisaged that the short and medium term strategies would take place over a period of six months and a year respectively.

Some components of the long term strategies would commence in the first year, but the majority would start in the second year and run for a further two years.

1.2.1 Short term strategies

1.2.1.1 Adoption of a Human-Wildlife mitigation Policy.

There needs to be a very clear and concise policy on Human – Wildlife conflict which will guide Directors and decision makers at provincial and district level.

The proposed draft for such a Policy is as follows:-

The policy of the Government of Mozambique towards animals that conflict with the safety and food security of people outside conservation areas and the agricultural objectives of the country, will be as follows:

- The Government accepts the responsibility of resolving those human-wildlife situations where the lives of its citizens, their food security and the agricultural objectives of the country are at risk.
- Landuse planning will be done in those districts with high degrees of human-wildlife conflict. The planning will determine the optimum development of the district and will incorporate wildlife conservation and sustainable utilization wherever it is economically viable and will benefit the communities.
- If viable populations of problem crocodiles, lion and elephant cannot be managed outside conservation areas so that the economic benefits of living with these species are greater than they would be if they were absent, these populations will be removed in the most humane and cost-effective manner.
- In the interests of developing an agricultural export industry, the buffalo populations in Maputo, Gaza, Inhambane, Manica and Tete provinces will be prevented from contact with cattle by the most cost-effective means possible. The monitoring and enforcement of this policy will be implemented by the Veterinary Epidemiology Unit, DNFFB and DNAC.

1.2.1.2 Revise legislation

The legislation must be revised to enable the responsible government agencies to take pre-emptive measures where necessary and to ensure that the policies on buffalo and cattle can be enforced.

1.2.1.3 Problem Animal Control units (PAC units)

At least three Problem Animal Control (PAC) units must be established, and properly trained and equipped to deal with conflict situations. One of these units should be based the north, the second at Tete and the third at Xai Xai. Each must be controlled directly from Maputo.

These PAC units must have appropriate staff who are provide with the skills and equipment to carry out their responsibilities. These responsibilities will be primarily to respond to human-wildlife conflict situations, to assess objectively what action should be taken and then to take action where necessary. Because

of the nature of the work, a mentorship programme will be necessary so that staff can gain practical experience as rapidly as possible.

1.2.1.4 Record keeping and database

A record keeping database must be developed and the data forms distributed to the affected districts.

1.2.1.5 Problem species mitigation strategies

Elephant

The mitigation of human-elephant conflict must involve the implementation of a number of programmes:

- Landuse plans must developed for districts where elephant are resident. These plans must consider the possibility of creating areas where elephants can be sustainably managed to provide benefits for the local communities and where they do not compete with humans for the same resources. They must logically also consider planning areas where there may be no elephants. In this period, the estimates and proposals for the funding for these plans must be made and submitted to potential donors.
- The creation of effective, low-maintenance barriers and other deterrents must be explored. As government will not be able to afford the resources to undertake this, motivations for donor assistance must be made to implement these.
- The hunting of elephant by community hunters is being commercialized by them and other parties and there is a very high wounding rate. This practice should be phased out as soon as the Government has developed its own PAC units.
- The value of the benefits that communities receive from elephants hunted in their areas must be increased. This can be done by:
 - a. Making a submission to CITES to allocate additional CITES permits so that a number of the elephants currently shot on control can be can be sold to Trophy hunters.
 - b. Increasing the proportion of the license fee that the communities receive from an elephant shot in their area.
- The high number of wounded elephants as a result of poaching and community hunters increases the incidence of rogue elephants. Serious efforts must be made to reduce poaching, as this will reduce the incidence of wounded elephant and reduce the number of people attacked by rogue elephants.

Crocodiles

- A programme must be developed to educate communities in how to reduce the risk of being attacked by a crocodile.

- Government must provide villages in high risk areas with the materials to make protective barriers within which people can safely collect water and wash.
- Mozambique has been allocated CITES permits enabling 900 skins or live crocodiles to be exported. The market for skins is for animals in the region of 1.5 m in length, but crocodiles this size are not the animals causing the problem. It is recommended that 100 of the permits are retained for Trophy crocodiles and that the remainder are allocated only for the live capture and export of crocodiles over 2 m in length.
- Crocodiles should be removed from water bodies which no longer have enough natural food to sustain a viable population of adult crocodiles.

Lion

- Outside the boundaries of the conservation areas and Coutadas, lions should be removed as soon as their presence is detected.
- The capture and translocation of lions is ineffective in solving lion problems and the proposed PAC units must be equipped and trained to destroy problem lions as efficiently as possible.

Buffalo

- With the development of the Great Limpopo Transfrontier Park and the increase in game ranching. The introduction and spread of buffalo has the potential of causing a major negative impact on the cattle industry and any future agricultural exports from the country.
- Plans are needed for the creation of buffalo-free areas in Maputo, Gaza, Inhambane, Manica and Tete provinces.
- Buffalo cordon fences must be planned and erected to prevent any buffalo-cattle contact in areas where a viable cattle industry can be developed.
- Buffalo found in cattle areas must be removed as rapidly and cost-effectively as possible. The PAC units must be responsible for ensuring that this is carried out.
- Buffalo should not be introduced into the Maputo Special Reserve.

Hippo

- Landuse planning must be done to determine where hippo populations can be conserved outside conservation areas. These plans would also determine where hippo are incompatible with the needs of people and from where they should be removed.
- In the short term, protective barriers to exclude hippo should be constructed to exclude hippo from crops.

- In the long term, sisal barriers should be planted to exclude hippo from fields.

Bushpig

- Bushpig occur throughout the country and most communities deal with the problem themselves. At this stage the PAC unit should not focus on bushpig problems and only tackle them for training purposes or when a very severe situation is identified.

Baboons and monkeys

- Baboons and monkeys were not mentioned as a priority by communities. Further data is required before a decision can be made as to whether DNFFB needs to take any action with these species.

Birds

- Data collection is needed to determine the scale and location of human-bird conflict and whether any mitigation measures can be cost-effectively applied. No immediate action therefore is required to control human-bird conflict.

Hyena

- The hyena problem in north-east Niassa and Maputo provinces must be solved as soon as possible by the proposed PAC units.

1.1.2.6 *Review the question of fences in the Limpopo National Park management plan*

The Limpopo Management Plan recommends that no fence is erected along its eastern boundary. This will result in severe conflict with elephants, lions and buffalo. The result will be that many self-sufficient families will have their livelihoods ruined.

Through the transmission of diseases, the impact of buffalo on the cattle industry will be severe and will probably exceed any benefits that will be generated by the park. For these reasons, it is strongly recommended that a buffalo and elephant proof fence is erected along the eastern boundary of the park.

1.2.2 **Medium term strategies**

1.2.2.1 *Landuse plans*

The National Elephant Management Strategy emphasizes the need to develop and implement landuse plans. The priority areas for landuse plans are the districts outside conservation areas that have a high level of human-elephant conflict (HEC), where there is human-hippo conflict and where buffalo are likely to impact on the cattle industry.

Where people are moving into areas occupied by viable populations of elephant, this settlement needs to be planned so that future conflict with elephants is minimized

1.2.2.2 Problem Animal Control units

The first trained and equipped PAC Units should be deployed to their station and start operating.

1.2.2.2 Species status surveys

Nation-wide species distribution and status surveys are needed for the following species: elephant, lion, and buffalo. These data will be used in the development of the management plans for elephant and hippo and in the zonation of the areas where cattle-buffalo contact is to be prevented.

1.2.3 Long term strategies

1.2.3.1 Capacity building of PAC Units

The capacity building of the Problem Animal Control units will be an ongoing process that will take at least two years.

1.2.3.2 Landuse plans

Once the landuse plans in high priority areas have been completed, the continued development of these plans will flow to the districts where a lesser conflict occurs. The ultimate objective must be that all districts with wildlife development potential or possible human-wildlife conflict in the country must be planned and developed according to the plan.

1.2.3.3 Consolidation of wildlife related Directorates

The effectiveness of Wildlife conservation in the field has been weakened by fragmenting the responsibilities into what is now three different organizations. It is strongly recommended that these organizations should be consolidated and come under one ministry as is the case in Botswana, Zambia and Zimbabwe.

1.2.3.4 Revisit the issue of compensation for elephant-damage

There may be areas where the only option left to retain elephants may be in awarding compensation for elephant-damage. Clearly, Mozambique could not afford this. However, what needs to be investigated is whether the concept could be supported by a foreign NGO.

2 METHODOLOGY

2.1 FIELD VISITS

The field assessment was intended as a rapid evaluation of the problems some of the worst affected areas. This consisted of visits to the following areas:

Niassa Province:	Maua District
	Nipepe District
	Majune District
Tete Province	Chifunde District
	Maravia District
	Mutarara District
Gaza Province:	Mabalane District.
	Chicualacuala District
	Massingir District
Maputo Province	Salamanga District
	Maputo Special Reserve

At Provincial level the issue was discussed with senior officials of DNAC, DNFFB and the Ministry of Agriculture. In the districts, we met with the Administrators or other senior officials, visited villages and farmers where human-wildlife conflict had been reported and discussed the problem with some of the people affected.

3 RESULTS: INSTITUTIONAL AND LEGAL CONSTRAINTS

3.1 LACK OF POLICIES

At present there is no clear policy on resolving human-wildlife conflict that can be used by administrators and managers to guide their decisions and actions. At present they are obliged to react to situations only when they arise but a clear policy on problem species will allow will allow some management actions to be taken before problems occur.

3.2 LACK OF CAPACITY TO RESOLVE PROBLEMS

3.2.1 The Fragmentation of Conservation activities

The shortage of human and financial resources are the main reasons why there is a lack of capacity in DNFFB to fulfill its mandate. Also, as a consequence of the recent history of the country, there are few if any staff with the practical experience to lead and mentor new staff in carrying out their duties.

Recently, the development and management of Conservation Areas was taken away from Fauna Bravia and a new Directorate (DNAC) formed under the Ministry of Tourism. Subsequently the Transfrontier Parks have become almost autonomous within DNAC itself.

With the help of NGO's in the development of the Transfrontier Parks (P.P.F, KFW and AWF), the Transfrontier parks offshoot of DNAC has attracted funding and steady progress has been made in achieving its objectives.

In contrast, Fauna Bravia, within DNFFB has the responsibility for wildlife outside conservation areas and for controlling activities such as crocodile farms and game ranches. The organization is under-funded, it lacks vehicles and the necessary equipment and skills. The staff morale and the enthusiasm to tackle the work are not what they should be.

Mozambique does not have the resources to afford three separate wildlife conservation organizations. We believe that dividing the responsibilities for conservation between three organizations has created more offices and administration staff but not help deploy more people where they are must urgently needed ; that

Mozambique does not have the resources to afford three separate wildlife conservation organizations.

is – in the field. These changes have not been in the best interests of wildlife outside protected areas. Wildlife conservation outside protected areas loses capacity by being a poor relation of Forestry. An example of this is that vehicles that are assigned to Fauna Bravia are taken without notice and used by more senior officials within the ministry. DNFFB would be more effective if were to have greater autonomy.

3.2.2 Data collection

Information gathering, record keeping and reporting must be very greatly improved. It is certain that there is considerable under-reporting of incidents of

human-wildlife conflict. This is shown in the available figures that were used by Magane (2005) in Table 1, showing the scale of the problem in each province. Examples of the degree of under reporting in these data are that in 2004, 30 people were killed by crocodiles in the Mutarara district alone, yet the total for the Tete province over 8 years is given as only 29. Over 18 months, between 2000 and 2001, 70 people were killed by lions in Cabo Delgado (Chardonnet 2002), but the table only shows a total of 48 over eight years.

The table shows that over seven years, 38 elephants were been shot on problem animals control, yet the National Strategy for the Management of Elephants reports 121 being shot on problem animal control over the three years between 1996 and 1999.

However, what the table clearly does show, is that human-crocodile conflict is greatest in Tete and Sofala Provinces and that Cabo Delgado has the most severe problem with man-eating lions.

TABLE 1. Records of Human : Wildlife conflict between 1997 and 2004: Animals killed and People killed. (Magane 2004)

	Elephant	People	Croc	Person	Hippo	Person	Lion	Person	Total Animal	Total Persons
Niassa	2	3	17	5	5	3	1	3	25	14
C.Delgado	9	7	5	3	0	3	13	48	27	61
Nampula	2	7	17	5	2	0	1	3	22	15
Zambezia	4	3	28	8	8	1	2	1	42	13
Tete	7	4	47	44	20	9	1	0	75	57
Manica	9	3	9	4	2	0	0	0	20	7
Sofala	2	3	40	29	10	6	2	1	54	39
Inambane	2	2	0	4	0	2	0	0	2	8
Gaza	1	3	2	5	14	3	4	3	21	14
Maputo	0	6	15	3	0	0	1	3	16	12
Total	38	41	180	110	61		25		304	240

Source: Magane, documento apresentado ao XIII encontro nacional de FFB em Songo 2003 & DNFFB, relatórios balaco do SPFFB, apresentados ao XV de FFB em Lichinga 2005.

Because the records that have been kept are incomplete and are not consolidated, it has not been possible to provide the accurate numerical data that should be in this report.

3.2.3 Lack of experienced staff

Very few staff have any real practical experience in dealing with human-wildlife conflict. This is primarily because they have rarely had the opportunity and also have not benefited from working under mature and experienced senior staff who could act as their mentors.

3.2.4 Budget constraints

The DNFFB budget is a major factor in limiting the effectiveness of the organization. The organization is understaffed for the scale of its responsibilities and also under equipped and the staff poorly paid.

A number of new firearms have been purchased and allocated to the DNFFB provincial offices and to the more seriously affected District Administrator's office. These have not been supplied with cleaning equipment and materials, because of a shortage of funds. Inevitably the condition of these expensive firearms will very rapidly deteriorate.

3.3 LEGAL CONSTRAINTS

3.3.1 Confusion on pre-emptive action

There is a problem in the interpretation of Article 25 in the wildlife legislation which rules that :]

“Hunting outside the modalities foreseen in this Act is only allowed when done for protection of people and goods, against factual or imminent attack by wild animals and when it is not possible to chase them away or to capture them.”

Members of DNFFB believe that, for example in the case of lions found outside a conservation area, action can only be taken after damage has occurred and that they must first attempt to catch the problem animal. This is totally impractical.

3.3.2 The CITES permits

At present the country has been allocated CITES permits for 40 elephant for hunting trophies. However, at least an additional 50 elephant a year are shot as problem animals in communal areas. Because the tusks of these animals cannot be exported as hunting trophies, the local communities derive little economic benefit from the animal being killed in their area.

3.3.3 Allocation of income from licenses to communities

At present, only 20% of the hunting license fees are allocated to the relevant community. There are cases where communities are not aware that funds have been received on their behalf and there is a protracted delay between a license being paid and any benefits reaching the community involved.

From an individual farmer's perspective, the family suffers the damage to their crops, but when an elephant is hunted the benefits go to the community the resulting development may be as far as 20 km away, where people have suffered no elephant damage at all.

4 PROBLEM SPECIES: RESULTS AND CONCLUSIONS

The findings of this survey are dealt with by species and where necessary specific provincial situations are discussed.

4.1 ELEPHANT

4.1.1 The National Strategy for the Management of Elephants

In 1999, the country adopted the comprehensive “National Strategy for the Management of Elephants in Mozambique” and the mission statement of the strategy is:

“ Maintain and, where possible, increase numbers and range of elephant populations, promoting their contribution to national development and the communities with whom they share the land and ensuring the maintenance of habitats and biodiversity.”

This strategy sets the goals of managing the elephants so that there is a population increase of 20% by 2010. (The estimated number of elephant in 1999 was then thought to be about 18,000.)

The strategy also defines one of its objectives (8.3) as being to effect “A reduction of human-elephant conflicts to acceptable levels”. It emphasizes the need for landuse planning and makes the important points for the national guidelines to deal with human-elephant conflict that:

“...it may be decided that electric fences around fields or villages is the best option for some areas, while in others the complete elimination of elephants or the resettlement of villages may be necessary”

While the strategy highlights the need to improve awareness of the benefits of the value and benefits of elephants. It makes no mention of the need to evaluate both Cost and Benefits in making landuse planning and management decisions. The assumption that elephants bring more benefits to communities than costs has been accepted without question and has not been tested in Mozambique.

4.1.2 Elephant distribution

Elephant distribution in Mozambique is noted in Blanc et al. (2003) and is illustrated below (Fig.1). In this publication, mention is made that some of the “Possible range” in the earlier report was upgraded to known range. Similarly, that their findings will also be updated. Also, for large areas of the country, there have been no inputs at all.

What is encouraging, from an elephant conservation point of view, is that it is apparent that elephants are still widespread and are more numerous than previously thought.

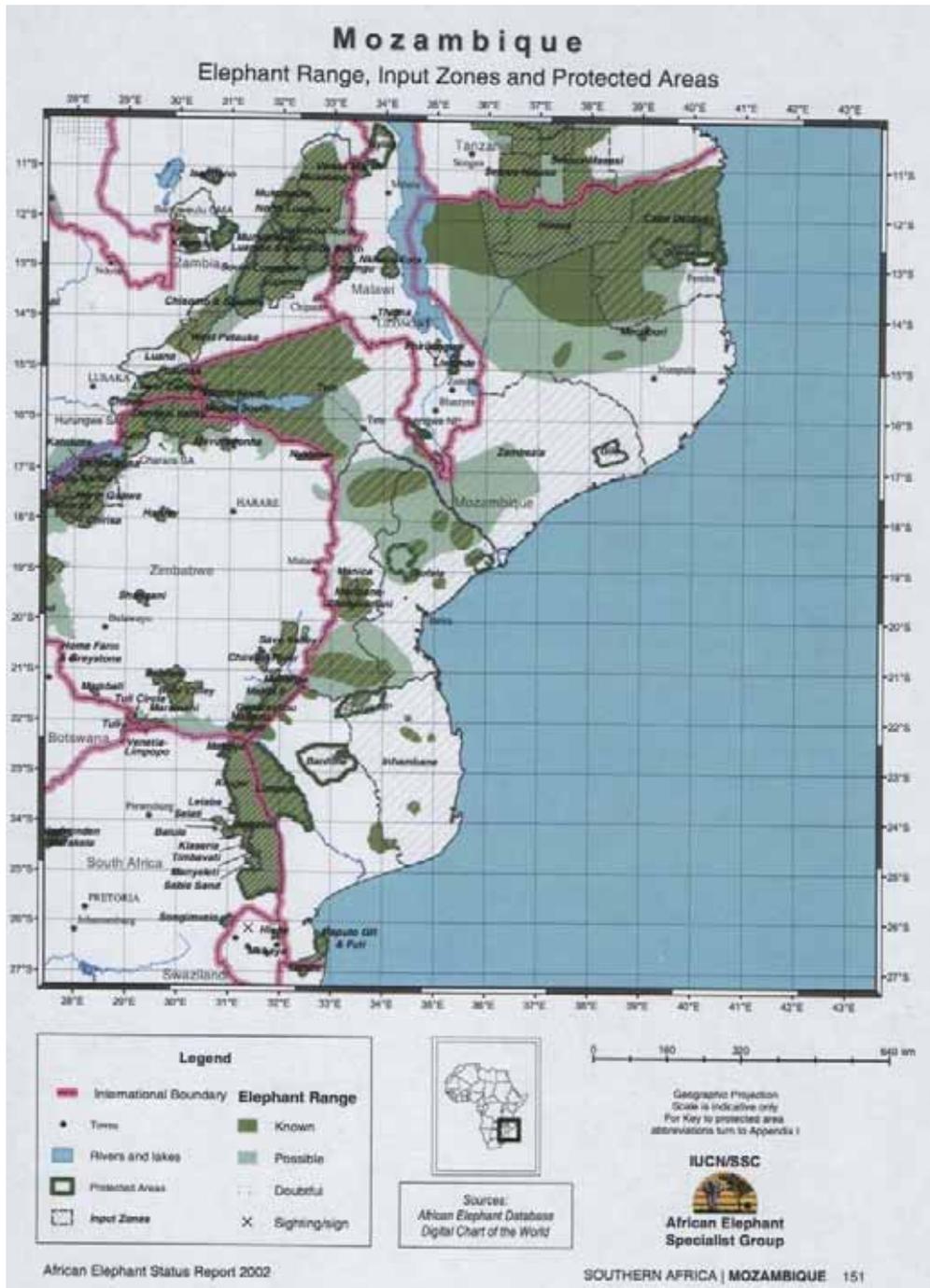


Fig. 1. Known and possible elephant range in Mozambique. (From Blanc *et al.* 2002)

4.1.3 Elephant numbers and trends

The latest information on elephant numbers (Blanc *et al.* 2003) gives an estimate of 21,502 elephants for the country. The more recent estimates by staff of DNFFB suggest that the population may even be higher than this.

The greatest future growth rate in any elephant sub-population will be that which is bound to take place in the Limpopo National Park, where animals are expected to move into the park from Kruger National Park. In 2001 the population estimate for the park was only 50 and today it is at least 150. The populations in Maputo Special Reserve and Gorongosa are also gradually increasing.

4.1.3.1 Niassa

Landuse

Niassa is a high rainfall area, and the vegetation is primarily tall *miombo*. Tsetse fly, which occurs over much of the province, limits the distribution of cattle to areas of open grassland and savanna. Agriculture consists mainly of small *machambas* where maize, sorghum, millet, cassava, cotton and bananas are grown. Cotton and to a lesser extent maize are grown as cash crops. The *machambas* are worked using the "slash and burn" method of cultivation.

Distribution of conflict

The occurrence of human-elephant conflict in the province is widespread. The intensity of conflict is probably greatest close to Niassa Reserve but there are low densities of elephant and persistent human-elephant conflict around Majune, Maua and Nipepe which are more than 150 km from the Niassa Reserve. While damage close to Niassa Reserve may result from elephants that come from the reserve itself, that which takes place in the above districts is caused by elephants that live permanently within these districts.

Seasonality and scale of conflict

An important point that was made in all districts is that the elephants are resident in the district all year. During the early rainy season they feed on fresh green grasses and other natural vegetation and are not a problem for farmers. The period of conflict starts in February and lasts until the rainy season commences in late September. The crops that are selected are maize, sorghum, cassava and bananas.

Once the maize has been harvested, elephants also damage the buildings used to store grain and in the instance illustrated (Fig. 2) the inhabitants deserted their homestead in fear of their lives.



Fig. 2. Maua District: Elephant damage to a grain storage hut. This household had been abandoned because of the owners fear of the elephants.



Fig. 3. Maua District: Elephant damage to banana trees usually results in the total destruction of the plant

Mitigation measures currently being employed in Niassa

Traditional methods, such as erecting observation platforms, making fires and making a noise are being used. As has been found elsewhere (Osborn and Parker 2002) these provide only temporary respite from the problem, and elephants soon become used to the disturbance and either ignore it or move on to an adjacent field.

Chilli barriers

People have been informed of the use of chilli smeared string (Osborn and Anstey 2002) to deter elephant from entering their fields. To be effective, the smearing of the oil-chilli mixture on string must be done at regular intervals. Without having a constant supply of the mixture, this was not possible and the method soon ceased to be effective. The consequence is that those people who have tried the method, no longer have confidence in its effectiveness and are convinced that it only works for a few weeks.



Fig. 4. This farmer has used the chilli smeared twine but does not believe that it is a permanent solution

Hunting elephant by community hunters

During our survey, a permit to shoot an elephant was issued to a community hunter and a bull was shot near Nipepe. The stomach contents of this animal were examined and no sign of crop remains were found. The hunter and the owner of the rifle and were then questioned and the following was determined:

- The owner of the rifle come from Zambezi province and he had recently purchased the .375 rifle in Nampula, primarily to hunt elephant.
- He had taken possession of most of the meat and was smoking this to take back to Zambezi province to sell it (Fig. 5).
- It was disappointing to note that most of the meat was destined to leave the district and the province.

- Soft nose ammunition was used by the hunter. This is entirely unsuitable for hunting elephant and it was fortunate that the hunter had shot it in the lungs rather than attempted a brain shot.

We had to conclude that in this case, the elephant had been shot as part of a commercial “bushmeat” business.

The use of unsuitable weapons and ammunition could account for some of the very high wounding rate of elephant hunted by community hunters. It is often elephant that have been wounded previously that become rogues and responsible for the deaths of people. There is a well know case where recently an elephant, wounded by a community hunter, killed several people in Cabo Delgado before it was finally shot (H. Motta, pers comm)



Fig. 5. Most of the meat from this elephant shot by a community hunter near Niipepe was taken by the owner of the rifle for sale in Zambezia province.

4.1.3.2 Tete

The province is much drier than Niassa and elephants are a particular problem around water points. For example, the elephant problem in Maravia district occurs in the dry season and appears to be primarily because water points where the elephant can drink are limited. Elephants are obliged to use water points close to and in doing so raid *Machambas* in the vicinity.

There is a high incidence of poaching for meat and ivory, both of which are smuggled to Zambia and Malawi for sale. This poaching, with muzzle loaders and AK47s, results in high percentage of wounded animals. An example of this is that over the last two years, all the elephants hunted in Chifunde district by Mulambe Safaris had been previously wounded (Fig. 6). It is a very real

possibility that some of these animals become rogues and deliberately attack people.

Apart from traditional mitigation measures , permits are issued for problem animals and some of these are shot by safari clients. These people cannot take the tusks, but they do make a donation to the community for the privilege of hunting an elephant. (A safari booking agent in the USA is already advertising “Problem Elephant” hunts in Mozambique at \$10,000 per elephant).



Fig. 6. These AK 47 bullet and musket balls were recovered from one trophy elephant, shot this year in Chifunde District.

4.1.3.4 Gaza

In Gaza, the human-elephant problem is a rapidly growing one. During the dry season, elephant in Limpopo National Park have are beginning to move down to the Limpopo river. There, particularly in Mabalane district, they have found green crops under irrigation and raided these (Fig 7). Both bulls and breeding herds of elephant have already begun to cross the Limpopo, which in the dry season is no barrier to them. Crops being raided included those growing outside the Limpopo National Park and beyond the support zone. In the case of the *machamba* illustrated, this farmer had installed a diesel pump and fenced the field to exclude cattle. He produces two crops a year and cultivates approximately 5 ha. An estimate of half a hectare was destroyed and in one night at a conservative estimate this was a loss of at least 15 bags of maize.



Fig. 7. Part of an irrigated maize field in August, damaged by elephant, on the east bank of the Limpopo near Mabalane

Further north at Chicualacuala, the problem has been that elephants have recently destroyed about 2000 young cashew trees. During the rainy season, when surface water is available, elephants cross the border from the Gonarezhou and damage *machambas*.

The District Administrator at Chicualacuala is extremely worried about the worsening elephant situation and in particular with the development of the Mbalabala Game Ranch. His concern is that the ranch owner wants to encourage buffalo, lion and elephant and these species will each conflict directly with the interests of the local people.

Mitigation measures are that staff from the Limpopo National Park attempt to drive elephant from the eastern bank back into the park. Staff from the park shot one problem elephant in 2003 and another in 2004.

4.1.3.5 Maputo province

The problem in Maputo province occurs when elephants leave the Maputo Special reserve damage *machambas* in communal areas adjoining the reserve. This problem was temporarily mitigated during the period of the Blanchard project, when a fence was erected running from the park headquarters northwards towards the river. The fence was effective for a few months but it was not maintained and once the solar panels, energizers and batteries were stolen, elephants broke it repeatedly (Fig 8). This fence is still not being maintained.

Elephant cause considerable damage to fields outside the reserve and the occupants of one homestead were observed to have lost their entire cassava crop (Fig. 9) . Because there is no compensation paid for elephant damage, many people have a strong negative attitude towards elephant and the reserve.



Fig. 8. The fence, erected in 1998, has been broken by elephant because the solar panels, energizers and batteries were stolen.



Fig. 9. A field of cassava outside the boundary of the Maputo Special Reserve that has been totally destroyed by elephants.

Mitigation of elephant conflict takes place when the situation becomes particularly serious, then staff from DNFFB and the reserve patrol the affected areas at night and attempt to scare the elephant back into the park by firing shots over their heads.

4.1.4 Cost : Benefits of elephant living amongst communities.

The National Strategy for the Management of Elephants has a goal statement (page 23) which is to “...ensure that the **tangible benefits** elephant bring to Mozambique and the people with whom they share the land exceed their **negative impacts**” .

The definition of this goal in the above terms is too simple, as it can mean that if elephants earn a community \$1000 but cost \$900 then the goal is achieved. Whereas in reality, the community are losing the extra \$800 they would have had if there were no elephants. **Where elephants live amongst people, in order to justify their presence to the communities they must be managed so that the communities are better of WITH the elephants, than they would be without them.**

The literature has been searched and enquiries from people who are very familiar with Human-elephant conflict (Dublin pers. comm., Hoare pers. comm., Cumming pers. comm., Niskanen pers. comm., Osborn pers. comm., Suich pers. comm., Parker pers. comm) and a request was made for any information on the Cost : Benefits of people living with elephants. While the benefits of managing elephants as part of CBNRM projects have been widely reported, the costs incurred by communities living with elephant do not seem to have been quantified or published. Or, as one respondent put it – “nobody has been brave enough to report on the costs”.

There will be a range of situations where, in some cases the costs of living with elephant will far outweigh any benefits e.g. in high production agricultural areas (banana plantations and irrigated fields). In other areas, such as savanna rangelands, where the costs may be low, the proceeds from elephant management can confer additional benefits to the community. It is felt that in much of the high rainfall elephant range in Mozambique, the difference between costs and benefits will be slight. The question arises as to what action to take if communities are worse off living with elephants than they would be if there were no elephants ?

The development plan for the Limpopo National Park, recommends that the area is not fenced and this view is supported by the technical advisor to the major donor (KfW). The benefits of the park have been widely publicized, but the costs have never been mentioned.

A range of the costs and benefits of people living with elephants in a communal area are shown in Table 2 below.

Table 2. Cost : Benefits of elephant living with people in communal areas

Social Costs	Social Benefits
People that lose crops have to be somehow be provided with food.	Revenue from trophy hunting may contribute to community well being.
Protecting fields against elephant at night is a high risk and time consuming task.	In some areas, elephants attract non-consumptive tourists which can create employment
Losses borne by individuals are not compensated from funds from licenses.	
People are sometimes killed while protecting their crops from elephant. Apart from the trauma to family members, the loss of a parent incurs a high social cost to the family.	
Environmental Costs	Environmental Benefits
High densities of elephant impact negatively on biodiversity of an ecosystem.	At moderate densities elephant contribute to biodiversity.
Economic costs	Economic Benefits
Subsistence farmers lose crops that would otherwise sustain them or help them to raise their living standard	If Trophy hunting takes place, some benefits go to communities.
Grain bins and huts are sometimes destroyed by elephant looking for food.	Where non-consumptive tourism is possible, communities may benefit financially.
Farmers incur an "Opportunity cost" in their efforts to protect fields	Individuals who monopolize the meat from elephants shot on permit earn money by selling it .
Elephant conflict creates a negative attitude towards wildlife and can hinder future wildlife development projects	Individuals benefit from elephants poached for meat and ivory.
The death of a breadwinner is a severe economic cost to the family survivors.	
Political Costs	Political Benefits
Communities believe that as the elephant belong to the government, that the Government is responsible for their misfortune.	None at present

4.1.5 Conclusions on Human-Elephant conflict

The underlying cause of the problem is that both the human and elephant populations are increasing and as has been found throughout Africa (Parker and Graham 1989), there is competition for the same resources. Elephants and people show a preference for the same habitats and history has shown that it is this competitive exclusion, more than the ivory trade that has caused the decline in elephant populations. Unless the benefits of managing elephants in areas occupied by farmers is greater than the benefits of farming without the elephants, people will not willingly tolerate the presence of elephants and they will eventually only be safe in protected areas.

Since the return of peace to the country, people have moved into areas where elephants occur and have started farming. There are no land use plans or controls as to where people may resettle. If such plans existed and were implemented, some of the conflict with elephants could be avoided.

The reasons behind the human elephant conflict and its intensity of conflict differ between provinces and sometimes between districts within a province. In general, it takes place because at certain seasons crops provide more palatable and nutritious food than natural vegetation, or because temporary water points in the rainy season permit access to areas that are normally too dry for elephants. Examples of these differences are discussed below :

- In Maravia District of Tete Province, the conflict occurs at isolated water points. People settle near available water and elephants are attracted to the water and in the process cause damage to *Machambas*.
- In the dry season elephants in the Limpopo National Park are moving down to the Limpopo to find water. In doing this, they come across the green crops and are tempted to feed on these. Similarly, in the dry season in Maputo Special Reserve, elephants move down to the Futhi and Maputo rivers and feed on the crops that they come across.
- In Cabo Delgado and parts of Niassa, people burn the grass as soon as it is dry. This takes place over a large proportion of the elephant range and with reduced natural food, elephants increase their raiding of crops.
- In Gaza province, east of the Gonarezhou National park, elephants move into the area during the rainy season when temporary pools allow them to use areas that for most of the year have no surface water.

4.2 CROCODILES

4.2.1 Crocodile distribution

Crocodiles occur throughout Mozambique wherever there are permanent rivers and major dams such as Cahora Bassa, Masingir Curromane and Piquina Lebombo. In addition to these, there are hundreds of natural freshwater lakes and swamps which are also suitable crocodile habitat.

4.2.3 Crocodile numbers and population trends

Population status

There has been no census of crocodile in Mozambique and indeed, to undertake such a large scale survey would take several years and would not warrant the expense. Considering the number of large rivers and lakes in the country, the number of crocodiles of all sizes must be at least 50,000. The following points give some indications of abundance.

- In 2004, a survey was done from the air of the crocodiles in Massingir and the estimate is that there are at least at least 800 large crocodiles in the dam (Swanepoel pers comm.)
- An index of crocodile numbers on the middle reaches of the Zambezi may be derived from the fact that in the 2004-2005 breeding season, 120 nests were found on 40 km of the Zambezi river at Mutarara, If all the nests were found, this would give a figure of 3 adult females per km of river. Using the adult sex ratio of 1:1.6 found by Leslie (1997) , this would give an adult population of 195 adult crocodiles for the 40km or a density of 4.87 adult crocodiles per km.

Population trend

There is no significant hunting or persecution of crocodiles in the country and no reason to conclude that the population is declining from this cause. As there is no measurable increase in available food for crocodiles, it is assumed that the population is stable in the wild. With the development of crocodile farming, the captive population in the country has rapidly increased.

4.2.4 The most affected Provinces

The problem is general throughout the country, but the provinces that have the highest incidence of crocodile attacks are Tete and Sofala, followed by Zambesia.

4.2.5 Human : Crocodile conflict

The cause of the problem

Unlike lion, where the killing and eating of people is unusual and is generally brought about by a desperation for food, crocodiles attack and eat people on an opportunistic basis, even when natural food is available. As crocodiles grow, their diet changes from arthropods to small vertebrates, and once they exceed 2.5m in length, large mammals form a major part of their diet (Cott 1961).

In Mozambique, outside the conservation areas and most Coutadas, large wild mammals are very scarce and the rivers are heavily fished by people. The most abundant large vertebrates remaining in these areas are people and domestic livestock. Therefore, as a consequence of the lack of alternative food species, large crocodiles in most of the rural areas in the country are obliged to feed on domestic livestock and people.

People in rural areas have to make use of natural water bodies for domestic water, washing clothes and bathing. As a consequence of this, many people are exposed almost daily to the risk of being attacked by a crocodile.

The scale of the crocodile problem

The reporting of crocodile predation on livestock or people is not done in a systematic manner. Many people live in remote areas without transport and several days walk to the nearest Government official. The number of deaths due to crocodiles is greatly under-reported. Everyone who was consulted on the problem mentioned the strong probability that when people in rural areas disappear, crocodiles must be considered a likely cause of their disappearance.

Accepting that deaths due to crocodiles are under-reported and that records are not well kept, some figures that give an idea of the scale of the problem are:

- From January to August in 2005, 12 people have been reported killed on the Limpopo between the confluence with the rio dos Elefantes and Xai Xai.
- Since 2000 in the Goba district, there have been 22 attacks on the Umbeluzi river and between January and August 2005 there had been four fatal attacks.
- During 2004, 30 people were taken by crocodiles in the Mutarara district of Tete province. This is over a distance of about 100 km on the Zambezi and only on the northern bank. In January 2005, six people were taken.
- The owners of the crocodile farm on Cahora Bassa (McCowan Hill pers. comm.) estimates that each year about 100 people are taken by crocodiles in the lake.
- In the Zumbu district in Tete province 15 people were killed between January and August this year.

4.2.6 The Cost : Benefits of crocodiles living amongst humans.

The most obvious cost : benefits of living in close proximity to crocodiles are listed in Table 3.

Table 3. The cost-benefits of crocodiles in communal farming areas

Social Costs	Social Benefits
Severe trauma in losing a family member to a crocodile.	None
Loss of working member causes severe hardship to family	
If a mother is killed, children have to take her household duties and this can impact on their education.	
Environmental Costs	Environmental Benefits
Not quantified	Unknown and complicated by the impacts of other factors: dams, erosion, alien species, pollution.
Economic costs	Economic Benefits
Damage to fishing nets.	Crocodile farming
Loss of livestock severe to poor households	
Loss of labour when family member killed.	
Political Costs	Political Benefits
Affected communities blame government for not reacting to their problems	None

4.2.6 Conclusions

In those areas where crocodiles are a problem, the impact on those families that are affected is severe. The following issues are the most obvious:

- The is great emotional trauma at losing a family member, particularly if the person is eaten.
- There is the economic impact loss of labour to the family and the need for someone else to replace this labour. In many cases this can mean that a child is deprived of the chance to attend school.
- Loss of livestock – on a district or provincial scale, the numbers of cattle taken may be low. However, to the individual or household concerned, the loss of one animal can mean the loss of most of that person’s economic worth.

- The problems caused by crocodiles, if left unresolved, are leading to a negative attitude towards Government and possibly the acceptance of any future wildlife conservation developments that may be proposed.
- In general, crocodiles bring little or no benefit to the communities living near them.
- No convincing arguments have been presented that the presence of crocodiles in is necessary to preserve the health of the river systems in Mozambique.

4.3 LION

4.3.1 Lion distribution

There are viable resident lion populations in the following areas: Niassa Game Reserve and adjoining hunting the blocks, Quirimbas National Park, Tete Province around Cahora Bassa, Gorongosa National Park, Marromeu and the surrounding Coutadas and more recently in Limpopo National Park.

Periodically, lion move out of the above areas and recent records show that problem lion have been active more than 100 km from where resident populations occur. For example, in 1999, a maneater terrorized the communities around the Mecuburi Forest near Nampula.

4.3.2 Lion numbers and trends

The most recent published population estimates for Mozambique is that of Chardonnet (2002). Who suggests a population of between 455 and 650 animals. It is felt that the true figure is probably closer to the upper end of this range.

As the buffalo population at Marromeu and the wildlife populations in Gorongosa and Limpopo National Parks increase, the lion populations in these areas are also going to increase.

4.3.3 Human - Lion conflict

The cause of the problem

The most frequent sex and age class of lions that cause conflict outside conservation areas has been found to be young males (Anderson, 1981) of the social status which Schaller (1972) termed nomads. These are animals that have been driven from a pride territory by the dominant territorial males (or male). If they have no siblings and are alone, they may not be strong enough to remain within the territory of a pride and are progressively forced out to areas which are unsuitable for lions because of a low prey density.

Where these nomads eventually find safety from other lions, is usually in areas where there are people, livestock and a low biomass of wild prey animals. It is inevitable that, in order to survive, they will be forced to kill livestock and sometimes people.

Lions that have been forced out of a territory become very wary as they are at risk from other lions if they disclose their presence. When a problem lion is hunted, if it is not killed at the first attempt, the animal rapidly learns that it is being hunted and becomes cunning and difficult to kill.

4.3.2.1 *Niassa*

Beyond the Niassa Game Reserves and adjoining blocks there appear to be no resident lion prides. Human-lion conflict in the province occurs every year.

4.3.2.2 *Cabo Delgado Province*

The human : lion conflict problems are more severe in Cabo Delgado than in other provinces. The University of Eduardo Mondlane has assessed the situation in this province and will be reporting separately on this.

4.3.2.3 *Tete Province*

There is a lion problem in Tete Province, but knowing that the province has a healthy lion population, the problem is lower than one might expect. The reason for this is probably because there are still good antelope and other prey populations and lions are able to find sufficient food without attacking livestock or people.

A serious concern is that the high level of commercial poaching for meat to sell in Malawi and Zambia, is reducing game numbers. **With a reduction in available prey, the lions will be forced killing more livestock and the risk of killing people will increase.**

4.3.2.3 *Gaza Province*

Until the formation of Limpopo National Park, there were no resident lion prides in the province. Problems have occurred when lions have moved out of the Kruger and Gonarezou National Parks. Both people and cattle have been killed. As the wildlife populations in the Limpopo National park increase, so will the numbers of lion.

4.3.2.4 *Maputo Province*

Occasionally lion are forced out of the Kruger National Park into the province. Again, no people have been killed over recent years but there has been considerable killing of livestock. The most recent occurrence was in December 2004, when lions from the Kruger National Park killed 18 head of Brahman cattle in the province.



Fig.10. The firearms, traps, snares and skins confiscated in 2005 by one safari company show the scale of illegal hunting that is taking place in Maravia district.

4.3.4 The Cost : Benefits of lion living in communal areas.

While lions are a sought after species for tourists and trophy hunters, under the present circumstances in Mozambique it is obvious that costs exceed benefits for lions living amongst people in communal areas. These have not been quantified but the more obvious costs and benefits are listed in Table 4.

Table 4 . The Cost : Benefits of lions living in communal areas

Social Costs	Social Benefits
The death of a person due to lions causes trauma to family and community.	None apparent
In areas with lion, freedom of movement is restricted.	
Environmental Costs	Environmental Benefits
None significant	Lion remove sick and weak animals from prey populations
Economic costs	Economic Benefits
Lions kill livestock and this has a severe negative impact on affected households	Where there is sufficient natural prey to sustain a viable population. Lion are an attraction for trophy hunting.
When a person is killed this can impact severely on the welfare of the surviving family	Lion kill bushpig, a species that causes damage to agriculture.
Lions utilize a prey population that could be harvested by people.	
Political Costs	Political Benefits
Affected communities believe that, as lions belong to the Government, that the Government is responsible for the conflict situation and for resolving it.	None

4.3.5 Conclusions

Human-lion conflict outside conservation areas is primarily due to the dispersion of “nomads” that have been pushed out of pride territories. The lack of wild prey forces these animals to kill domestic livestock and sometimes people. The frequency of this conflict will increase when :

- Poaching continues to deplete natural prey populations in conservation areas and coutadas.
- The lion population in Limpopo National Park builds up and animals are able to disperse freely into the adjoining communal areas.

The most common large prey in communal areas are people and livestock and it is just a question of time before either one or the other are killed. The capture of animals is impractical as the lions that enter communal areas have generally been forced out by others and to catch and return them will only result in the process being repeated. This policy has been implemented in Botswana and in 2003, one male lion was captured and translocated seven times (I. Khama pers comm.).

The problem can be mitigated by efficient control of lions as soon as they are detected outside conservation areas or coutadas..

4.4 BUFFALO

Buffalo are an important trophy species for the safari industry and both safari operators and game ranchers value the animals. However, buffalo are also a serious constraint on the future growth of the cattle industry. This is because, in the region the species is a carrier for all the strains of Foot & Mouth disease in southern Africa. Buffalo also carry *Thieleriosis* or Corridor disease which is fatal to cattle and there is a heavy rate Bovine tuberculosis infection amongst the buffalo in the Kruger National Park. Bovine tuberculosis is also fatal to cattle.

4.4.1 Distribution of buffalo

Viable populations of buffalo are found in Niassa, Tete, Zambezia and Sofala provinces. There are presently no resident buffalo in Maputo province or the Maputo Special reserve.

4.4.2 Numbers and trends

The largest populations of buffalo are in Niassa Game Reserve and the adjoining safari blocks (c. 9000) and Marromeu (c. 6000) and the adjoining Coutadas, with healthy numbers in Tete province around Cahora Bassa.

4.4.3 Human-buffalo conflict

Human-buffalo conflict is primarily in the impact that buffalo borne diseases have on cattle. When Mozambique reaches the point where it wishes to export agricultural crops, these will have to come from areas that are certified to be free of Foot and Mouth disease. This can only be done if the areas are free of buffalo.

To ensure that they are able to export agricultural products Botswana, Namibia, South Africa, and Zimbabwe have strict controls on the distribution and movement of buffalo.

4.4.3.1 Niassa

Tsetse fly occur over most of the province and it is not a significant cattle producing area. There are no significant human-buffalo problems.

4.4.3.2 Tete province

The buffalo populations in the province are concentrated primarily around Cahora Bassa. In the tsetse fly areas there is no conflict with cattle but, in those areas which are tsetse free, the cattle numbers are steadily growing.

4.4.3.4 Gaza Province.

There are small numbers of buffalo in Limpopo National Park and some have moved east and out of the park and crossed the Limpopo. There have been recent deaths of cattle at Chilenbene and Chibuto (76 cattle) as a result of contracting *Thieleriosis* from the buffalo. There are still about 15 buffalo at Chibuto and another seven between the Limpopo and the railway line in Mabalane district. These will continue to present a risk to cattle until they are removed.

There are no tsetse fly over most of the province and together with Maputo Province it has the potential to form the core on the country's cattle industry. If unfenced game ranches in the province are permitted to stock buffalo, there is an increased risk of the transmission of Foot and Mouth, Bovine tuberculosis and *Theileriosis* to cattle.

4.4.3.5 Maputo Province

There are no resident buffalo in Maputo Province and the cattle industry is steadily improving. If the game ranches in the province are permitted to introduce buffalo and they are introduced to Maputo special reserve, it will mean creating a high risk of cattle deaths from *Theileriosis* and possibly the spread Bovine tuberculosis into cattle. The question to be asked becomes, is the risk worth it ?

4.4.4 The Cost : Benefits of Buffalo outside protected areas

The Cost Benefits on buffalo living in communal lands in the proximity of people (Table 5) will differ depending whether the community live in an area where there are Tsetse fly and no cattle, or whether it is Tsetse free and a cattle producing area.

Table 5. The Cost : Benefits of buffalo living in communal areas.

Social Costs	Social Benefits
The loss of cattle to a household often means the loss of family savings and can create dependence on aid. The owners may have to seek employment which may not be possible to find.	None
The loss of Agricultural exports due to a Foot and Mouth outbreak can result in greater unemployment	
Environmental costs	Environmental Benefits
Buffalo compete with cattle for the same resources, increasing pressure on the grasslands	None
Economic costs	Economic Benefits
The loss of cattle to <i>Theileriosis</i> and Bovine tuberculosis is severe to the affected families and communities. (cattle are a source of wealth to the Shangaan people)	Small benefits to Safari hunting companies from buffalo hunting
The opportunity cost of not being able to export cattle and some agricultural crops in future is high.	Some revenue can be derived from trophy hunting
Political Costs	Political Benefits
Government are aware of the potential problems. Economic losses will have to be explained to the stakeholders.	None

4.4.5 Conclusions

Although the danger to human life is very low, the Human-buffalo conflict issue is potentially the **most economically harmful** wildlife conflict issue in the country. If the problems which can arise from the spread of buffalo are not prevented beforehand, it will result in serious opportunity costs to the development of agriculture in the country.

Buffalo carry two important diseases which can be transmitted to cattle, Foot and Mouth, and Corridor Disease or *Thielerialiosis*. Cattle in Mozambique are inoculated against Foot and Mouth. Corridor Disease which is transmitted by ticks is fatal to cattle and cannot be prevented. Furthermore, the buffalo population in the Kruger National Park is also heavily infected with Bovine tuberculosis which can be transmitted from them to cattle and is eventually fatal. An outbreak of Foot & Mouth disease prevents the export of other agricultural crops and the implications of this must be considered for when the irrigation scheme at Chokwe is fully developed.

If Mozambique ever intends to develop a viable cattle industry, contact between buffalo and cattle must be prevented in Maputo, Gaza, Inhambane, Tete and Manica Provinces. In the future, if crops are to be grown for export, any outbreak of Foot & Mouth will result in exports being banned to most countries and this will include South Africa. Where the tsetse-fly densities are higher, the cattle industry is not viable and the same controls between buffalo and cattle will not be cost effective.

4.5 HIPPO

4.5.1 Hippo distribution

Hippo occur at low densities in most of the rivers in the country. In the past, the highest density was found in lake Urema in Gorongosa National Park.

4.5.2 Hippo numbers and population trends

Continued uncontrolled hunting and poaching of hippo has drastically reduced their numbers and the trend continues. Unless the future of the species is planned and managed, it is likely that hippo in Mozambique will only be found in the Conservation Areas.

4.5.3 Human-Hippo conflict

Hippo cause damage to *maChambas* that are close to a river or lake. Deaths due to hippo are relatively few compared to other species and are generally accidental.

4.5.4 Cost : Benefits of hippo living in proximity to people

Nowhere have the Cost : Benefits of hippo living in proximity to people been quantified. The most obvious ones are shown below in Table 6.

Table 6. The Cost : Benefits of hippo living in communal areas.

Social Costs	Social Benefits
Cause human deaths	None evident
Environmental Costs	Environmental Benefits
At high densities cause range degradation. (not applicable here)	Hippo help to keep river channels open
	Bring nutrients to water bodies
Economic costs	Economic Benefits
Raiding of crops impacts on farmers	Sustainable management for protein
	Limited trophy value
Political Costs	Political Benefits
Communities regard Government responsible to resolve problems	None evident

4.5.6 Conclusions

Hippo damage to crops is localized and can be a severe blow to the individual farmers concerned. The human deaths that do occur are more accidental than cases of hippo intentionally targeting people.

Landuse planning will determine whether there is a long term future for hippo populations outside conservation areas.

4.6 BUSHPIG

Everywhere that bushpig occur, they were reported as being a problem. Most communities implement some form of hunting of bushpigs and at present do not expect government to control bushpigs. People in the Majune District of Tete province are using baits with rat poison to kill bushpig and this can have secondary poisoning consequences in other species.

4.7 BABOONS AND MONKEYS

People mentioned that, baboons and monkeys are a problem. But these species were not regarded as a priority. The reason for this is probably because people are able to drive them away with no risk to their lives and in some areas problem monkeys are hunted with the aid of dogs.

4.8 HYENA

The only hyena problems that were reported were in the north-west of Niassa province and at Goba in Maputo province. North-west Niassa is a region where in there was historically a problem with man-eating hyena (Balestra, 1962). The problem is not widespread and probably caused by one clan or one or two individuals and can rapidly be solved by a concentrated effort on removing these animals. At Goba, goats have been killed by hyena that are thought to come across for Mlawula Nature Reserve in Swaziland.

4.9 BIRDS

Birds were never mentioned as being a problem by either District Administrators or farmers. This seems to be one of perception, because when we noticed that quelea *Quelea quelea* had damaged the sorghum crop of a farmer in Niassa, He complained bitterly about two elephant that had walked through his cotton crop, but he did not complain about the queleas. In both Niassa and Tete Provinces we saw small flocks of quelea, but people only mentioned bird damage when they were specifically asked about it.

According to Elliott (1881 and 1989), Mozambique falls within the area where the severity of the quelea problem in terms of damage was classed as major pest on cereal crops.

5 RECOMMENDATIONS

5.1 POLICY

5.1.2 The Draft Human-Wildlife conflict Policy

The country needs a policy on Human-Wildlife conflict so that Ministers, Heads of Directorates, have a clear mandate within which they can plan and manage. It is suggested that the draft Policy points below can be used on which to build the final policy :

Background

1. Recognizing that the Government has a responsibility to conserve the biodiversity of the country, conservation areas have been established where this will be the primary objective in the development and management of each area.
2. Outside the boundaries of conservation areas, the different needs of the local communities and the achievement of food security and the growth of the agricultural industry will enjoy priority.
3. Recognizing that wildlife conservation and the sustainable use of wildlife resources need not be incompatible with rural communities or agriculture, the Government will support the concept of sustainable wildlife utilization that improves the well-being of communities living outside protected areas.

Draft Policy

The policy of the Government of Mozambique towards wild animals that conflict with the safety and food security of people outside conservation areas and the agricultural objectives of the country, will be as follows:

- In the cases of human-wildlife conflict the Government accepts the responsibility of resolving situations where the lives of its citizens, their food security and the agricultural objectives of the country are at risk.
- Landuse planning will be done in those districts with high degrees of human-wildlife conflict. The planning will determine the optimum development of the district and will incorporate wildlife conservation and sustainable utilization wherever it is economically viable and will benefit the communities.
- If viable populations of problem crocodiles, lion and elephant cannot be managed outside conservation areas so that the economic benefits of living with these species is greater than it would be if they were absent, these populations will be removed in the most humane and cost-effective manner.

- In the interests of developing an agricultural export industry, buffalo populations in Maputo, Gaza, Inhambane, Manica and Tete provinces will be prevented from contact with cattle by the most cost-effective means possible. The monitoring and enforcement of this policy will be implemented by the Veterinary Epidemiology Unit, DNFFB and DNAC.

5.2 LANDUSE PLANS

The development and implementation of landuse plans is a high priority to mitigate human-wildlife conflict. This is especially important where the wildlife species concerned conflict directly with agriculture e.g elephant and hippo which damage crops and buffalo which transmit diseases to cattle. What is needed is that landuse and particularly the settlement of people, is planned to select the best options for the sustainable use of land and for supporting people. The concept that in high potential areas, agricultural is the preferred option and in low potential areas that wildlife is a more sustainable option is represented in Fig 11. This zonation of a country's preferred landuse options was done very successfully in Zimbabwe.

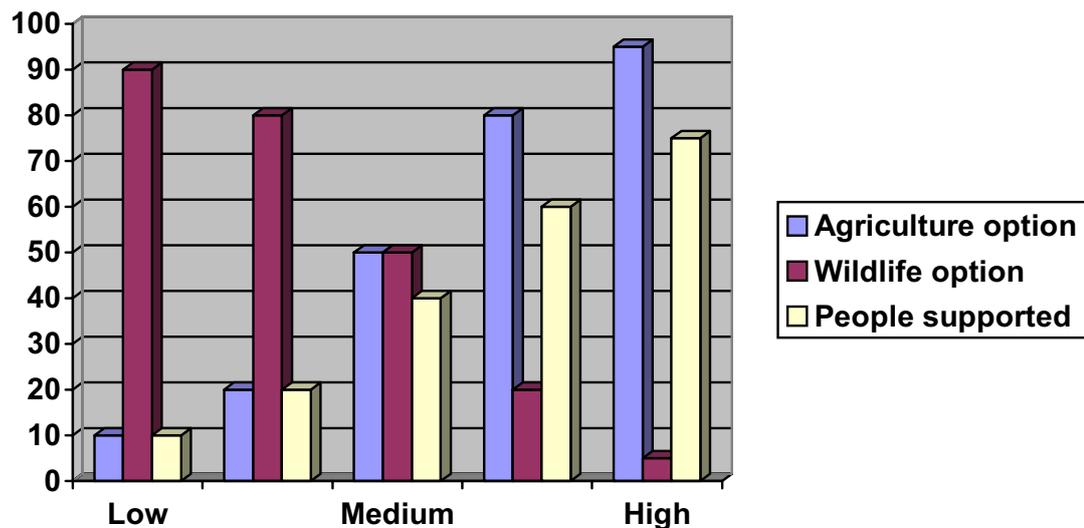


Fig. 11 A representation of the optimal sustainable landuse options in areas of different agricultural potential

5.3 THE NATIONAL ELEPHANT MANAGEMENT STRATEGY

The recommendations made in the National Strategy for the Management of Elephant (1999) must be implemented, and probably the most important of these is to secure a source of sustainable funding.

The strategy must also be updated as already the elephant population is known to be 20% larger than it was at the time the strategy was written.

From a conflict perspective, the goal - Group II on page 23 of the National Strategy - should be changed to read:

“Through **effective management, elephant numbers** and range have increased by 2010, by ensuring that the **tangible benefits** they bring to Mozambique, and the people with whom they share the land, are **greater than the people would have if the elephant were not present.**”

5.3 CONSOLIDATE THE WILDLIFE RELATED DIRECTORATES

The resources available for wildlife conservation and management are very limited in Mozambique. It is strongly recommended that, rather than manage wildlife conservation issues with three different organizations, it would be more efficient and cost-effective to create a single umbrella organization within the same ministry, similar to those in Botswana, Zimbabwe, Zambia and Kenya.

5.4 THE DEVELOPMENT OF PROBLEM ANIMAL CONTROL UNITS

The Human-Wildlife conflict problem cannot be solved without the formation of at least three Problem Animal Control (PAC) units. These Units must have their own vehicles and equipment and although each they will be based in a province, they must answer directly to Maputo. A PAC unit should be stationed in the north (Lichinga or Pemba) another centrally at Tete and the third in the south at Xai Xai or Massingir.

The staff in these units must be carefully selected and trained in the assessing of Human-Wildlife conflict situation so that the correct judgment is made on the action to be taken. They must also have the skills and equipment to be able to implement any action that may be required and to maintain accurate records of the problem and the actions taken.

The training and skills required by these Problem Animal Control Units is listed in Appendix 1. and the equipment in Appendix 2. The training must be supported by a mentor programme which should be for at least two years

5.5 APPOINTMENT OF HONORARY WILDLIFE OFFICERS

The appointment of a few selected people that have the experience and equipment to deal with a problem animal situation should be considered. These “Honorary wildlife officers” should be prepared to act on behalf of the government but to receive no financial reward for doing so. When a situation arises and a PAC unit is not able to attend to the problem, an Honorary officer could be delegated to attend to the situation and carry out the task as instructed by the person in charge of the PAC units.

The position is one that can easily be abused, so it is an issue that needs very careful consideration.

5.6 INCREASE THE VALUE OF ELEPHANTS TO COMMUNITIES

5.6.1 Allocation of greater proportion of license fees to communities

At present community structures get 20% of the revenue from the sale of licenses. This proportion is low when compared with that in Zimbabwe, Botswana and Namibia and an increase in this percentage will greatly increase the income to the communities and appreciation of the benefits of wildlife.

5.6.2 Increase income from hunting in Communal areas

An increase in revenue for communities can be achieved by the introduction of a daily hunting fee being paid to the community.

5.7 PROBLEM SPECIES MITIGATION STRATEGIES

5.7.1 Elephant

The mitigation of human-elephant conflict will involve a combination of both short term and long term actions. These can be grouped into land-use and resettlement planning, crop protection, control shooting and increasing the value of elephants to communities.

Short term strategies

5.7.7.1 Land-use Planning

In the short term, districts where landuse planning to resolve human-elephant conflict is important, must be identified and then prioritized. The budgets required to undertake these plans must be determined and the motivations for this funding prepared and submitted for consideration by donors.

The importance of land-use planning to mitigate predicted Human-Elephant conflict was emphasized by the National Strategy for the Management of Elephants. This is becoming more urgent today as more people return to areas where they once lived and spread into new areas. It is particularly important, with the development and recovery of National Parks and Reserves (Limpopo National Park, Gorongosa National Park and Quirimba National Park and Maputo Special Reserve).

Elephant occur outside conservation areas over a wide area of the country. In most of these In these areas, agriculture and human settlement must obviously have priority. However, proper land-use planning of these areas must be done to determine whether there are areas where elephant can remain with minimal conflict with people, or to identify areas where elephants have to be removed or their numbers controlled. As part of the landuse plan, these populations must be managed so that the benefit of this management to communities **with** elephant would be greater than it would be without elephants.

At present people are settling wherever they wish, sometimes even in National Parks e.g. Banhine. If the unplanned movement of people into areas occupied by elephant and hippo continues unchecked, human-wildlife conflict will continue to escalate.

The resettlement of people has to be planned and integrated into the landuse planning that is needed for areas with viable elephant and hippo populations.

5.7.1.2 Crop and village protection

There is an important place for using different types of barriers to protect crops from elephant, particularly where intensive agriculture is concerned.

Crop and village protection with the use of electric fences and chilli impregnated cord both require maintenance and support. It is clear that DNFFB does not have the resources to supply this support and it will have to be requested from Aid Agencies and NGOs. In the short term, motivations for NGO participation in the crop protection strategy should be prepared and submitted to interested NGOs, particularly the Elephant Pepper company in Zimbabwe.

5.7.1.3 Control shooting by community hunters to be phased out

The very high rate of wounding of elephants hunted by community hunters is a deep concern. The reason for this wounding may be due to hunters using the wrong ammunition, but it may also be due to lack of skills. It is also very obvious that some of this hunting has now become an excuse for commercial hunting for meat.

It is strongly recommended that the shooting of elephant by community hunters be phased out as soon as the Problem Animal Control Units can be formed and are capable of undertaking this control work when necessary.

5.7.1.4 Motivate for CITES permits for problem animals outside Coutadas

At present, approximately 50 elephant a year are being shot on problem elephant permits and a significant number are also wounded and lost. There is a great loss of potential benefits that could be derived if a proportion of these elephant could be sold to hunters with an accompanying CITES permit.

It is essential that much greater value from the elephants shot on control is created for the affected communities. Already some of the problem elephant are being shot by foreign hunters, but because the tusks cannot be taken by the hunter, there is no license fee payable to the Government and little benefit to the community. The opportunity to hunt a problem elephant in Mozambique is being advertised in the USA at a trophy fee of \$10,000 for the elephant, even though the tusks cannot be taken.

If a transparent method of permitting some of the problem elephant to be hunted on additional CITES permits can be achieved, this will provide increased some benefits to communities and help reduce negative attitudes towards wildlife.

There will be problems to be overcome in the awarding of additional CITES permits.

Examples of these are :-

1. The peak season for human-elephant conflict in Niassa is between February and May. This is before the safari hunting season opens and few overseas hunters can get to Mozambique at very short notice. However, there is a strong local market of Mozambique residents and people from neighbouring countries prepared to pay the license fee for an elephant.
2. It will be important to ensure that the awarding of any extra CITES permits is handled transparently and objectively, so that there can be no concern that undue influence has been exerted to favour one company above another.

In addition to earning more from problem elephant, it is strongly recommended that the percentage of the revenue from licenses sold for problem animals shot in communal land should be raised from the 20% that it is at present.

5.7.1.5 Improve the database

The database on elephant damage must be improved. The data sheet proposed by Hoare (undated) is very comprehensive, but in areas with a low level of resources - such as Mozambique - and where elephant damage is an almost daily occurrence this needs to be simplified.

Medium term strategies

5.7.1.6 Removal of problem elephants

Quite clearly there will be situations where elephants will have to be removed from communal farming areas. There may be opportunities for breeding herds to be captured and translocated to parks such as Gorongosa where the elephant population is still far below carrying capacity. In the case of mature bulls, the most cost effective and human solution may be to shoot the problem individuals.

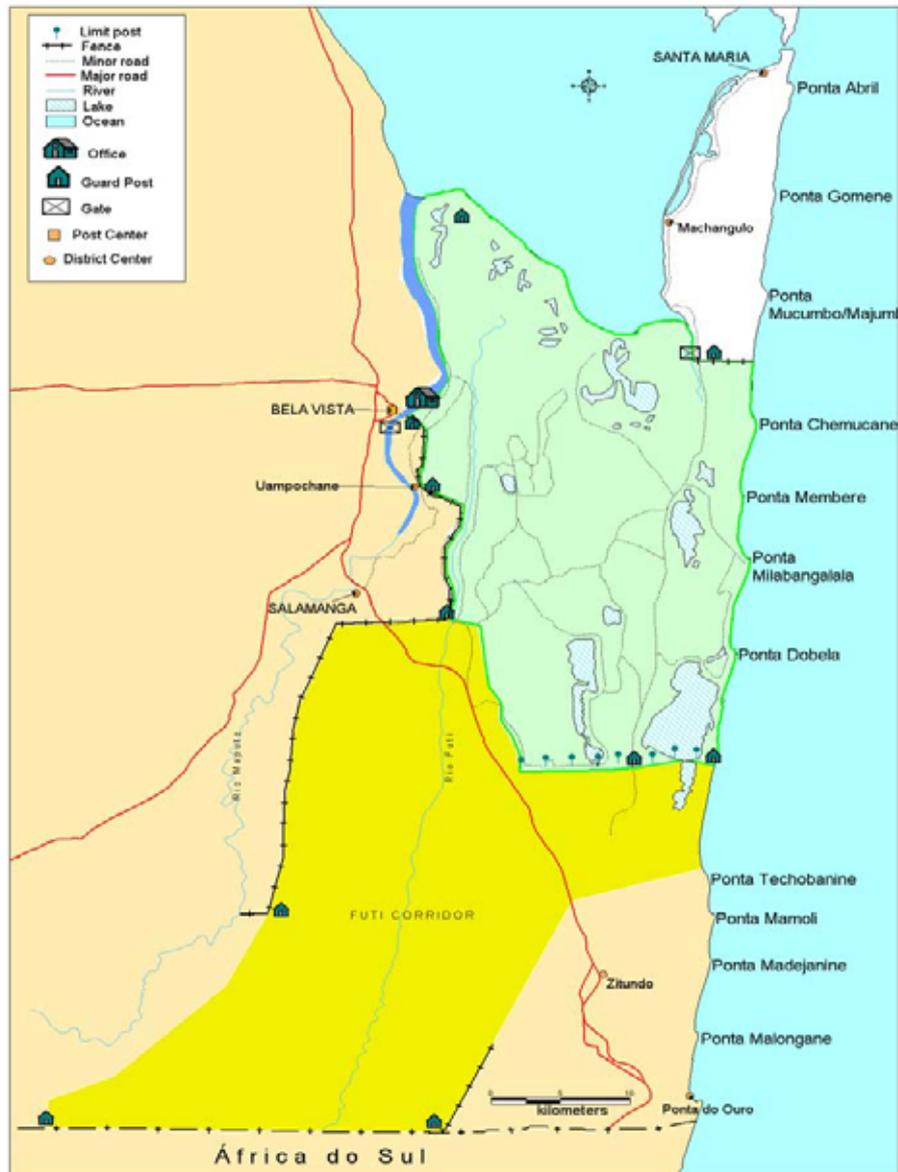
5.7.1.7 Improve information on elephant distribution and numbers and damage estimates

A survey of the distribution and numbers of elephants outside protected areas is required. Particularly in Niassa, Cabo Delgado, Tete, Nampula and Manica Provinces.

5.7.1.8 Erection of the Futhi Corridor fence in Maputo Special Reserve.

The erection of an elephant proof fence along the Futhi corridor, as already proposed in the (2004) Ministry of Tourism report, is a high priority. The erection of this fence (Fig 12) will make a major difference to the degree of elephant conflict outside the reserve.

Fig 12: Proposed location of the Futi Corridor fence



5.7.1.9 Undertake Landuse planning of priority areas

The importance of Landuse planning of high human-elephant conflict districts was stated in the National Strategy for Elephant Management. It is again stated here is important to determine whether it is possible to plan the landuse of a district

the resettlement of people

Long term strategies

5.7.1.10 Improve the database on elephant in the country

Considerable effort must be directed towards obtaining better information on the distribution and numbers of elephant in the country. This is essential to

constructive landuse planning and the possibility of setting aside areas where people and elephants are not competing for the same resources.

There are low densities of elephant over a very wide area of Niassa, Cabo Delgado and Nampula provinces and

5.7.1.11 Review the issue of compensation

It is a very worthy objective to try and increase the value of elephant to local communities. However, if this cannot be done and damage costs continue to exceed benefits, then the logical option is then to remove the elephants.

It is felt that there may be circumstances where the issue of compensation must be revisited. It was concluded by Bandara and Tisdell (2003) that the future of wild elephants in Sri Lanka would only be assured if compensation was paid for elephant damage. They found that urban dwellers were prepared to pay compensation for what was lost by people living with elephants. In Mozambique's case, its urban dwellers clearly cannot afford to contribute to this compensation. However, the possibility of this being adopted by a foreign NGO should not be overlooked.

5.7.1.12 Develop management strategies for elephant sub-populations.

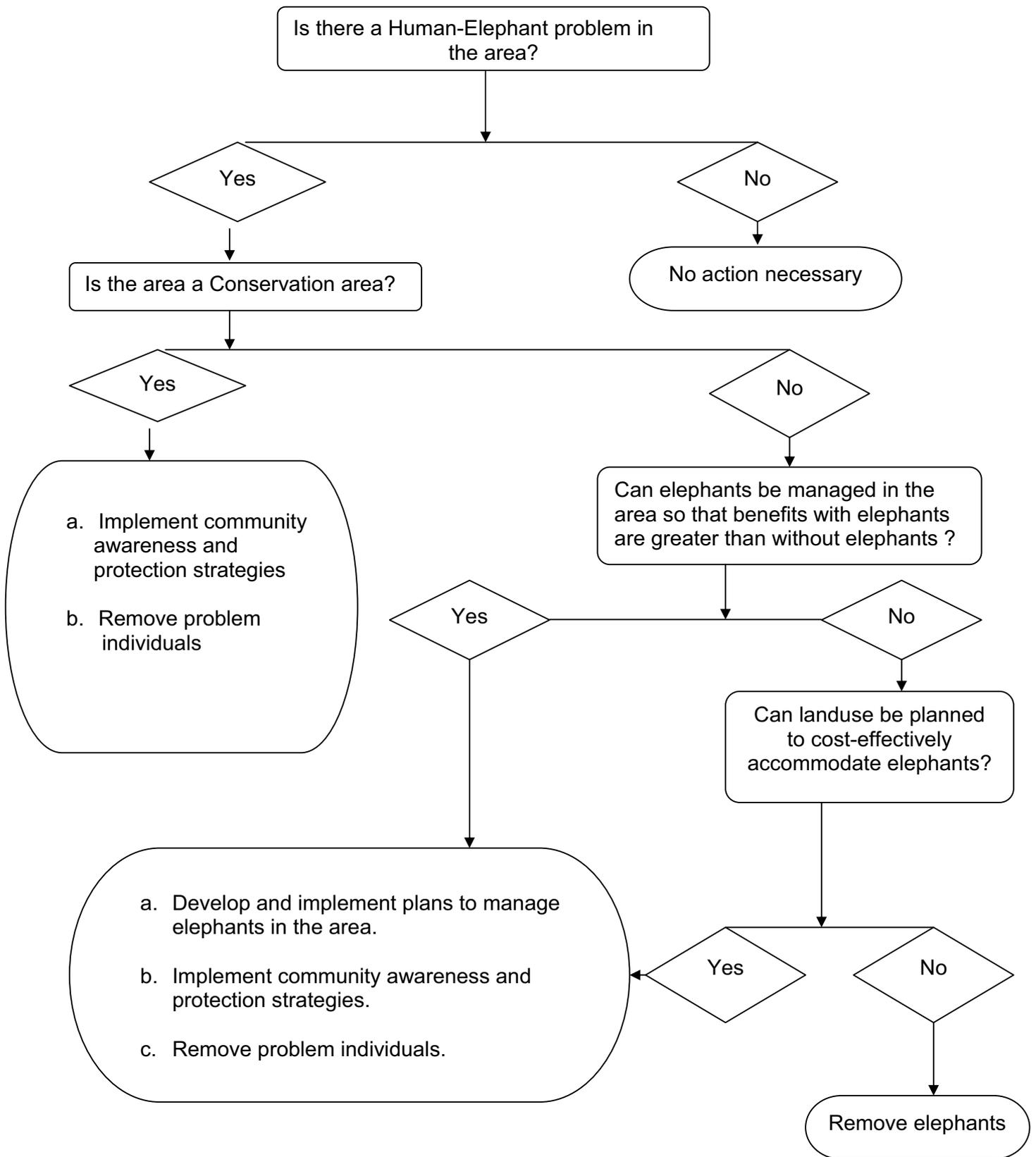
It will help to reach long-term solutions to Human-Elephant conflict if management strategies can be determined for each of the different elephant sub populations in the country. The decision process outlined in Fig 13 should be a guide as to the eventual outcome of the process.

Assuming Mozambique is able to manage its elephant populations. Key questions that will have to be answered are:

Management strategies are needed for each of the different elephant sub populations in the country.

- What is the optimum elephant population for each sub-population ?
- Whether areas within a sub-population's range can be set aside as "elephant priority" areas with no human occupation ?
- How should each sub-population be sustainably managed for optimum benefits for the local communities ?
- Where elephant populations should be reduced, is capture and translocation a realistic option ?

Fig.13. The decision support process to determine management actions in areas with elephants



5.7.2 Crocodiles

Short term recommendations

The recommended actions to reduce the number of attacks by crocodiles are in two categories.

- Implement measures to reduce the risk that people take in their daily lives.
- Plan and implement actions to reduce crocodile numbers where they occur in close to people and where there is insufficient natural food to sustain a viable population.

5.7.2.1 Reducing the risk of crocodile attacks

Most people take little or no precautions when collecting water or washing. As an immediate step in reducing the incidences of crocodile attacks, fenced enclosures should be built at villages where the risk is high. There should be at least two enclosures – one to cater for normal and low river levels and the other for river high levels.

Protective barriers

In the case of villages, Government should supply the wire netting that will be needed to build the enclosures. For individual households, people must be encouraged to make protective barriers using timber and handwoven nets (such as those used for hunting). Alternatively, lengths of wire netting could be supplied to villages to erect protective barriers.

Awareness training

There needs to be a programme to create an awareness amongst rural people of precautions to be taken when close to water in which crocodiles are likely to occur. This awareness must include the precautions to be taken to avoid an attack, and what best to do if one is attacked. This information can be communicated over the radio during the hot season when attacks are most common and by posters and in schools.

Wells next to river

Communities should be encouraged to dig wells close to rivers so that water can be collected safely.

Water lifting devices

Where riverbanks are steep and the construction of an enclosure is not possible, an alternative is to construction a simple water lifting devices such as the Egyptian “shadoof” (Fig. 14). The shadoof consists of a long pole, balanced on a post with a counterweight (this can be a rock, log or a basket of sand)

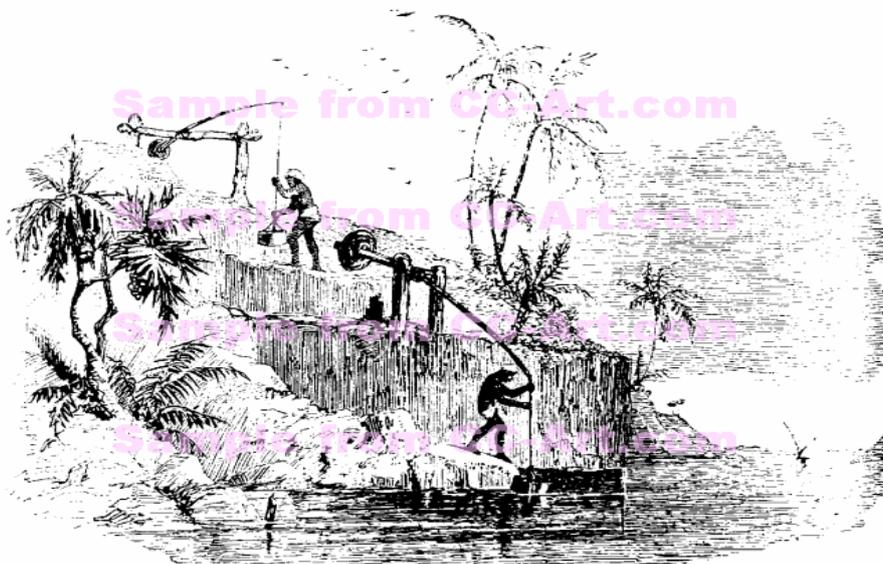


Fig. 14 Using a *shadoof* can reduce the risk of a crocodile attack

5.7.2.2 *The reduction of crocodile numbers*

The decision process on what crocodile management action should be taken in a particular water body is outlined in Fig. 15. It is concluded that it is not logical to retain crocodile populations in rivers where there is not enough natural food to support large crocodiles. Preference must be given to removing crocodile alive to be used in the crocodile farming industry and only where live capture or an urgent situation arise, will the problem animals be shot.

It may be argued by some, that the remove of crocodiles from a river will disrupt the ecology of the river system – particularly as they are an apex predator. One must draw attention to the fact that most rivers are no longer pristine natural systems for the following reasons :-

- Dams have been erected in the catchments and the natural flow and flood regimes disrupted. Examples of this are Kariba, Cahora Bassa and the Kafue dams which have totally changed the flood pattern and impacted heavily on areas such as Mana Pools and Marromeu. The Limpopo alone has over 1500 dams in its catchment.
- Alien fish and plants have found their way into some of the rivers and have a major impact on their ecology e.g. the silver carp in Massingir dam.
- Hippo, which play a role in keeping open channels through reed beds, have been eliminated from most of the river systems, except where they run through conservation areas.

Given that the above factors have already had large impacts on the ecology of the already changed river systems, the removal of crocodiles from selected systems will not have a measurable ecological impact on the rivers. Therefore the following short term actions are recommended:

- It is recommended that of the 900 CITES permits for crocodiles that have been allocated to Mozambique, 100 of these are retained for trophy hunting and that the balance are allocated for live capture only. The CITES permits for the live capture must specify that the crocodiles are longer than 2m. This will encourage operators to select for large crocodiles – those that cause the problems.
- It is recommend that the live capture of crocodiles in the country is awarded to companies that have invested in the crocodile industry in Mozambique.
- It is recommend that crocodile farms in Mozambique are allocated unlimited capture permits to catch adult crocodiles for breeding purposes. These permits to be issued for the rivers identified through the process outlined in Fig 13.
- It is recommended that as soon as possible, capture permits are issued for the following waters:

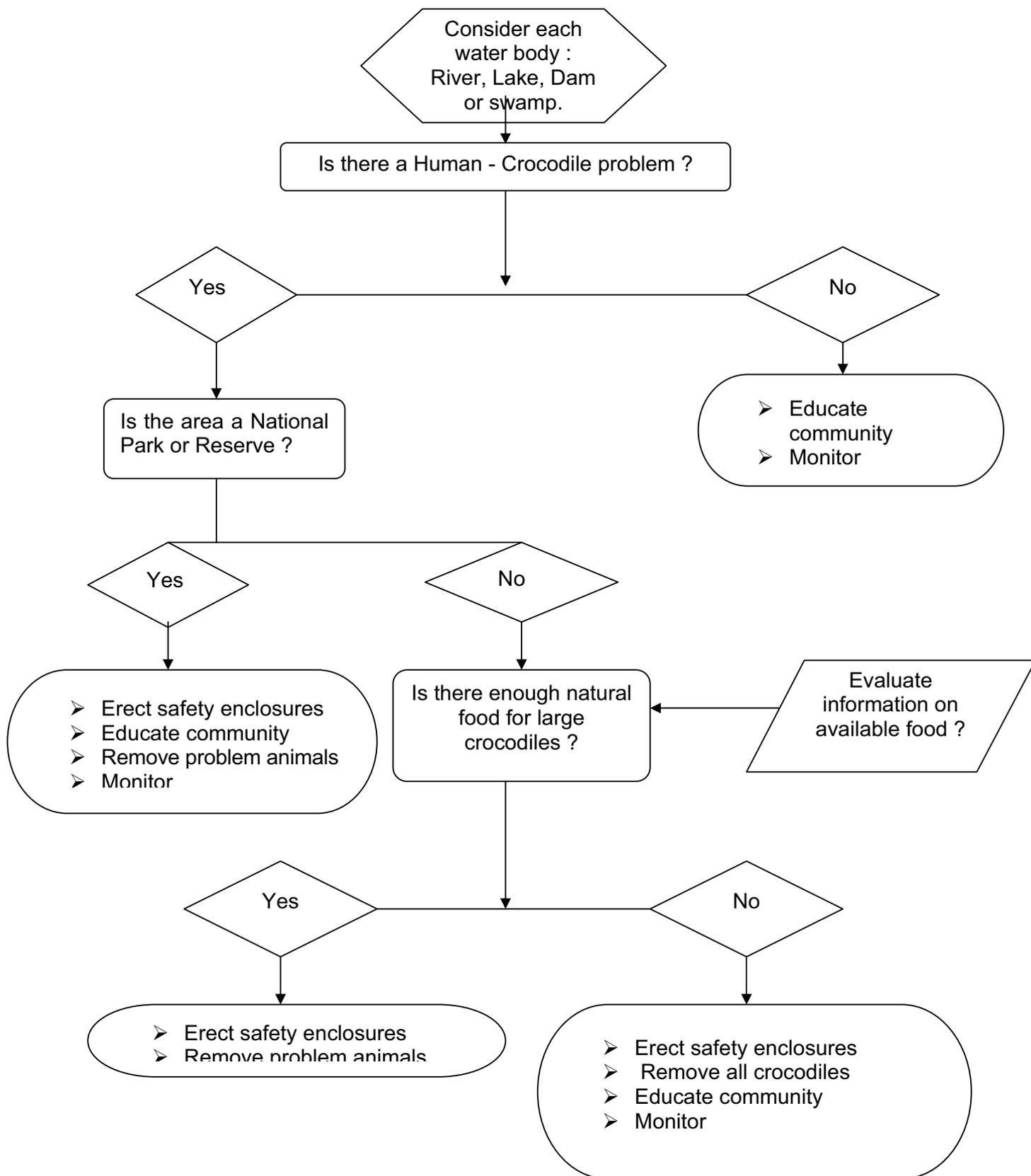
Rivers	Umbeluzi, NKomati Limpopo below the Limpopo National Park Rio des Elefantes below Massingir dam Zambezi below Cahora Bassa
Dams	Cahora Bassa Curumane Piquena Lemombo
- Where the crocodile farming companies indicate that it will not be cost-effective for them to catch crocodiles in a conflict area, the proposed PAC Units must be responsible for removing as many large crocodiles from the area as possible.

Medium term recommendations

The PAC units must collect data on all rivers where a Human: Crocodile problem has been reported. As a start the information is needed for the following rivers: Save, Pungwe, Lugenda, Buzi, Rusito

It is recommended that action plans for the management of crocodiles in Mozambique is done on the basis of classifying water bodies according to the flow diagram in Fig. 15. The basis of this classification is that outside conservation areas, crocodiles can only survive in the presence of people if there is sufficient natural food (e.g. Massingir dam).

Fig.15. The decision support process for actions to resolve Human - Crocodile conflict



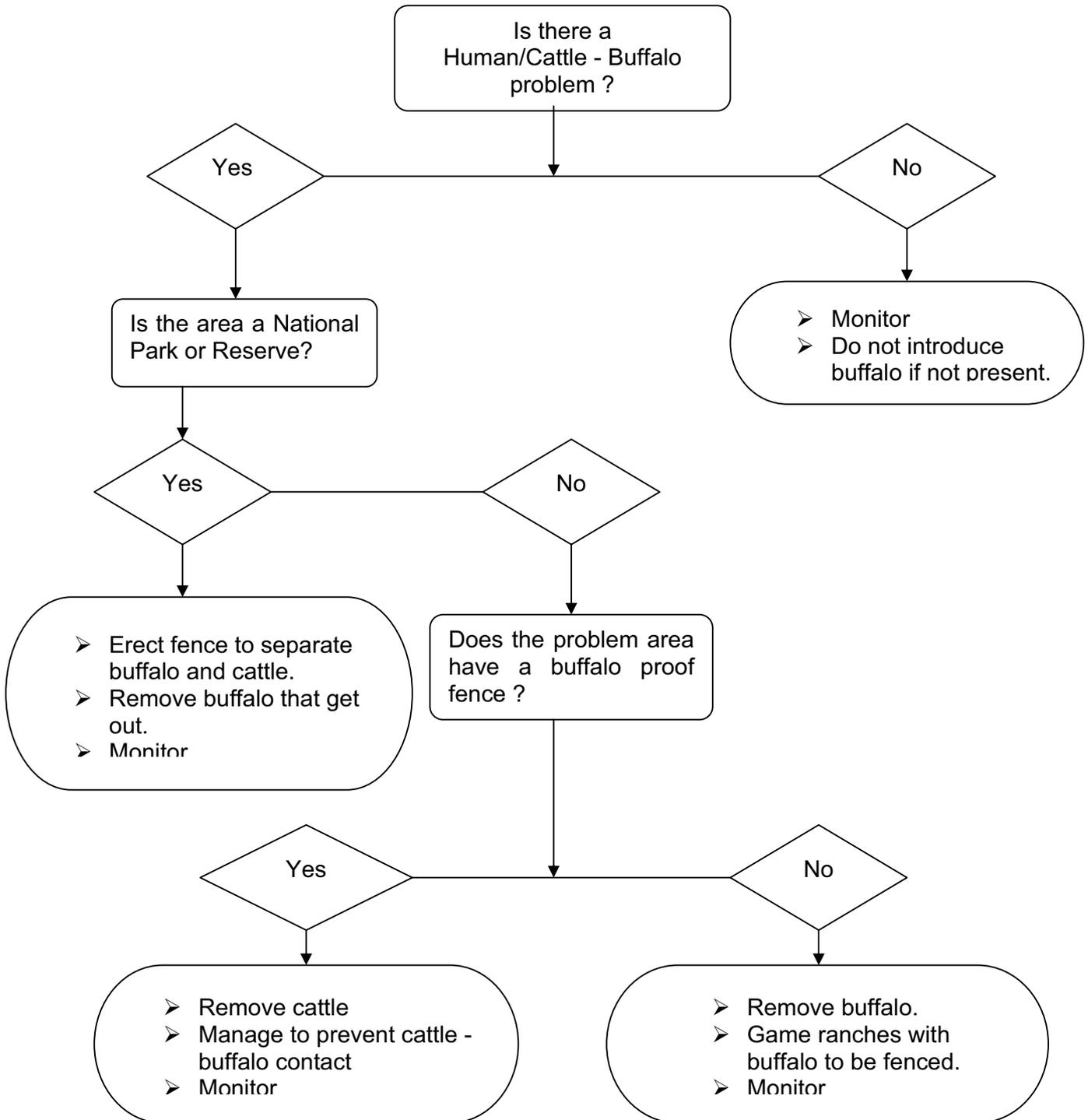
5.7.4 Buffalo

In the interests of the future of the agricultural industry and the economy of the country, it is important that the distribution of buffalo in the country is assessed and then zones are planned so that the areas of high cattle production potential are zoned to be "Buffalo Free". In Botswana, Namibia, South Africa and Zimbabwe, there are strict controls to prevent contact between buffalo and cattle and this is strongly recommended for Mozambique by the Mozambique Animal Health Department (Veterinary Epidemiology Unit) (C. Pereira pers comm)

- We strongly recommend that buffalo proof fences are erected between the Limpopo National Park and the adjoining communal land.
- Landuse planning in cattle producing provinces must consider that some areas should be "buffalo-free" zones.
- Any game ranches in Gaza, Maputo, Inhambane, Manica and Tete provinces that intend stocking buffalo must have a permit to do so and, depending on their location, may be obliged to erect a perimeter fence that is able to prevent contact with cattle.
- The buffalo at present in the communal areas outside the Limpopo National Park must be removed as soon as possible. If the private sector is prepared to catch these they should be encouraged to do so. If they are unable to catch the animals within three months, the animals should be shot.

The decision process for selecting the appropriate action on buffalo conflict situations is given in Fig. 16.

Fig.16. The decision process for actions to resolve Human/Cattle : Buffalo conflict



5.7.5 Hippo

Short term strategies

It is recommended that the following short term actions are taken to mitigate hippo problems.

Protection of maChambas from hippo

Hippo are not able to get over a 75cm high fence, so where materials are available (e.g. poles, or cable) a strong fence this height will keep hippo from damaging crops.

Medium term strategies

Assess and plan hippo management areas

The status of hippo in the country needs to be assessed and, wherever possible, hippo populations that do not conflict with should be conserved and managed for sustainable utilization.

Remove hippo where no future for them

Where there is clearly no long-term prospect of keeping a viable population in an area, the hippo should be removed in the most cost-effective and humane manner. The possibility of capture and translocation to a protected area must always be considered.

Long term strategies

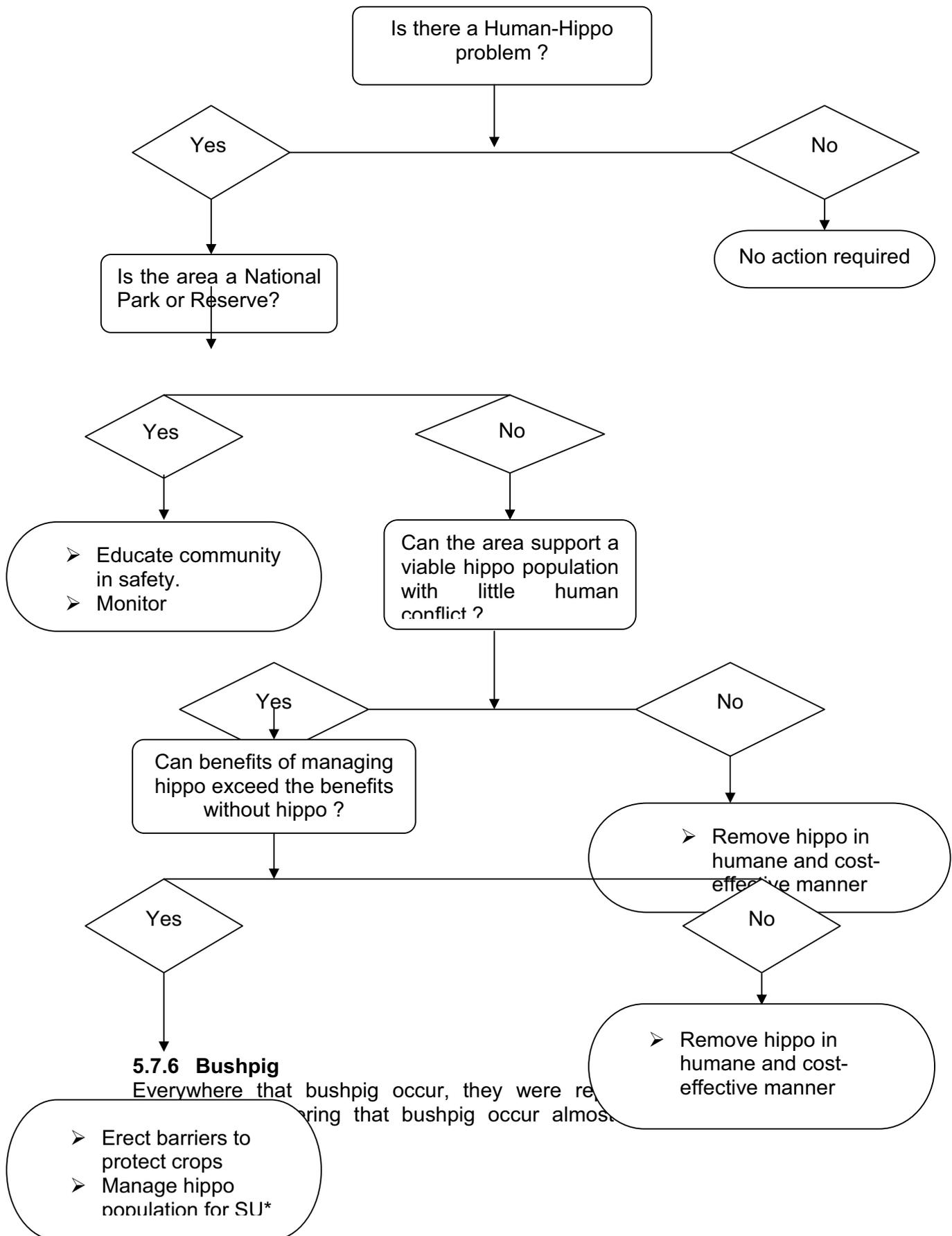
Protection of maChambas with a sisal barrier

A double sisal hedgerow will deter hippos from entering *maChambas*. However, this is a long-term solution as it takes several years to grow and can only be regarded as a long term solution. The nurseries for growing sisal seedlings can be started in the earlier phases.

Management of hippo populations in communal areas

The management of all hippo populations found in communal areas should be classified according to the decision process outlined in Fig. 17.

Fig.17. The decision process for actions to resolve Human-Hippo conflict



problems with elephant, crocodile and lion have been addressed, we do not recommend that DNFFB tackle the problem on a national scale.

During periods when the PAC unit is not involved in an elephant, crocodile or lion problem, they could tackle bushpig complaints more as a training and skills exercise.

5.7.7 Baboons & monkeys

As problems with baboons and monkeys were not reported as being a high priority, no action is recommended at this stage. When the collection of information improves, and if baboons are identified as being a serious problem, then the worst affected areas must be identified and the baboons removed using the live trapping method that eliminates an entire troop.

5.7.8 Birds

Short term actions

Until a serious bird damage problem is identified and the locations pinpointed, no action is required except to improve the collection of information.

Long term actions

If it become apparent the queleas are a problem in the country, the logistics involved may make it impossible to spray the birds with *Queleatox*. The appropriate PAC units must also trained in the dynamite and diesel/petrol method of control. Both methods of control are applied when the birds are roosting outside the breeding season (Mundy & Jarvis 1989)

5.8 LIMPOPO NATIONAL PARK: REVIEW MANAGEMENT PLAN

Specific mention is made here of the Limpopo National Park. The reason for this is that there has been considerable international publicity and news coverage around the formation of the Limpopo National park and the Great Limpopo Transfrontier Area and the benefits that it will bring to the countries and the local people.

Officials in Gaza Province insisted that we tell the truth about the situation adjoining the Great Limpopo Transfrontier Park. From what we heard and saw in the area, we share their concerns that unless proper mitigation measures are in place, the Transfrontier Park can become an economic disaster for a large section of the local communities

Our perspective is that, despite the fact that animals (in particular elephant) have so far only increased to numbers that are still way below the anticipated final stocking rate, the development of the park is already bringing severe negative impacts to some of the communities that live in the area.

In addition to the depredations of crops by smaller antelopes the following will have the greatest negative impact:

- Buffalo: It must be clearly understood that with the spread of buffalo into the area where they will mix with cattle, that there will have two major

consequences, namely outbreaks of “Foot and mouth” disease in the area, and the cattle will in the area will eventually die out. The deaths will be due to *Theileriosis* or Corridor disease. As the area holds approximately 10,000 head of cattle (on both sides of the Limpopo River, this will be a significant loss to the region and the nation and particularly to the cattle owners. Formerly there were 76,000 cattle and 16,000 goats (DNFFB, 1998).

- Elephant are already now crossing the Limpopo River and are causing serious damage to crops on both sides of the river. The irrigated maize is now green while most other elephant food has now dried out;
- Hippo numbers are at present low, but they have the potential to destroy the crops in the emerging and planned irrigation projects;
- Lions will directly prey on the livestock and will endanger peoples lives, particularly those farmers who are out at night trying to protect their crops from other animals (as is now the case in Cabo Delgado);
- Fortunately upstream from its junction with the rio dos Elefantes, there are very few crocodile and they are is not a serious concern at present.

No cost-benefit analysis of the these specific impacts of the park on the subsistence-living of the communities adjoining it has been undertaken.

The livelihoods of a large number of self-sufficient farmers can be destroyed by the increasing number of wildlife. It must be understood that the communities along the Limpopo and Elefantes Rivers will continuously bear the brunt of wildlife conflict, as these animals will be attracted to the rivers because of the availability of water (particularly in winter when large sections of the Park are waterless) and because of the presence of quality feed in the form of maize or vegetable crops.

The alternatives, in the form of tourism or even community resource areas where safari hunting is practiced, are not necessarily going to benefit the same people that will suffer the wildlife related damage. The concession holders as well as ranch owners adjoining the Park, are most likely to be expatriates (generally South Africans), whose local partners are people of influence usually living in Maputo . If the former self-employed farmer is fortunate he or she may get a job with a concession holder. However, because most of the present farmers and cattle owners speak only Shangaan, the jobs that they may get are likely to be menial ones. Sadly, many of them are middle aged or elderly and they are unlikely to find work at all. The ecotourism development of the Park is thus unlikely to favour the present generation of farmers, but will hopefully make a major difference in the lives of some of their children. The conflict between damage caused by wildlife on the one hand and the rewards brought through tourism on the other hand also has the potential to divide communities and to increase local tensions.

In the first DNFB Concept Plan in 1998, it was advocated that a game fence be used to shield the communities from the wildlife and wildlife diseases and that artificial water points be used to supply water to the wildlife coming towards the rivers during the dry season.

It is acknowledged that this is a less than ideal solution from an ecological perspective. The Management Plan of the Park has therefore moved away from this position. However it is believed that the reality of the situation must be recognized and that a compromise must be implemented that ensures the successful development of the Park in terms of wildlife and ecotourism, whilst ensuring the survival and improvement of conditions for those communities living along the Limpopo and Elefantas Rivers.

It is strongly recommended that the current Land Use and Land Capability Planning Project for the Support Zone of the Park takes full cognizance of these negative impacts and that there is no evidence of any historical game migration (USAID 2003), by advocating a 'hard edge' (by means of a game fence) between the communities and the Park.

The Transfrontier park could become a textbook example of how to impoverish local communities in favour of conservation ideals and ecotourism opportunities that benefit a privileged minority of mainly outsiders....

Unless this approach is followed, the Transfrontier Park could become a textbook example of how to impoverish local communities in favour of conservation ideals and ecotourism opportunities that mostly benefit a privileged minority of outsiders who do not suffer the negative consequences of these changes.

The following logframes deal with the most important fundamental tasks that need to be done:

6.1 ACCEPTANCE OF A HUMAN-WILDLIFE CONFLICT POLICY

Table 7
The steps and indicators in the development of a national Human-Wildlife conflict Policy

THE DELIVERABLES	ACTIONS NECESSARY	INDICATORS	DATE FOR COMPLETION
A national policy for human-wildlife conflict is submitted for ratification	A workshop is held on the Draft Policy , amendments and additions are made where necessary	The Minister PAC submits the proposed policy for consideration	30 November 2005
The proposed Policy is discussed and ratified	The Policy is approved at the highest level necessary.	The final draft of the policy is approved.	mid-December 2005
The accepted policy is distributed to the relevant Ministries & Directorates	Copies of the now official Government policy on human-wildlife conflict are distributed to all relevant Ministries	All relevant Ministries acknowledge receipt of the policy.	January 2006

6.2 DEVELOP AND MANAGE PROBLEM ANIMAL CONTROL UNITS

Table 8
The steps required to develop and manage Problem Animal Control units

THE DELIVERABLES	ACTIONS NECESSARY	INDICATORS	DATE FOR COMPLETION
The motivation and budget needed to recruit, train, equip and operate three PAC units is prepared and submitted to donors	Budgets are determined and the motivation for funding made to appropriate donor agencies	Funds for the development and operation of PAC teams are secured.	November 2005
A consultant team and DNFFB counterparts to be contracted to provide the necessary service	Suitably qualified companies or individuals are asked to submit an Expression of Interest	A suitable consulting team and DNFFB counterparts are appointed	February 2006
Procure vehicles and equipment for training team and the first PAC unit	Suitable vehicles and equipment are identified and ordered.	Vehicles and equipment are purchased	March 2006
Suitable personnel are recruited, trained and equipped for the first PAC unit	Recruit candidates. Train in PAC skills, maintenance of equipment and reporting	The first PAC unit of four staff is trained and equipped and able to start operation under mentorship	by June 2007
Suitable personnel are recruited, trained and equipped for the second PAC unit	Recruit candidates. Train in PAC skills, maintenance of equipment and reporting	The second PAC unit of four staff is trained and equipped and able to start operation under mentorship	by September 2007
Suitable personnel are recruited, trained and equipped for the third PAC Unit	Recruit candidates. Train in PAC skills, maintenance of equipment and reporting	The second PAC Unit of four staff is trained and equipped and able to start operation under mentorship	by December 2007

6.3 DEVELOP AND ADOPT LANDUSE PLANS

Table 9

**Steps to develop and adopt landuse plans
for districts with high human-elephant and high human-hippo conflict**

THE DELIVERABLES	ACTIONS NECESSARY	INDICATORS	DATE FOR COMPLETION
The motivation and budget needed to undertake landuse plans is prepared and submitted to donors	Budgets are determined and the motivation for funding made to appropriate donor agencies	Funds for the development and operation of PAC teams are secured.	December 2005
Suitably qualified consultants are appointed to undertake the planning	Suitably qualified consulting firms are asked to tender or submit Expressions of Interest .	Suitably qualified consulting firms or consortia are appointed to undertake the landuse planning	February 2006
Prepare Landuse plans for the worst affected districts	Consulting firms complete landuse plans for the worst affected districts	Landuse plans for the worst affected districts are completed and implementation starts	December 2006
Prepare Landuse plans for the districts with second tier problems	Consulting firms complete landuse plans for the areas in the second tier of human-wildlife conflict	Landuse plans completed and implementation starts	December 2007

6.4 INCREASE THE VALUE OF WILDLIFE TO COMMUNITIES

Table 10
Steps to increase the value of wildlife to communities

THE DELIVERABLE	ACTIONS NECESSARY	INDICATORS	DATE FOR COMPLETION
The proportion of license fees that is allocated to the communities is increased.	The present allocation is reviewed and a case submitted to decision makers to increase the proportion of revenue from hunting licenses allocated to communities	Communities are encouraged by the increase in revenue from license sales and become more positive towards the sustainable use of wildlife.	June 2006
CITES permits are allocated for elephant to be hunted on problem animal control to increase income to affected communities	A comprehensive motivation must be prepared for submission to the next CITES COP meeting for an allocation of additional CITES permits for problem elephant.	Greater financial benefits are achieved by communities from elephant shot on problem animal control	In time for the next CITES Conference of Parties in 2007
A process is put in place where problem animals that would be hunted by the PAC unit can be marketed to a wider range of hunters in Mozambique and neighbouring countries	Investigate the practical aspects of allowing hunters from Mozambique and neighbouring countries to pay to accompany the PAC units and hunt problem animals	Increased revenue and benefits to local communities is derived from local hunters prepared to accompany the PAC units	June 2006

6.5 DEVELOP MANAGEMENT PLANS FOR KEY SPECIES

Table 12

THE DELIVERABLES	ACTIONS NECESSARY	INDICATORS	DATE FOR COMPLETION
The motivation and budget needed to undertake landuse plans is prepared and submitted to donors	Budgets are determined and the motivation for funding made to appropriate donor agencies	Funding for the development of key species management plans is made available	March 2006
Expressions of interest are called for for developing management plan for the key species and consultants appointed	The TOR for the project is prepared and advertised. The most suitable persons are appointed to undertake the task	The consultants appointed for the project commence work	July 2006
Management plans for sub-populations of key problem species living amongst communities	The consultant(s) carry out the field work necessary and complete their written report.	The report(s) provides realistic solutions to the management of key species sub-populations	December 2007

6.6 DEVELOP A NATIONAL POLICY AND PLAN FOR BUFFALO

Table 13

The steps needed to develop a national policy and plan for buffalo.

THE DELIVERABLES	ACTIONS NECESSARY	INDICATORS	DATE FOR COMPLETION
A national policy and plan for buffalo is accepted that takes into account the future of the cattle industry and agricultural exports	The motivation for a buffalo policy and plan is prepared and submitted to the Ministers of Agriculture & Tourism	Funding is obtained for the preparation of the national policy and plan	December 2005

6.7 REVIEW LIMPOPO NATIONAL PARK MANAGEMENT PLAN

Table 14

Review the Limpopo National Park Management plan with regard to the issue of Human – Animal conflict and the need to create a hard edge v

THE DELIVERABLES	ACTIONS NECESSARY	INDICATORS	DATE FOR COMPLETION
Approach the Ministry of Tourism with request to review the fence option on the LNP management plan	Prepare and submit written representation to request MITUR to review the fencing option in the LNP management plan.	The Ministry of Tourism agree to review the “No fence” option in the	21 October 2005
The fencing component of the LNP management plan is reviewed, taking into account the likely human-wildlife and cattle-buffalo conflict under the [present plan.	The Ministry of Tourism engages key stakeholders to find a solution to the likely human-wildlife conflict on the perimeter of the Limpopo National Park. The LNP plan is changed to reflect this solution.	The Ministry and Tourism ensure that the LNP management plan is reviewed to	December 2005

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Appendix 1:

Training needs for the PAC units - all training to be done in the field and on real problem situations

Bush craft
Camp craft
Behaviour, habits and biology of important species
Marksmanship and weapon handling
The ability to use a heavy rifle under pressure
Routine care of vehicle and all equipment
Dealing with routine vehicle problems e.g. puncture repair
First aid
Radio, GPS and satellite phone care and operation
Recording PAC incidents
Evaluating PAC damage and animal numbers
Time management
Decision making
Making recommendations to the appropriate response
Methods for hunting problem elephant – with practical
Methods for hunting problem lions – with practical
Methods for hunting & catching problem crocodiles – with practical
Methods for hunting buffalo – with practical
Community liaison and public relations
Record keeping and report writing

**Appendix 2:
Provisional list of equipment for one PAC unit**

Item	Number
Landcruiser: diesel with canopy and long range fuel tank	1
Trailer for Landcruiser with same size wheels	1
Additional spare wheel	1
Vehicle tools (Pump, Jump leads, puncture repair kit, tyre levers, duct tape, funnel and filter, etc)	various
Radio VHF to talk to Provincial offices	1
GPS	1
Satellite phone	1
Jerry cans for fuel	5
Hand winch 5 ton	1
Steel cable	30 m
Water containers 20 litre	4
Tents (canvas - bow)	3
Folding camp beds	5
Folding table	1
Folding chairs	5
Sleeping bags	5
Hurricane lanterns (paraffin)	3
Camp shower	1
First aid kit - comprehensive	1
Metal bucket	1
Steel trunks for storage with padlocks	4
Rifle .458 (BRNO CZ)	2
Rifle .375 (BRNO CZ)	1
Scope sight for .375 (low power and robust to withstand recoil)	1
Rifle cleaning equipment and solvent, oil and patches	2
Spotlights with red filters	2
Portable rechargeable 12 volt battery	1
Cassette player and amplifier – rechargeable batteries	1
Predator calling CDs	3
Night viewing goggles or scope	1
Coyote getters	6
Head mounted light	2
Hand torches (flashlights)	2
Canvas water bags	3
Spade	1
Hand axe	1
Skinning knives	2
Cane knife	1
Gas light and spare mantles	1
Gas cooking ring	1
Gas bottle: refillable- 20kg	1
Kettle	1
Cooking pots	2

Appendix III

Crocodile attack form for IUCN Crocodile Specialist Group

Fill one of these forms for each report of attack that caused injury or death to humans or livestock

Reported to who;	Date reported
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Name of person reporting;	Date of attack:
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Name of person attacked	Age of person attacked yrs
M/F	Sex of person attacked

Location– village/place name;	River/lake name:
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Time (hour) of attack;	No. of witnesses
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Activity before the attack?;

What happened ?	Size of crocodile ?
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What precautions used (if any)?

Killed during attack	Yes / No	Body recovered	Yes / No
Survived but died later	Yes / No	Survived with injury	Yes / No
Went to hospital/clinic	Yes / No	Extent of injuries:	
Action after attack;			
Reported to; headman/chief/local admin/district admin/Police/Health/Mission/Wildlife Authority			
Crocodile killed later?	Yes / No	Who by?	Correct crocodile?
Yes / No			

Measures used to prevent more attacks ?

Livestock killed

TYPE	Dog	Goat	Sheep	Cattle	Donkey	Other
NUMBER						
PERIOD						
VALUE						

N.B: PLEASE RETURN A COPY OF COMPLETED SHEETS TO zeahtco@zol.co.zw FOR INCLUSION IN THE AFRICA CROCODILE CONFLICT DATABASE