KAVANGO ZAMBEZI
TRANSFRONTIER CONSERVATION AREA (KAZA TFCA)

A MANUAL for REDUCING and MITIGATING HUMAN-AQUATIC ANIMALS CONFLICT (HAAC)

Hippopotamus *(Hippopotamus amphibious)*

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Abbreviations

HAAC	Human Aquatic Animals Conflict
HWC	Human Wildlife Conflict
KAZA TFCA	Kavango-Zambezi Transfrontier Conservation Area
PA	Protected Areas

KAZA Mission

"To sustainably manage the Kavango Zambezi ecosystem, its heritage and cultural resources based on best conservation and tourism models for the socio-economic wellbeing of the communities and other stakeholders in and around the eco-region through harmonisation of policies, strategies and practices"

1. Introduction

Kavango-Zambezi Transfrontier Conservation Area (KAZA TFCA) is a transboundary collaborative initiative of five Partner States; Angola, Botswana, Namibia, Zambia and Zimbabwe, in the conservation of shared natural resources and the development of the communities in and around the landscape. The TFCA is a mosaic of multiple land uses composed of:

- Protected areas (PAs) in the form of national parks; game reserves;
- wildlife/game management areas; forest reserves; and conservancies/ community concessions areas; and
- Communal areas (settlement, pastoral, and arable farming).

There are about 3 million people settled across the KAZA landscape. The human population is mainly rural, largely dependent on subsistence pastoral and arable agriculture. The multiple land use status of the KAZA landscape present many development challenges and opportunities for the resident communities.

Human-Aquatic Animal Conflict (HAAC) is fast becoming a serious threat to the survival of aquatic species that include the crocodile and hippopotamus. In the KAZA TFCA, aquatic animals have coexisted for millennia. Recent decades have seen a dramatic increase in the frequency of human-aquatic animal conflict resulting mainly from the ever-increasing human population's need for more land.

The demographic and social changes have placed more people in direct contact with large aquatic animals as settlements expand into and around protected areas. Within the KAZA TFCA and surrounding areas where many rural people live in close proximity to rivers, dams and protected areas. The contact between humans and aquatic animals often result in fatalities (from both crocodiles and hippos) or destruction of crops (from hippos) causing severe economic and livelihood hardships on affected individuals and families. In retaliation, humans usually shoot, poison, capture, injure or kill these animals.

KAZA TFCA, the world's largest transfrontier conservation area, is an extremely important conservation landscape for the awe-inspiring aquatic animals particularly the crocodile and hippopotamus. These animals are also a key attraction for the tourism industry in the KAZA landscape, therefore their persecution because of being considered destructive can have negative impacts not only on the ecological processes, but on the tourism industry as well. In order to reduce and mitigate the undesirable results of interactions between humans and aquatic animals, there is need to provide information to all stakeholders in KAZA TFCA on various methods that may enable more harmonious coexistence of people and these animals.

Figure 1: Nile Crocodile (Crocodylus niloticus).

1.1 Goal of the manual

The overall goal of this manual is to:

- Improve the understanding of conflict between people and aquatic animals and assist the affected communities in applying best management practice to reduce and mitigate the conflicts.

1.2 Objectives of the manual

The objectives of the manual are to:

- Equip users of the manual with knowledge on human-aquatic animals conflicts; and
- Assist users of the manual in applying best management practices in reducing and mitigating human-aquatic animal conflict.

1.3 Targeted users of the manual

- Farmers (subsistence and commercial) affected by human-aquatic animals conflicts in their daily lives.
- Wildlife managers and extension officers involved in natural resources management.
- Stakeholders interested in coexistence of people and aquatic animals.

2 Human-aquatic animal conflict (Case of Hippopotamus and Crocodiles)

Crocodile attacks on people are opportunistic. They can attack even when natural food is available. Hippos are considered to be responsible for more human deaths than any other large animal in Africa. Nowadays, however, cases and reports suggest crocodiles to have superseded the hippopotamus. Crocodile attacks are common due to their higher numbers and distribution and cosmopolitan nature (able to live in close proximity to people and across many areas without being detected) within the KAZA landscape.

Often the number of attacks is underestimated as some cases go unreported, lack of evidence to suggest disappearances were a result of crocodile attacks and association of attacks to witchcraft among others.

In some areas human activity such as overfishing and poaching has resulted in low wildlife populations and fish stocks in the rivers. Resultantly, due to shortage of food resources, crocodiles turn to livestock and being man-eaters. Since people and livestock in most rural areas depend on the rivers and dams for their domestic use, they are a target to these crocodiles.

The Hippopotamus is one of the most feared of all African animals due to its aggressive behaviour around water bodies. Most conflict occurs within a few metres from a water body. In most cases attacks occur under the following circumstances:

- When people are guarding their crop fields at night;
- Accidental contact with a hippo at close quarters notably on its line of paths near water;
- Encounter with an injured hippo or that with a calf

Hippopotamus are also one of the prominent animals responsible for crop raiding. Being bulk feeders they eat almost everything in their sight.

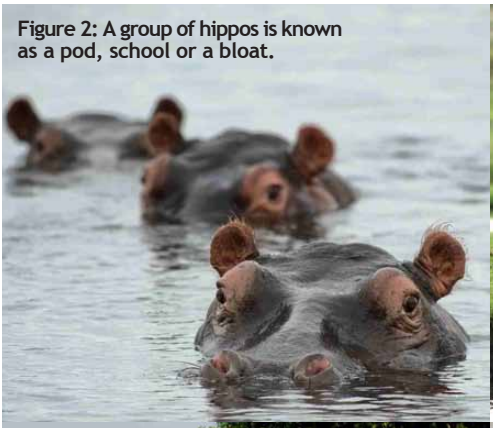

Figure 2: A group of hippos is known as a pod, school or a bloat.

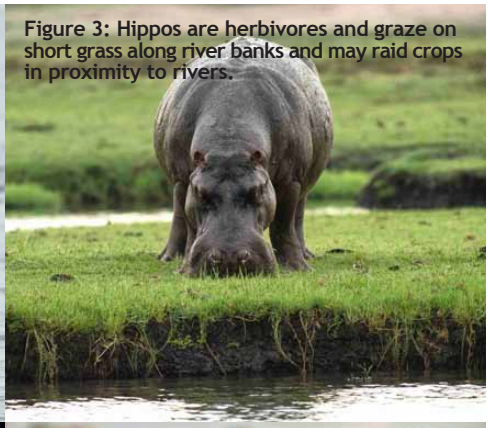

Figure 3: Hippos are herbivores and graze on short grass along river banks and may raid crops in proximity to rivers.

Figure 4: Kids playing on the river are often targeted as prey by large crocodiles.

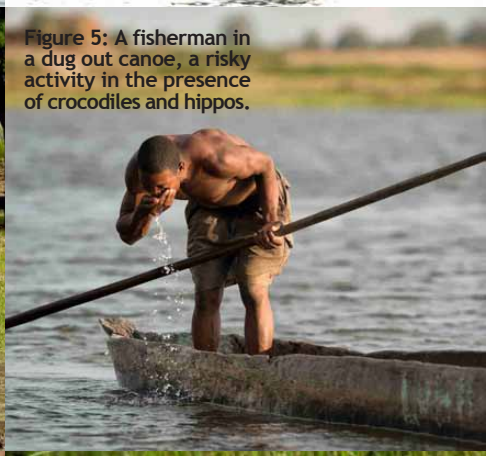

Figure 5: A fisherman in a dug out canoe, a risky activity in the presence of crocodiles and hippos.

Figure 6: A crocodile basks in the sun on the river bank.

Figure 7: Crocodiles are carnivores and feed mainly on fish, frogs, birds and mammals.

2.1 Behavioural traits of aquatic animals

Crocodiles

- Crocodiles being cryptic, semi-aquatic and largely nocturnal are able to inhabit water courses that are often in close proximity to humans.
- Crocodiles are able to remain beneath the water for up to one and a half hours. They can also inhabit small water bodies far from main water channels. This can be very deceptive as people commonly expect crocodiles to be in large water bodies. As such people should approach smaller water bodies with caution.
- When in water, crocodiles usually detect human presence well before they are seen, submerging and remaining in ambush.
- Due to their opportunistic behaviour, crocodiles are a threat to livestock and humans along most of the larger rivers especially those adjacent to the communal areas.
- Crocodiles have a well-developed sense of hearing, smell and sight.
- Crocodiles are easy to see at night using a torch. One can see their eyes as distinct small red dots in water.
- Crocodiles do stress easily during capture. One can calm them down by binding their mouths using tape, blindfolding them and placing them in a dark well aerated cool crate or reservoir.

Figure 8: Crocodiles generally try to go under fences but are good fence climbers.

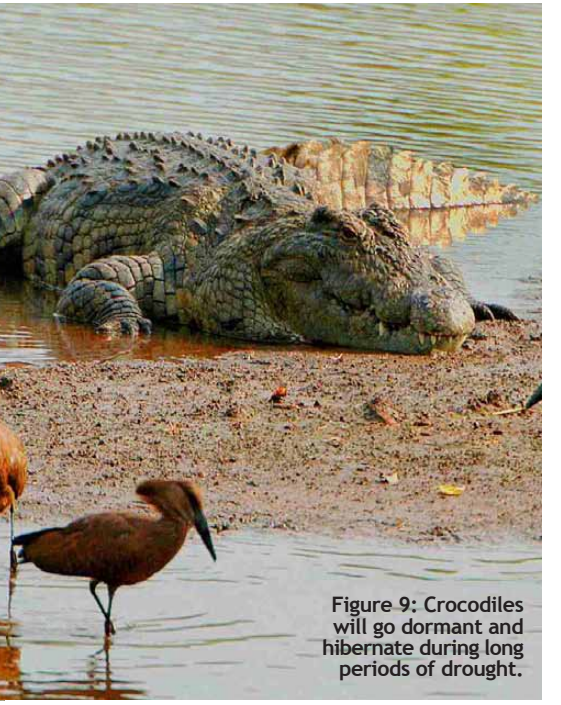

Figure 9: Crocodiles will go dormant and hibernate during long periods of drought.

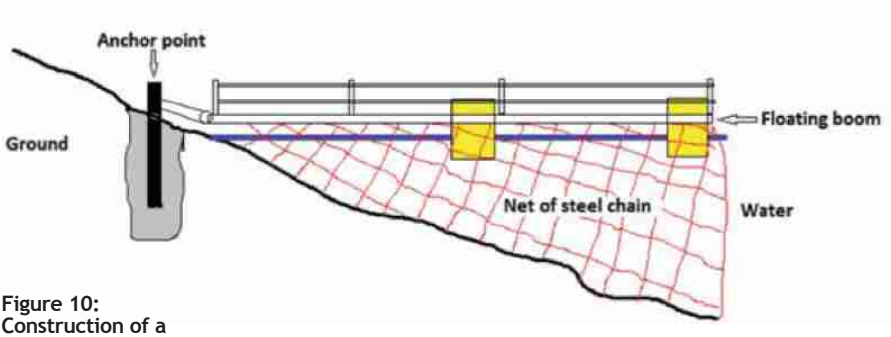

Figure 10: Construction of a crocodile exclusion enclosure.

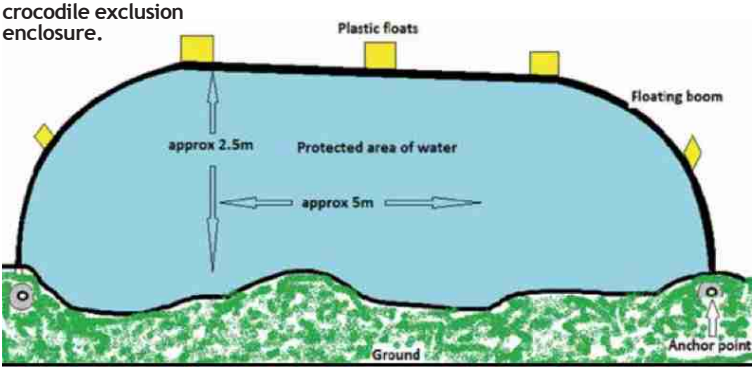

Figure 11: Barricades against crocodiles and hippos in places where people fetch water and livestock drink from.

2.1 Behavioural traits of aquatic animals

Hippos

- Hippos are largely nocturnal; they rest during the day in large bodies of water. They wander out of the water for some kilometres (at times more than 20km) to feed. They also feed during the day around the vicinity of water bodies.
- Paths used by hippos to and from their preferred grazing areas are clearly demarcated by midden and splash. It is advisable to avoid these paths as they are mostly areas were they feel challenged when confronted.
- Hippos are territorial living in family pods largely at peace with communities unless disturbed. This territorial behaviour causes the destruction and capsizing of fishing dug-out canoes of resident human communities. As the pools evaporate, territories become smaller resulting in fights between dominant males often leading to eviction of the loser.
- Hippos move along distinct paths to and from their pools often on separate entry and exit paths.
- Mostly hippo rest on the river bed. If disturbed hippos seek shelter with overhanging vegetation- they often stay underwater only exposing their nostrils to breathe at 5-7 minute intervals.
- Hippos are not strong swimmers. In deep water, they will rather walk/run along set routes rather than swim, surfacing briefly to breathe and look around.

Figure 12: Hippos always forage on land consuming very little aquatic plants.

Figure 13 & 14: Incidences of human-hippo conflict as these are increasing in the KAZA TFCA.

Figure 15: The yawn of a hippo is a territorial gesture that warns rivals not to come closer.

2.2 Common problems caused by aquatic animals(crocodiles and hippos)

Crocodiles

- Injuries, or loss of lives
- Loss of livestock thereby impacting on livelihoods

Hippos

- Damage to crops
- Damage and loss of fishing gear – fishing nets for local people
- Human attacks that may cause injuries and deaths

3 Methods of reducing and mitigating human aquatic animals' conflict

Crocodiles

- Safety first is the best mechanism to manage risks of fatal attacks.
- Reduction of reliance on the rivers and offer alternative sources of water. Drilling of boreholes and construction of protective infrastructure on the boreholes are some of the measures that can be taken.
- Where there are no alternative water sources, constructing crocodile-proof barriers at water collection locations used by communities.
- Crossing of rivers by locals and their livestock should be done at designated shallow points where the ground can be seen. This reduces chances of crocodile attacks compared to crossing in deep waters. Where possible, construction of foot bridges should be considered.
- An improved system of reporting aquatic animals attacks so that potential danger zones should be developed and monitored. Quite often, attacks are not reported. It is important HAAC hotspots are mapped and publicized. This should also include cross border cooperation for all KAZA TFCA partner countries so that the true extent of HAAC is realised.
- Improved and increased communication between all interested parties for reporting and feedback.
- Motivate for land-use planning through local and national political structures.
- Relocation of problem crocodiles.
- Provision of water drinking points for livestock.
- Provision of better agricultural practises such as irrigation, boreholes and aqua-phonics systems in arid regions to curb stream bank cultivation.

Figure 16: Hippo and crocodile exclusion enclosure.

Figure 17: Hippos have large teeth and tusks that they use for fighting off threats, including humans.

Hippos

- Fencing of lands planned in clusters. Fences can be fitted with cow bells or other noise making bangers;
- Digging wide vertical sided gullies that inhibit hippos to cross over.
- Maintenance of buffer zones along riverine areas. Human activities should be at least 100 metres away from the river or dam waterline.
- Community awareness to include educating locals about the behaviour of hippos, risk factors and ways of reducing encounters with hippos.
- Erecting strong solid barriers around the field deters the hippos' access to the affected field. The same result can be achieved through digging wide trenches that will stop hippos' access to fields.
- Capture and translocation of the problem hippos.

4 Training

Training should be a continuous process for all stakeholders. Various programs of training targeting farmers and extension officers should be executed periodically to improve the technical capacity of the various stakeholders that are responsible to respond to HWC. The understanding of animal behavior and wildlife management, as well as the general awareness programs should be part and parcel of the authorities responsible for wildlife management.

5 Conclusion

It is essential to have accurate spatial and temporal geo-referenced information about when and where the conflict is occurring. This understanding, together with implementation of appropriate mitigation measures, should lead to a better focus on target areas and the most relevant species. Wildlife management and conservation authorities need to understand the HWC hotspots in their respective components and design robust programs for support to the communities against wildlife damages. The support programs should be accompanied by effective support on implementation of mitigation measures, and Monitoring & Evaluation tools. In order to realize positive result in dealing with HWC all stakeholders are requested to ensure that:

- The above interventions are constantly implemented and supported, and not just as occasional campaigns;
- There is greater active participation in the strategic activities by the various parties responsible HWC mitigation;
- There are opportunities to Introduce other innovative mechanisms and approaches on dealing with any type of HWC; and
- Adequate capacity in terms of equipment, skills set, technology, and financial resources are in place to effectively support HWC mitigation.

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