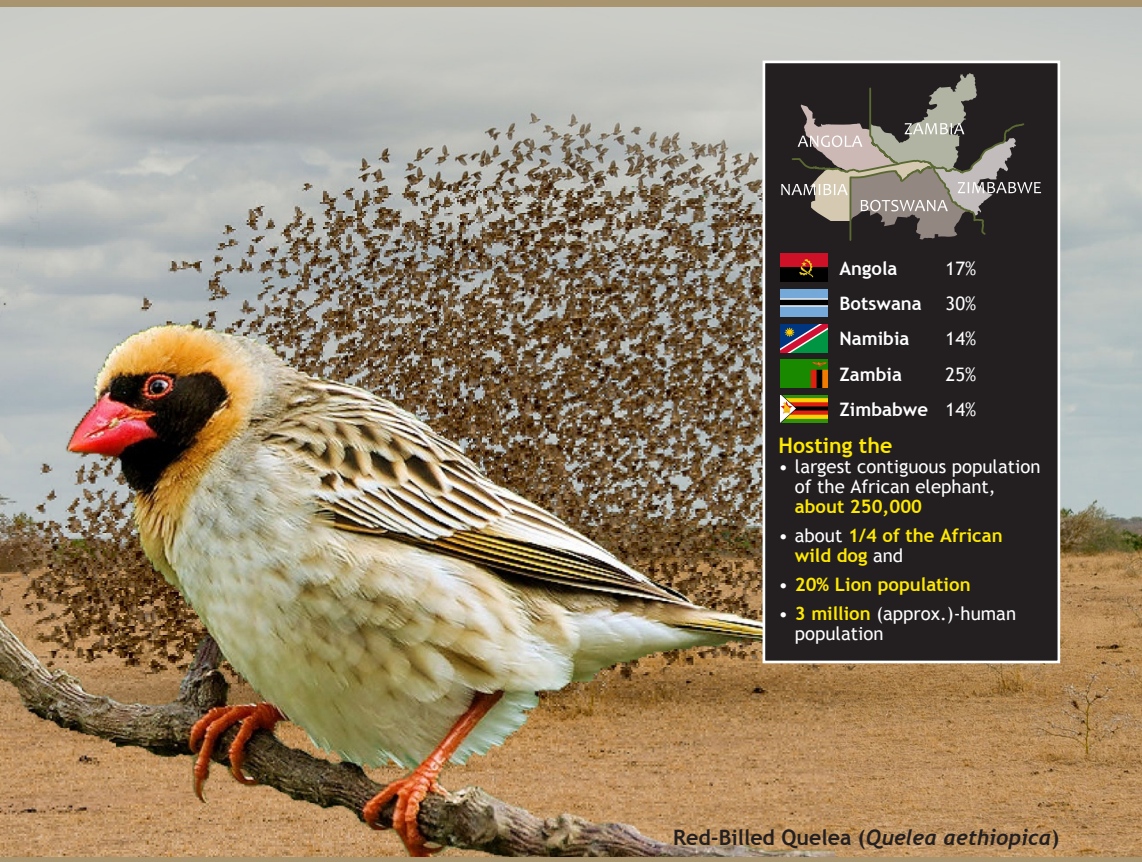
# KAVANGO ZAMBEZI
## TRANSFRONTIER CONSERVATION AREA (KAZA TFCA)

# A MANUAL for REDUCING and MITIGATING HUMAN-BIRD CONFLICT (HBC)




Red-Billed Quelea (*Quelea aethiopica*)

## Table of Contents



### Abbreviations

| | |
|---|---|
| HBC | Human Bird 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 and 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 Bird Conflict (HBC) is the interaction between people and birds resulting in negative consequences on human, bird conservation and the environment. In some cases HBC denotes instances in which demands for resources by humans and birds overlaps, resulting in competition for food, water and space. Human-bird conflict forms part of Human Wildlife Conflict (HWC). In the KAZA TFCA, HBC is typically between birds and subsistence and commercial farmers. Birds that feed on grains and seeds (granivorous birds) cause crop damage while birds that feed on meat (raptors) attack, kill and feed on chicken and other small livestock. Wherever targeted crops and/or livestock are available close to roosting sites of large numbers of problem birds, human bird conflicts are common.

The KAZA region experiences dry weather conditions. As a result, most communities practice subsistence crop and livestock production. The main crops are maize, sorghum and millet while goats and chicken are the most common livestock. Where irrigation is provided, farming includes wheat production. Small grain crops are targeted by the red-billed quelea (RBQ) (see figure 1), pigeons and cranes. While this manual is targeted at birds that eat grains and seeds; killing of poultry (domestic fowls that include chicken, turkeys, geese and ducks) and small livestock by birds that feed on meat is another common source of HBC in the KAZA region. Wetland dependent birds such as Cranes sometimes use cultivated lands to search for food and in dry areas like KAZA they target irrigated lands. Estimates are that Africa has 7,000 Wattled Cranes and 35,000 Grey Crowned Cranes (see figure 2). In the KAZA region, Zambia supports the highest number of both Grey Crowned and Wattled Cranes (more than 1000 of each species). Both species of cranes may cause damage to crops although the Grey Crowned Crane causes a lot of damage.

Figure 1. Red-billed Quelea

Figure 2. Grey crowned crane

Figure 3. Wattled crane

## 1.1 Goal of the Manual

The goal of this manual is to:

- Improve the understanding of conflict between people and birds that feed mainly on grains, and
- Assist the affected communities in applying best practice management to reduce and mitigate the conflicts.

## 1.2 Objectives of the manual

The objective of this manual is to:

- Equip communities and government extension authorities with knowledge on human bird conflict conflicts; and
- Assist and the relevant stakeholders to apply best management practices in reducing and mitigating HBC.

## 1.3 Targeted users of the manual

- Farmers (subsistence and commercial) experiencing and affected by HBC;
- Wildlife managers and extension officers; and
- People interested in coexistence of people and birds.

# 2. Human Bird Conflict: Granivorous birds

The KAZA TFCA supports more than 600 bird species with at least 524 bird species breeding within this TFCA. Granivorous birds are considered to be species which feed on seeds, droplets, pollen and fruits of plants in general and include such species as quelea, sparrows, doves, pigeons, grouse, quails, finches and some cranes. The greatest impact of granivorous birds is economic and the Red billed Quelea (RBQ) is the most common bird species involved in HBC across the KAZA region. In Africa, RBQ species has an estimated population in excess of 1.5 billion, according to the FAO. The estimated agricultural losses attributable to the RBQ are in excess of US$50 million annually in Africa. It is estimated that RBQ feed and destroy grains equivalent to their average weight per day. A flock of two million birds can destroy up to 50 metric tonnes of grain in a day leading to shortage of food.

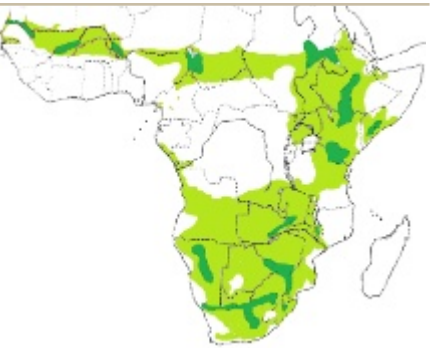


**Figure 4: Red billed Quelea (RBQ) distribution in Africa.**

## 2.1 Behavioural traits of birds that feed on seeds and grains

**Migration**

Most birds that feed on seeds are nomadic. They migrate seasonally over long distances in anticipation of the availability of their main natural food source, which are seeds of annual grasses. Birds such as quelea move to these low-lying areas with the onset of the rains in November, when the natural grass seeds have begun to germinate and are no longer available in the highveld at this time.

**Feeding**

Each species of granivorous birds may prefer just one type of natural seed for its primary diet, but will often nibble on whatever foods that are most easily available. The variety of seeds a specific bird eats typically depends on the bird's bill. Grain and seed eating birds can also eat insects, caterpillars or spiders as sources of protein from growing chicks during the nesting period. When feeding, they do so in huge flocks of hundreds to thousands of individuals, with birds that run out of food at the rear flying over the entire group to a fresh feeding zone at the front creating an image of a rolling cloud. When supply of natural seed runs out, seeds and grains of cereals are eaten at large scale. Birds such as quelea respond by concentrating around this improvised food source, forming large groups to take advantage of the timely concentration of the food source. Interestingly research indicates that even so quelea birds still prefer natural food growing within and around the wheat.

**Reproduction**

For most of the birds that feed on seeds and grains, they reproduce in large numbers each year. For successful breeding, they require dry conditions found in the KAZA TFCA below the 1200-meter contour line. These areas provide sufficient food through annual grasses, timely insect flush to provide food for their young and Acacia type thickets in which to build their nests. Granivorous birds breed successfully and can grow to millions of birds making them not only the most abundant birds in the world but also the most destructive. Queleas are the most destructive birds in the KAZA region. They breed up to three times in any one season where perfect breeding conditions continue to prevail owing to breeding synchronisation and short nesting/fledgling/dispersal time. This breeding trait makes Quelea the most numerous undomesticated birds on earth. They live in groups that gather wherever possible depending upon food availability. They breed from November through to March, spreading out in smaller groups to take advantage of the more widely spread food sources.

**Roosting**

Granivorous birds occupy large sites for their resting and sleeping (roosting) overnight that are close to their food sources. They forage on the same source several times until food is no longer available before they can search for a fresh food source. At the end of each foraging period, they return to the same roosting place. Quelea birds usually reoccupy a roost used in the previous season enabling easy monitoring of their build up.

## 2.2 Common problems caused by granivorous birds

**Damage to the crop yields**


Figure 5: Granivorous birds feed on seeds.

- Birds that feed on seeds and grains are attracted by wide varieties of arable crops which result in significant damage to the crop yields.
- Birds can inflict damage to crops and a loss to the farmers in all the stages of crops from sowing and planting until harvesting.
- Examples of birds that cause huge crop damage include pigeons, cranes, and some African grouse that may consume citrus, tomatoes, watermelons, cabbage and grain.
- Quelea birds are a constant threat to fields of wheat, sorghum, barley, millet and rice due to their large numbers.
- Being nomadic in nature, birds transmit diseases to domestic fowl and eventually to humans.
- The end result of damage to the crop yields are reduced farm outputs, shortage of food for human consumption, malnutrition and perpetuation of poverty.

**Human health hazards of bird droppings**

- Granivorous birds have been implicated in the transmission of several diseases. Individuals do not pose much a health risk however when they flock together and rest and sleep in trees near homes and public facilities, they can cause a human health hazard.
- The most serious health risks arise from disease causing organisms that can grow in the nutrient rich accumulations of bird droppings, feathers and debris.
- Diseases such as the respiratory ailment histoplasmosis, candidiasis, cryptococcosis and E. coli infection can be passed on from birds to humans indirectly. In severe cases, the disease can kill people.
- Examples of birds that have been associated with this problem are pigeons and gackles (native to North and South America but introduced in Africa). Pigeons have also been implicated in the transmission of several other diseases such as pigeon ornithosis, encephalitis and salmonella causing food poisoning.

**Other problems**

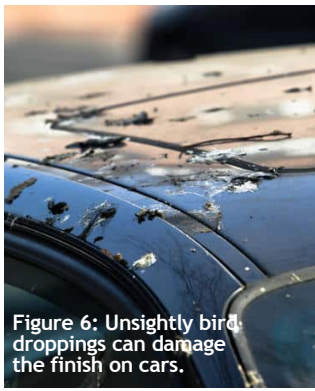


Figure 6: Unsightly bird droppings can damage the finish on cars.

- Bird droppings are an unsightly mess that can be difficult to clean-up.
- Large amounts of droppings can kill vegetation.
- In addition, around farms and in urban centres, birds manure deposited on farm machinery, cars and buildings is a nuisance to the eyes and nose.
- It also quickens damage of the finish on cars and buildings.
- Birds in large numbers also cause noise pollution that may be disturbing.
- Carnivorous birds eating livestock and chickens.
- Birds such as guinea fowl tend to cause fatal vehicle accidents.

## 3. Methods of reducing and mitigating human-birds conflict

Several methods can be applied to mitigate HBC thereby reducing the adverse impacts of grain losses. It is important to begin application of mitigation measures as soon as it is evident that farmland is under attack of granivorous birds as it may be difficult to displace the birds after they have invaded a crop field for a while.

### 3.1 Trapping

Bird trapping techniques of reducing and mitigating human birds' conflict include a wide range of Bird trapping techniques that have their origins in the hunting of birds for food. The widely used methods include trap door traps, clap traps, funnel/coral traps, noose traps, birdlime, trap nets and catapult traps. Some KAZA TFCA partner countries do not encourage the baiting and trapping of birds.

Figure 7: A funnel trap.

- **Trap door traps** are humane box traps with a spring-loaded lid and feeding platform. The trap attracts birds to feed and is triggered when the bird steps on a perch. The trap then drops the bird via gravity into a quiet, comfortable space until they are ready for live removal and harvesting.
- **Clap traps** are spring loaded frames with netting that are set up in two parts that come together rapidly when triggered by birds or manually controlled to enclose birds. They are usually used for ground birds when they get into vulnerable crop fields.
- **Funnel / corral traps:** Funnel traps have a narrow entrance into which birds may be lured or driven and the entrance typically leads to larger holding pen or corral. Funnel traps can be very large and can be used at large scale farms.

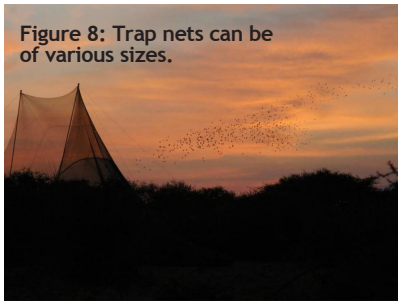


**Figure 8: Trap nets can be of various sizes.**

- **Noose traps:** These can be used to trap ground walking birds. The technique uses a mono-filament noose that is usually placed along favoured feeding, roosting or nest sites.
- **Birdlime:** The application of sticky latex, birdlime, often obtained from local trees to favourite perches is used in many parts of the world to capture and harvest small birds. Technique involves use of a long stick smeared with thick birdlime. The sticks are strategically placed around the vulnerable crop fields. The muscles of perching birds allow the toes to pull inwards with some force but there are no strong muscles to open them up.
- **Trap nets:** The method of using nets involves covering the farmland of crops by a net with a sufficiently small mesh to prevent the passage of granivorous birds. The method is an expensive technique, only justified for high value seed plots.
- **Catapult Traps:** Various designs of catapult traps are devised among communities where birds are attracted to seed bait on the ground that is then triggered maiming and killing the feeding birds for food. Most of these employ inner tube rubber set two (2) metres apart pulled back on a manual trigger arrangement deployed manually when many birds are feeding.

Figure 9: Scare crows-one of the most traditional ways of scaring birds out of fields.

Figure 10: Catapults are useful and can be lethal in managing crop raiding birds.

Figure 11: Bird caught in a net.

Figure 12 & 13: Captured and sun dried RBQ are a delicacy across the KAZA TFCA.

## 3.2 Frightening and scaring tactics

The use of frightening devices that include loud noise making devices (bangers, whistles, air horns) shouting, gunshots, firecrackers and exploders is a traditional HBC mitigating measure that is the most successful method of dispersing birds' roosts and drives away birds from the vulnerable crop fields. Below is guidance on the implementation of the methods:

- Scaring away birds from their preferred site of rest and sleep so that they migrate to sites far away from the vulnerable fields. The majority of birds arrive at the site of rest and sleep about an hour before sunset each day so a person involved in frightening the birds should be in position and ready before the first birds start to arrive.
- Implementation of the method should begin when the first birds start to arrive and continue until dark. The last few minutes before dark, when the birds are still moving is a critical period when most firepower is needed. The procedure should continue for several evenings in a row or until all of the birds have migrated.
- Scaring away birds from vulnerable fields is part of good bird minding by vigilant farmers. A variety of improvised tools that include string fences and streamers around the edge and within lands, bangers (and other noise providers such as whips, horns, whistles), scare crows, wind affected plastic sheeting and bags may be used to scare away birds as they get onto the fields. The technique is effective on a small scale farm but not practical on a large scale.
- Where farming is mechanised over large crop fields, gunshots, whistling, firecrackers and exploders will be more effective. Firing may have to be as often as once every 5 minutes during the feeding periods. The position should be changed every 2 days and the direction of firing every day. The effectiveness of this mitigation measures depends on persistence and proper timing.
- Slinging stones or small mud balls towards the birds is another traditional method of reducing and mitigating human bird conflict.
- People throw stones using catapults and slings to problem birds with the aim of driving them away from the farmlands. It is effective when the land under protection is small but use of the method is tiring.

## 3.3 Chemical repellents and lethal chemicals

The technique involves use of repellents such as methio-card which causes conditioned food aversion and 4-aminopyridine that frightens the birds. The method is costly for practical use in small scale farmlands. Though the technique is modern, it has great negative environment implication, especially due to its impact on non-targeted biodiversity species. The last resort should be lethal control which involves spraying with chemicals such as avicide queletox to control the birds, during the time when the birds gather in groups to rest or sleep.

## 3.4 Biological control

A biological control method may be applied although it is costly and resource intensive. The method involves introduction and boosting of the natural predators of the target bird species. The natural predators include herons, storks, falcons, goshawks, owls, hornbills, rollers, kingfishers, crows and marabou. This may be perceived as the best method of controlling these avian pests since this method does not affect the ecosystem negatively. However, its applicability needs to be tested and there is need for a favourable environment for sustaining the introduced natural predators. Using trained falcons, eagles and hawks to scare the birds away, is another method that is effective and less costly compared to the boosting of predator numbers. This is regarded as the best method of mitigating HBC since this method does not affect the ecosystem negatively.

## 3.5 Habitat manipulation

Thinning roost vegetation makes it less attractive to birds often produces lasting results than scaring devices. This includes active destruction of nests and fledglings during breeding. When possible, thin the roost vegetation after the birds are dispersed to discourage their return. Thinning the vegetation one time, however, is not a permanent solution to the problem. A regular vegetation maintenance program must be established. Guano platforms can be established where bird droppings accumulate and are collected then used as manure as they are high in nitrogen and phosphates.

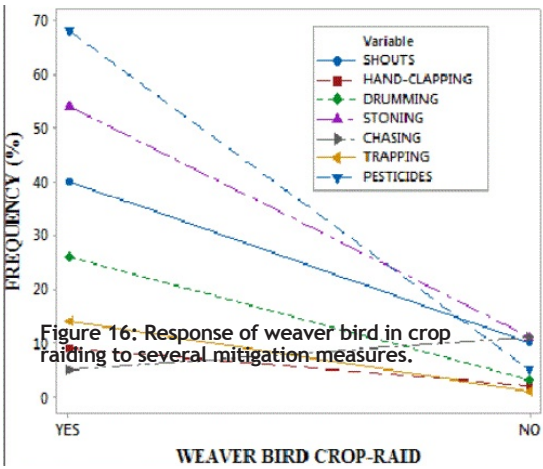



Figure 16: Response of weaver bird in crop raiding to several mitigation measures.

Figure 14 & 15: Biological control of granivorous birds using hawks, falcons and goshawks.

Figure 17: Weaver bird prepared for the pot.

## 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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**Figure 18: A large flock of red billed quelea invading new territory.**

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