SOUTHERN GROUND-HORNBILL

BUCORVUS LEADBEATERI

SPECIES CONSERVATION STRATEGY & ACTION PLAN: ZIMBABWE 2020 – 2021

IUCN SSC Species Survival Commission

Hornbill Specialist Group

CONSERVATION PLANNING SPECIALIST GROUP

Changing the Future for Wildlife

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COLLABORATIVE CONSERVATION

A collaboration between the IUCN SSC Conservation Planning Specialist Group, IUCN SSC Hornbill Specialist Group, Mabula Ground Hornbill Project and Birdlife Zimbabwe. For further information about this action plan and its implementation, please contact: BirdLife Zimbabwe CEO Julia Pierini (juliapierini@birdlifezimbabwe.org)

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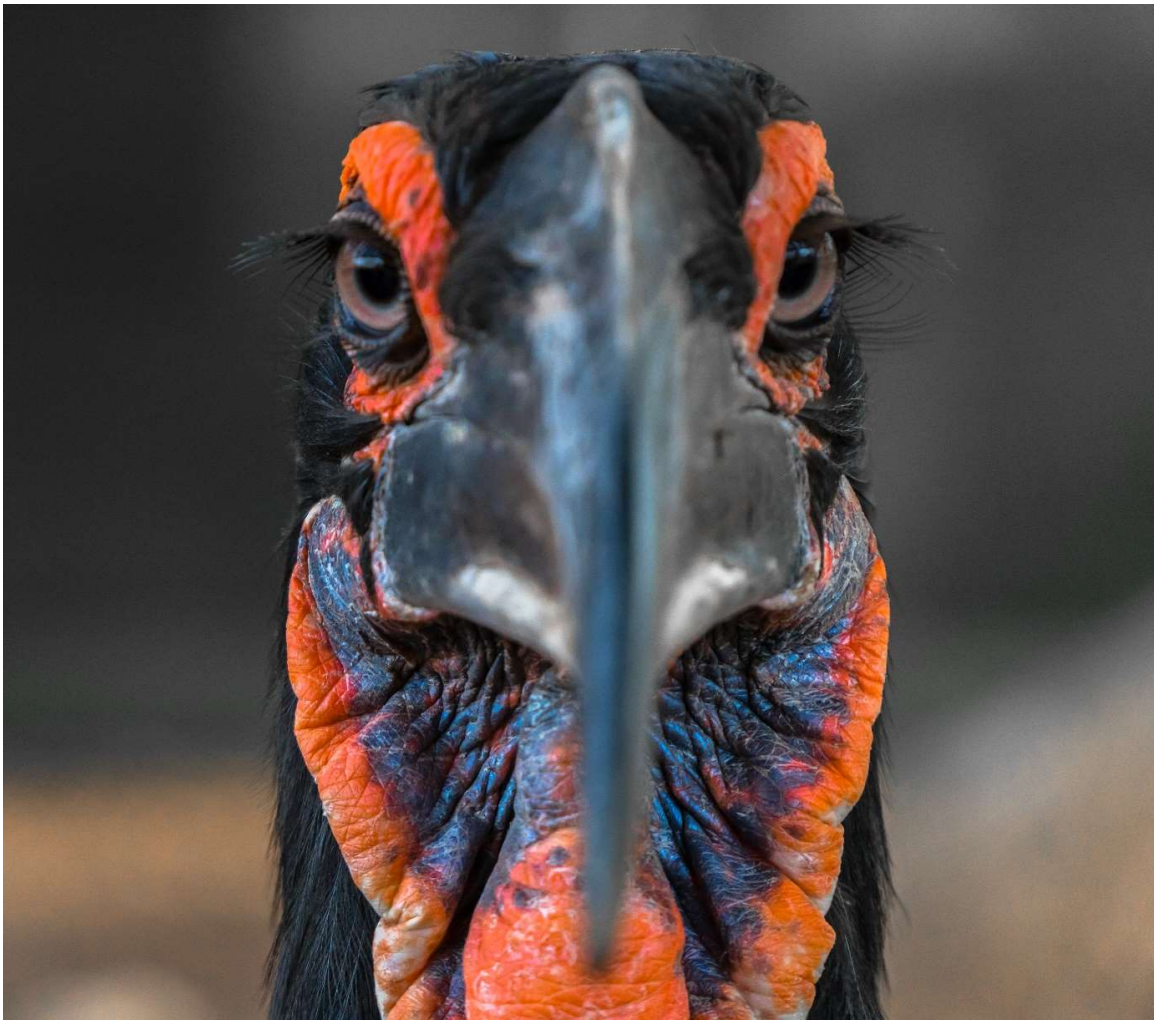

FOREWARD

Who has not thrilled at the sight of a group of Ground Hornbills purposefully and slowly moving across the veld, all deep in foraging mode? Up to a maximum perhaps of nine birds, the adults coloured in black and white feathers and bright scarlet faces, and apparently not concerned about mammalian predators. And who has not welcomed the deep booming calls of the male and female at dawn, bringing in the day like an alarm clock. People put words to those calls in their own languages. Such is the impact of the Southern Ground Hornbill *Bucorvus leadbeateri*, on people's notions, cultures, beliefs. Not just any old bird is it, but a special one, inspiring superstitions, and unfortunately attention from the n'angas for 'tribal medicine'. We can see their body parts on sale at local markets (certainly in Bulawayo and Harare, and elsewhere too in Africa?).

Striding through the savanna, the Ground Hornbill exhibits characteristics of Biblical proportions: monogamous, partner-fidelity, extended family, territory up-keep, all individuals of service to the group. Am I waxing too lyrical? When you encounter a group, you can age and sex each bird, and you can watch who is interacting with who, and how. For bird watchers it is probably a unique aspect of this bird, and one should enjoy being able to watch the dynamics unfold.

Of course, in this world dominated by humans (nearly 8 billion now) and the resultant global warming, all is not as it should be within the hornbill's purview. Here in Zimbabwe, we have been watching the species for about 40 years. But as yet nobody has studied it in detail. However, 14 years or so ago a project was started by Elspeth Parry in the communal lands surrounding the Matobo National Park, a project continued by Evans Mabiza and in very recent years also involving Patience Shito and Merlyn Nkomo. Can you imagine? – the bird shuns the national park and much prefers to feed and breed alongside the local communities in those communal lands. I am glad to say that the locals reciprocate to the extent even of revering the bird – let no man lay a hand on those hornbills!

But possibly this is a special enclave in Zimbabwe. We know that elsewhere in the country the bird is disturbed to the point of harassment and killed by other means. Not everybody shares the reverence for it, after all doesn't it break the glass windows at schools? Overall, how is the hornbill doing, are the many groups surviving, are the juveniles themselves able to survive to older years, or in the face of known threats is the species in fact in decline? Would we as bird watchers, or perhaps glorified by the name of "citizen scientists", ever be able to answer these questions and a host of others, by ourselves? I will be pessimistic and doubt it. Therefore, it was great news when Lucy and Patience offered to help us by holding a workshop to develop a national conservation plan. All day we debated the issues surrounding and involving the hornbill, and under their guidance came up with this plan. There are a lot of people, both rural and urban, who are already sympathetic to the Ground Hornbill, so on that basis, and with the stakeholders and drivers present at the workshop, I expect to see this plan in action.

So, with grateful thanks to Lucy and Patience from the Mabula Ground Hornbill project, for their initiative, I trust that *Insingizi/Dendera* will get the benefit of the plan - and outlive us all!

Prof Peter Mundy

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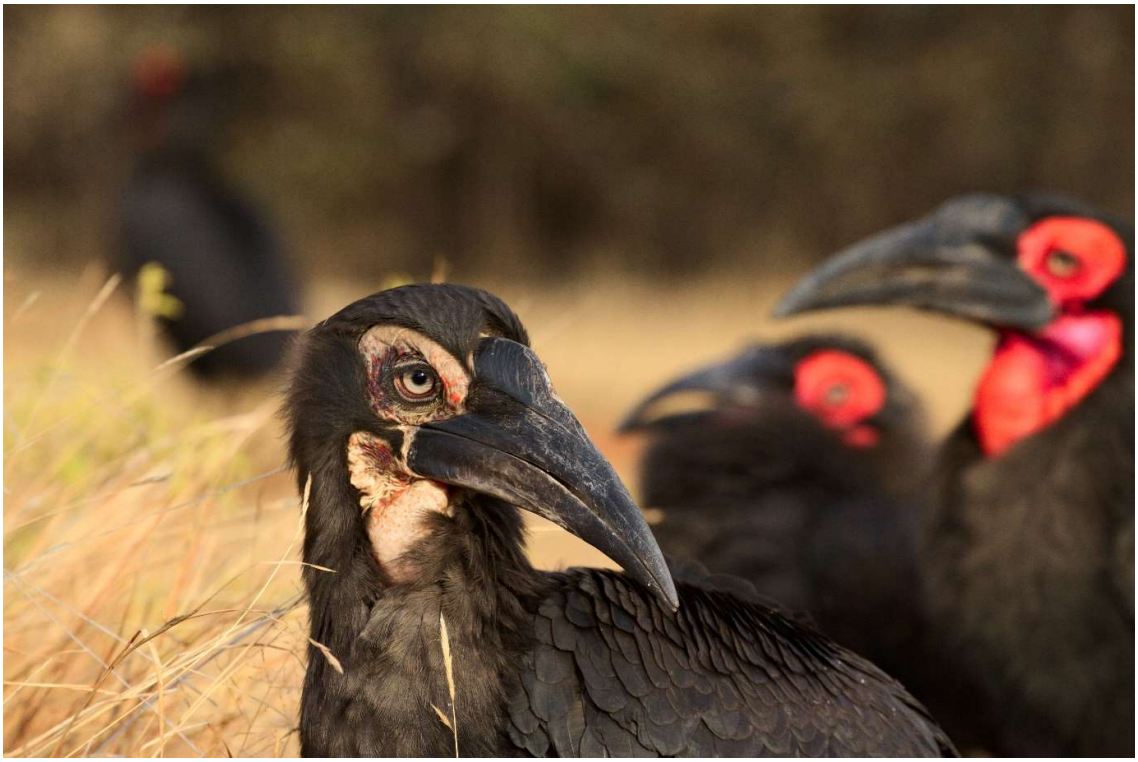

ACRONYMS AND ABBREVIATIONS

AC	Artists for Conservation
BLZ	BirdLife Zimbabwe
CAAZ	Civil Aviation Authority of Zimbabwe
CNCZ	Children and Nature Conservation Zimbabwe trust
DWT	Dambari Wildlife Trust
EMA	Environmental Management Agency
FAO	Food and Agriculture Organisation
HWC	Human and Wildlife Conflict
IUCN	International Union for Conservation of Nature
MaGHP	Matobo Ground Hornbill Project
MGHP	Mabula Ground Hornbill Project
MNP	Matobo National Park
NGO	Non-Governmental Organisations
NPO	Non-Profit Organisations
NUST	National University of Science and Technology
RDC	Rural District Council
RS	Rare Sightings
SGH	Southern Ground-Hornbill
SSP	Special Species Platform
SSS	Special Species Sightings
UNDP	United Nations Development Programme
ZETDC	Zimbabwe Electricity Transmission and Distribution Company
ZPHG	Zimbabwe Professional Hunters and Guides Association
ZPWMA	Zimbabwe Parks and Wildlife Management Authority
ZRP	Zimbabwe Republic Police

EXECUTIVE SUMMARY

INTRODUCTION

The Southern Ground-Hornbill (*Bucorvus leadbeateri;* hereafter SGH) is currently listed as Vulnerable throughout its sub-Saharan range (BirdLife International, 2012). Of the 16 countries with resident populations of the species, only South Africa, Lesotho, Namibia and Swaziland have thus far carried out national population estimates that have enabled them to uplist their populations to Endangered (Simmons et al., 2015; Taylor et al., 2015). Little is known about the state of the populations in the remaining range states, but widely reported to be in decline (Kemp, 2017). The SGH Preliminary Conservation Action Plan (SGH-PCAP; 2020 – 2021) is the result of an intensive one-day workshop that was held in Bulawayo on the 5th of December and attended by 19 participants from 11 organisations in the country. It is the first step in the development of a coordinated national conservation plan for the species.

FIGURE 1 SUGGESTED CONSERVATION STATUS OF SGH THROUGHOUT ITS RANGE (KEMP,2017)

THREATS

The main threats to the species in Zimbabwe were highlighted to be habitat destruction, fragmentation, and modification. The number of large trees suitable for roosting and nesting is reducing rapidly due to deforestation due to the needs of growing human population. SGH are susceptible to secondary poisoning when they scavenge off carcasses laced with poison for 'pest' control. They are also persecuted for window breaking, when due to their highly territorial nature, they break windows or any shiny surface where they can see their reflection as they are unable to recognise that it is not another SGH invading their territory.

GOALS

I. A coordinated conservation action plan, that is implementable, with clear timelines.
II. A national monitoring plan to allow spatial analysis of land-use etc.
III. A red-listing assessment to determine the current conservation status.
IV. Standardized research methodologies used through Zimbabwe.
V. An enhanced conservation education campaign, with special focus of belief-based medicine and deforestation.
VI. Ultimately to see co-existence with people, and population persistence, then growth.

RECOMMENDED ACTION

The following were the key recommended actions that will ultimately lead to the achievement of the above goals:

IMPLEMENTATION

- BirdLife Zimbabwe will be the lead agency for the implementation of this PCAP.
- Government ministries and agencies: Ministry of Lands and Agriculture; Ministry of Home Affairs; Ministry of Education; Ministry of Environment and Ministry of Tourism; Zimbabwe Parks and Wildlife Management Authority (ZPWMA); Forestry Commission (FC); Environmental Management Authority (EMA)) will be involved in the mobilisation of manpower and resources required in the implementation of the key actions.
- NGOs, NPOs and Civic organisations will provide on-the-ground information and liaise with ordinary citizens in the collection of information at the local level which will be utilised at a national level.
- Universities, colleges, and other learning institutions will coordinate and provide resources for research activities.

STATUS REVIEW

INTRODUCTION

Bucorvus leadbeateri commonly known as the Southern Ground-Hornbill (hereafter SGH) in Africa, is a common resident in Zimbabwe and is listed as vulnerable on the IUCN Red-list. It mainly occupies open woodlands, grasslands habitat and agricultural lands throughout the region (Reeson et al, 1994; Msimanga, 2004). The species is sensitive to habitat disturbance and larger numbers are restricted to less inhabited and protected areas mainly due to the protection these areas afford then from various anthropogenic threats (Chiweshe, 1994). SGHs play a significant role in cultural practices throughout the continent. The cultural practices range from traditional medicines, rituals, or ceremonial acts, like dancing, painting, or sculpture (Coetzee et al., 2014).

DESCRIPTION

SGHs are the largest bird in the family of eight hornbill species found in Zimbabwe. It is an almost all-black bird with an approximate height of about 110 cm and weight of about 3.77 kg (Anon, 1998). The face throat and wattles are bright red, with females having a blue patch on the bare skin under the neck. It has a wide and broad wingspan, showing all-white primary feathers only when in flight (Bruyns et al., 2013). Juveniles are browner than adults and with pale grey-brown facial skin which turns to yellow within a year, orange in 3 years and fully red in 4-6 years (Kemp, 1980). Their call is a very deep, four-note booming sound, which is started by one bird and replied by another with a lower pitch (Anon, 1998; Coetzee et al, 2014). It has six types of calls which are recognized as territorial, contact, alarm, fright, acceptance, and begging calls (Maasdorp, 2007).

Generally, SGH feeds predominately on invertebrates but will hunt any small animals up to squirrel/hare size, and reptiles such as snakes, tortoises and lizards (Chiweshe 1994; Chiweshe, 1998; Anon, 1998). In a review by Maasdorp (2007), SGH is also reported to feed on mice, chicks and domestic fowl.

HABITAT AND DISTRIBUTION PATTERNS

SGHs are territorial birds which inhabit savannah woodlands and grasslands (Chiweshe, 1994). The birds avoid dense forest and more continuous woodlands, they extend into short scrub with a few large trees or into grasslands adjacent to the forest where they can enter to roost and breed (Chiweshe, 1994).

In a study by Chiweshe (2007) on the conservation status of the species in three different land uses, results indicated that a larger number of hornbills were seen in commercial farms than in protected areas and the lowest found number in communal lands. Furthermore, the study indicates that the species prefers mopane woodland both for breeding and foraging purposes. He further highlighted that it is also the woodland type where we find the largest population of the Baobab (*Adansonia digitata*), which is a preferred tree for nesting.

HISTORICAL AND CURRENT DISTRIBUTION

The distribution of SGH ranges from eastern South Africa to south-west Angola and southern Kenya (BirdLife International, 2010; Bruyns et al., 2013). In Zimbabwe it appears to be distributed along patterns of average annual rainfall, vegetation and soil types (Chiweshe, 2007). In the Zambezi Valley, due to the effects of drought, the birds were mainly seen along major rivers in association with animal herds (Morris, 1981; Chiweshe, 2007). According to the 1990 Ground Hornbill Survey (Hustler et al., 1990) the SGH is poorly distributed along the high ground in Zimbabwe; including the Mashonaland plateau (Bruyns et al., 2013).

POPULATION SIZE

Unknown.

a) b)

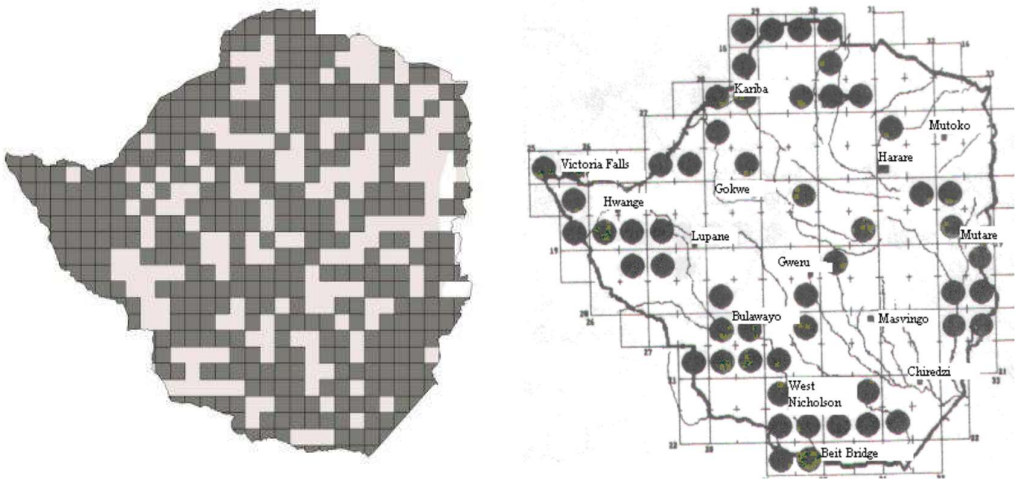

FIGURE 2 A) MAP OF ALL HISTORICAL RECORDS FOR ZIMBABWE (KEMP,2017) AND B) A COLLATION OF ALL SIGHTINGS RECORDS (CHIWESHE, 1994)

BREEDING AND POPULATION

SGH have a long mean lifespan, which is estimated to be 50-60 years, and have a late age of 6 -8 years to sexual maturity and first breeding is after 10 years (Kemp, 1995; Kemp & Kemp, 1980). Low productivity of the bird is a critical aspect in its breeding biology. Initiation of breeding ranges from September to April, with most egg laying occurring from September to December (Msimanga, 2004). They nest in open hollows of dead or living tree trunks (Msimanga, 2004; Witteveen et al, 2013) and unlike other hornbill species, the hollow is not sealed (Coetzee et al., 2014).

SGHs live in cooperative groups usually of 2 to 8 and sometimes up to a dozen individuals in a territory of about 100 km^2 (Chiweshe, 1994; Kemp & Kemp, 1980; Knight, 1990; Wyness, 2011). The actual population of the species has not been quantified, and no data on population numbers are available for Zimbabwe (Bruyns et al, 2013; Kemp, 2017). However, Chiweshe (1994) recorded a total of 354 birds in protected areas, commercial farms and communal lands. In another study, a total of 2218 birds were recorded in 686 separate group sightings (Chiweshe, 2007). The study also revealed that the highest productivity was in communal lands, with 32% of the birds seen being young while the protected areas and commercial farmlands had 17% and 20% respectively.

MAJOR THREATS AND REASONS FOR CONCERN IN ZIMBABWE

SGHs in Zimbabwe have declined significantly outside most protected areas in Zimbabwe (Anon, 1998; Chiweshe, 2007). Major factors contributing to the decline are competition for space with the expanding human population, loss of large hollow tree trunks for nesting, birds eating poisoned baits, snaring and persecution (Bruyns et al., 2013). Rapid deforestation in communal lands has restricted the birds to protected areas (Kalamira, 2007; Bruyns et al., 2013).

In communal areas, small poisoned carcasses and grain baits cause very high mortality rate and indiscriminate shooting by irate farmers and households when the birds smash window-panes (Chiweshe, 2007).

However, the SGH is an icon of most tribes in Zimbabwe. Superstitions and beliefs contribute to the survival of SGH populations (Chiweshe, 1994). The bird is believed to be a spiritual bird and it is feared by the Ndebele (Chiweshe, 1998). It is also believed to be associated with the rains and in areas where rainfalls are good, the bird is distributed (Chiweshe, 2007).

THE SOCIO-POLITICAL SITUATION

The economy of Zimbabwe has experienced great turmoil in the past twenty years. Local and international changes in policy throughout this period has had adverse effects on national productivity in all sectors of the economy, rendering a large proportion of the population unemployed. This in turn has had a negative effect on the environment due to the increased demand for natural resources such as timber and non-timber forest produce and land for subsistence farming, especially in urban areas (pers. obs). In urban areas the poor are engaged in urban agriculture, which has resulted in the destruction of green belts. Stream bank cultivation has contributed to the siltation of the urban drainage systems. This, together with the proliferation of invasive aquatic species as well as the increasingly variable rainfall patterns due to climate change, have severely compromised the country's water resources. The high rate of unemployment has forced many to venture into informal business enterprises.

RESEARCH AND CONSERVATION EFFORTS TO DATE

The majority of research on SGH has been done in the Matebeleland Provinces of the country. Matobo District in Matebeleland South has one of the highest densities of SGH outside of protected areas in the country. This has made it a prime site for research work on various aspects

of the SGH. Short-term research has been carried out by Audrey Msimanga and Ngoni Chiweshe on the role of SGH in local culture, as well as aspects of its biology. Elspeth Parry and her team carried out the longest running SGH research and education project in the district, which culminated in one publication on the breeding density of the species in the district. Evans Mabiza, under Children and Nature Conservation Zimbabwe (CNCZ) has carried on the work that was initiated by Elspeth Parry in SGH education and research. Merlyn Nkomo and her team have carried out a short-term research project in the district as well, carrying on from the work done by Parry and Mabiza. A study is currently underway in the Hwange communal areas in Matebeleland North, headed by Bekezela Khumalo, on cultural aspects of the SGH, among other avian species, in local tradition. The only study on a national level was carried out by Ngoni Chiweshe in 2007 on the conservation status of the species.

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CONSERVATION STRATEGY AND ACTION PLAN 2020 - 2021

On the 5th of December 2019, 19 stakeholders from 11 organisations met for an intensive one-day workshop in Bulawayo, Zimbabwe, to develop a preliminary conservation strategy and action plan for the SGH population in Zimbabwe. The organisation represented included Special Species Platform (SSP), Zimbabwe Professional Hunters and Guides (ZPHG), National University of Science and Technology (NUST), BirdLife Zimbabwe (BLZ), Matobo National Park (MNP), Dambari Wildlife Trust (DWT)and *ex-situ* conservation organisations.

The workshop was organised by Merlyn Nomsa Nkomo and her team in collaboration with NUST. Funding was provided by MGHP and BLZ, and the workshop was facilitated by Lucy Kemp and Patience Shito.

This document summarises the directions and priorities recommended by workshop participants. It is intended for use by:

- workshop participants, as a record of the actions, initiatives and collaborations discussed;
- government agencies to help guide the development of other plans that may impact on this species;
- non-governmental conservation organisations and community groups, to guide and inform their priorities and work plans;
- the IUCN SSC Hornbill Specialist Group, to help track and support progress with the directions and priorities agreed;
- donor organisations, to guide priorities for funding support.

In summary, the 2020-2021 Conservation Strategy and Action Plan for SGH includes:

- A **PRELIMINARY LIST OF STAKEHOLDERS** to be involved in the conservation planning and implementation for the SGH;
- A **WISH LIST** from all participants with regards to the future of SGH in Zimbabwe;
- A list of **SGH THREATS**, especially those unique to the Zimbabwean landscape;
- **ACTION STEPS** to be taken to solve the threats, including recommendations on where and how action should be taken and who would be ideally placed to take it.

COLLECTIVE VISION FOR THE SOUTHERN GROUND-HORNBILL POPULATION IN ZIMBABWE

The following image summarises the desired state of the SGH population in Zimbabwe highlighted by each of the workshop participants.

FIGURE 3 COLLECTIVE VISION FOR SGH IN ZIMBABWE BY WORKSHOP PARTICIPANTS

KEY SUMMARIES FROM PAST RESEARCH CONDUCTED ON SGH IN ZIMBABWE

The participants were organised into pairs. In this session, published papers from a literature search of all Zimbabwean papers mentioning the SGH were used. The participants were tasked with identifying **WHAT** the threat or main point was, **WHERE** it happened and **WHEN** it happened if at all it is still a relevant issue. The what where and when process was done using highlighters to mark the major points.

Group 1: Bruyns et al, 2013; Chisadza et al, 2013.

- Traditional medicine market threat in Bulawayo 2013 – still relevant.
- Belief in rain forecasting in Mzingwane catchment area 2013 – still relevant
- Data deficiency in SGH 2013 – still relevant.

Group 2: **Msimanga, 2000; Chiweshe 2007.**

- Cultural beliefs in Matobo District 1977-2005 – still relevant.
- Conservation status, threats, habitat, land uses demographics and productivity in Zimbabwe (2007) 1977-2005 - needs revisiting.

Group 3: Rusinga et al, 2014; Witteveen et al,2013.

- Cultural beliefs in Southern Africa: persecution, trade, secondary poisoning, bringing change, rain 2011-2013- still relevant.
- Prey density increase human population, government policies that do not support SGH conservation in Matobo area 2013- 2014- relevant.

Group 4: Maasdorp, 2007; Jiri et al, 2015; Jacobsen 1979; Manson, 1983.

- Education awareness by BLZ, highlights conflicts and deforestation and persecution (2007) – still relevant
- Climate change- relevant.
- Habitat change, deforestation and persecution, use of body parts as medicine – encourage Indigenous Knowledge Systems(IKS) and incorporate it in conservation- relevant.
- Short note of sighting in Vumba.

Group 5: Williams et al, 2013, Dunham, 2004.

- Monoculture taking away trees, need for species specific survey call for national action plan- still relevant.
- Aerial survey of animals in the Zambezi heartland.

Group 6: Mundy, 2000; Mundy, 2003; Materson 1979; Msimanga, 2004.

- Possibility of minefields being dug up by SGH after the war- irrelevant.
- List of bird strikes but not SGH, but the open grassland could attract them there- still relevant.
- SGH shot at an airport by a Parks warden (1994), Vic Falls airport morphometric measurements and stomach contents taken – irrelevant.

- Increasing human population, national study from 1900 on nest record cards- still relevant.

Group 7: Coetzee et al, 2014;

- SHG sightings no longer frequent and farmers seeing climate change (2014) in Manicaland area- still relevant.
- SGH used in the markets for muti are not being traded in Zim- still relevant.

GAPS IN KNOWLEDGE OF SGH IDENTIFIED SPECIFICALLY FOR ZIMBABWE

- Population size
- National population status.
- Belief-based medicinal use.
- Persecution in different ethnic groups.
- Threats specific to different land-use types.
- Disease risk to SGH in Zimbabwe.
- Efficacy of current environmental education programmes (Social Science).

STAKEHOLDER IDENTIFICATION

The participants were given pieces of paper to write down all the stakeholders they thought needed to be involved and these were categorised under two groups, the stakeholders and the Network links, which would be a bigger body of different contributors.

TABLE 1. A LIST OF STAKEHOLDERS IDENTIFIED AS CRUCIAL TO THE SURVIVAL OF SOUTHERN GROUND-HORNBILL IN ZIMBABWE

Participants required to develop full conservation plan	Stakeholders that should be consulted and kept informed of progress and to utilise as valuable players.
BLZ (Lead Agency)	Schools
Museums	Private landowners
Universities and colleges	Environmental educators
A patron such as Strive Masiyiwa, Rumbidzai Takawira or Suluman Chimbetu	Safari operators
Ministries of Education	RDCs
Ministry of Lands	Media houses
CAAZ	Citizen scientists
Forestry Commission	Farmers Unions
ZPWMA	NGOs Reps
EMA	
Traditional leadership	

MAPPING OF KNOWN OCCURRENCE AND ABSENCE OF SOUTHERN GROUND-HORNBILLS IN ZIMBABWE

Participants were tasked with ticking areas on the Zimbabwean map where they currently know ground-hornbills to be (in the last 5 years). They were also requested to indicate, with a red X where they know SGH to have disappeared in recent history in the map shown below.

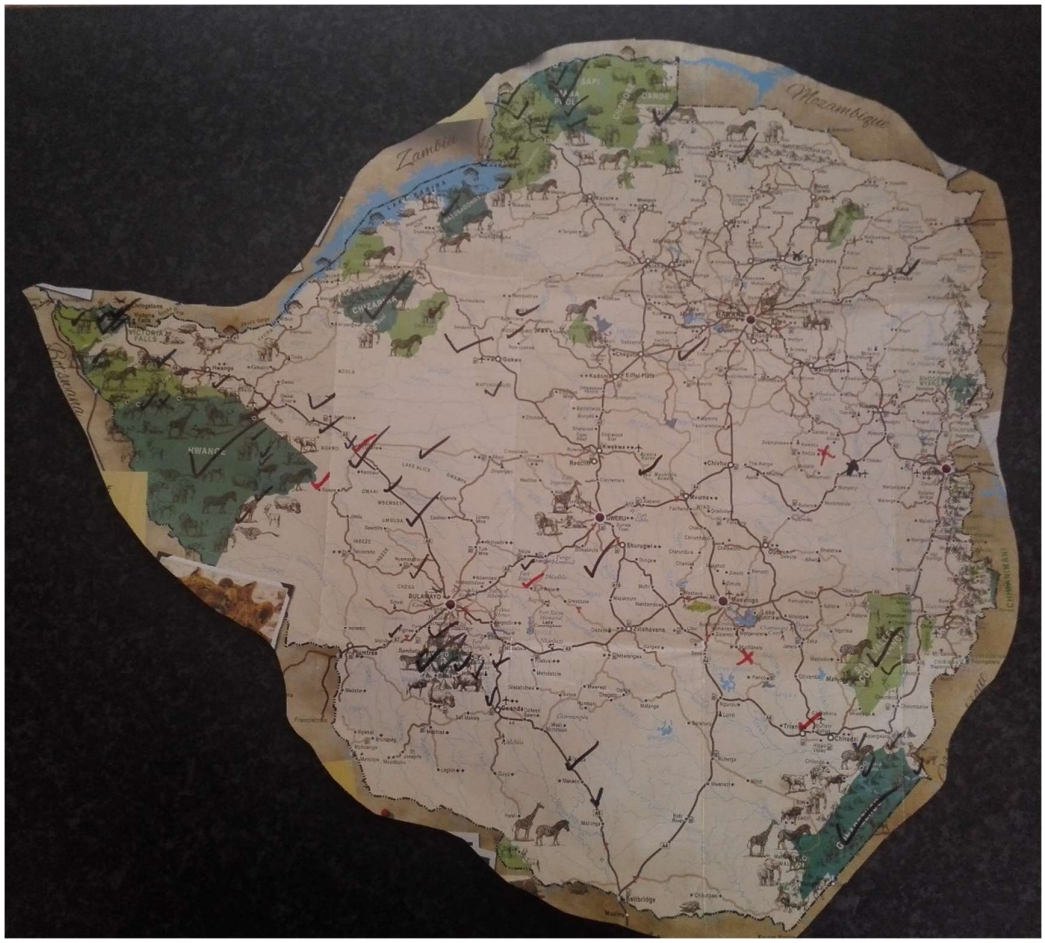


FIGURE 4 MAP USED BY PARTICIPANTS TO MAP KNOWN PRESENCE AND ABSENCE

THREAT IDENTIFICATION

Individuals wrote down the threats that they know to affect SGH in Zimbabwe and these were grouped according to popularity and common focus to show which threats are prevalently known amongst the participants. Then participants ranked threat by those likely to have the most significant impact on SGH populations, as shown below.

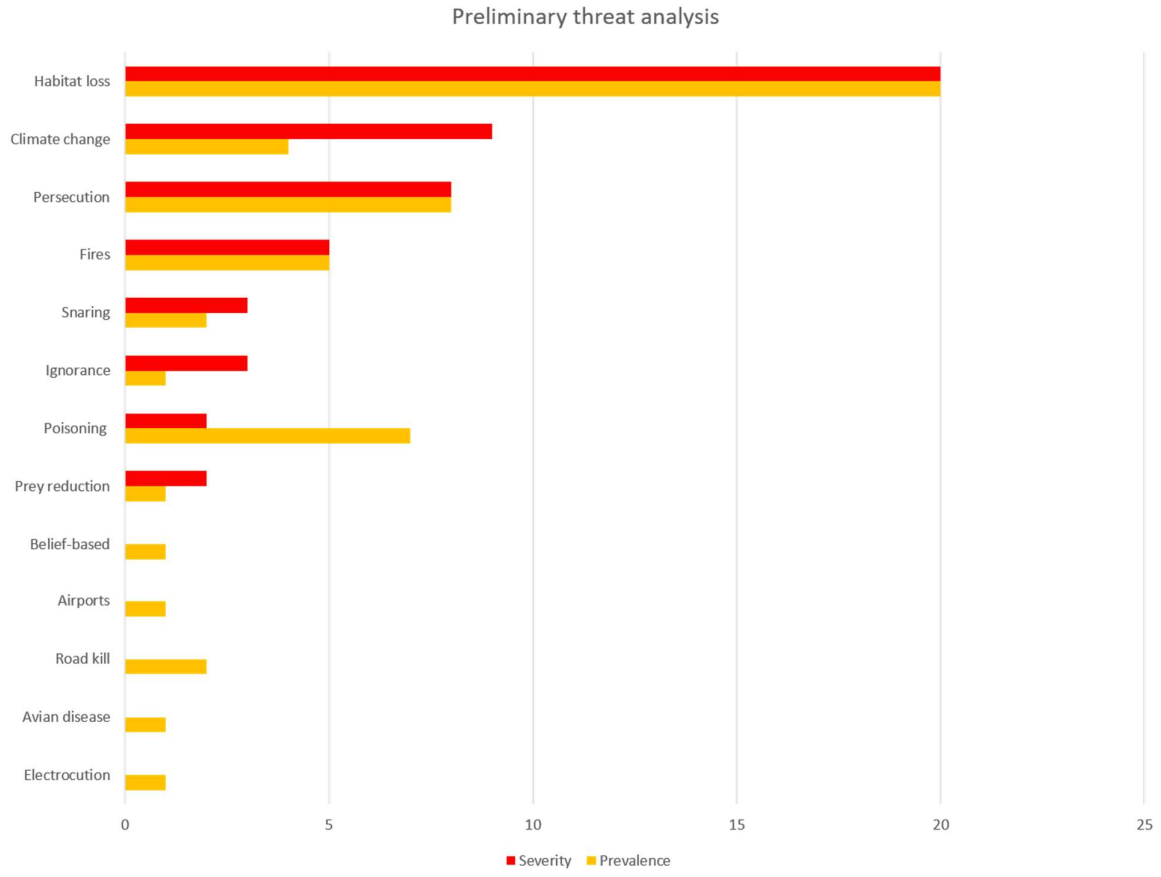


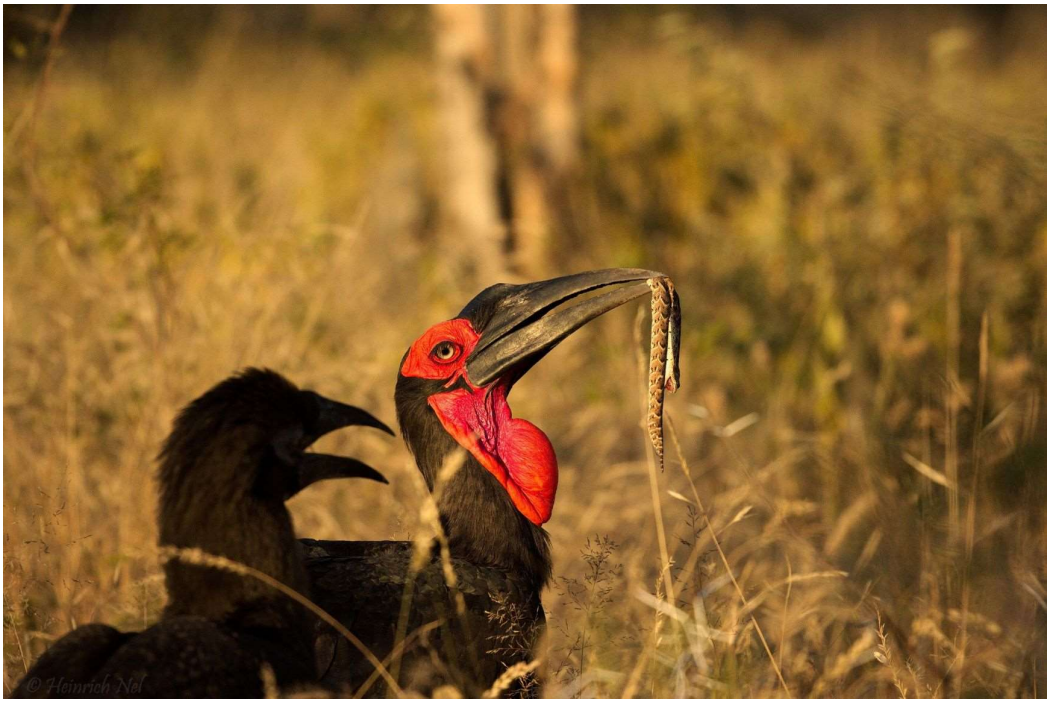
FIGURE 5 KNOWN AND POSSIBLE THREATS TO SGH AS IDENTIFIED BY WORKSHOP PARTICIPANTS

WORKING GROUPS: CHALLENGES AND OPPORTUNITIES

Groups were tasked with looking at the factors they had raised as primary threats (in the table below) and producing causal flow diagrams for each (e.g. Fig 6).

TABLE 2. GROUPS OF PARTICIPANTS TO TACKLE IN-DEPTH THREATS ANALYSIS (WITH PERCEIVED PREVALENCE OF THREAT RATING)

Group 1	Group 2	Group 3
Habitat	Persecution	Prey decline
Fire	Ignorance	Airports
Electrocution	Disease	Climate change
-	Roadkill	Poisoning
-	-	Cultural use



GROUP 1

PROBLEM STATEMENT 1: FIRE

Poor fire management is a threat to SGH, due to impacts on habitats, prey, and potential damage to nesting sites. Each year, Zimbabwe experiences a fire season which occurs during the cold, dry season. Large tracks of private and state-owned land are burnt, largely due to anthropogenic activities such as the clearing of croplands and harvesting of wild honey. Although fire is a natural part of the ecosystem, fires in Zimbabwe are now occurring at a rate that is too rapid for the ecosystem to recover. Repeated fires cause ecosystem imbalance, as some organisms thrive at the expense of others.

TABLE 3: ACTIONS FOR FIRE THREAT AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Action	Implementing parties	1-2 year	Long-term
Community engagement to reduce conflict (between communities, pa and private land-owners)	Local authorities (e.g. ZimParks, EMA, Forestry Commission, RDCs); private landowners; NGOs; traditional leadership.	Within 2 years (immediate willing communities)	Ongoing
Lobby for policy change / improvement and/or enforcement (e.g. burning season reduction)	NGOs; local authorities; relevant Ministries		Within 4 years
Engage the media and stakeholders to raise awareness about the effects of fire on SGH	NGOs; civil society; local authorities; media (print, electronic, audio and visual)	Within 2 years	
Provide alternative smoke devices for honey collection	NGOs (livelihoods)		Within 5 years
Promote alternative land management practices for moribund and invasive species control e.g mowing	Local and national authorities; research organisations; private landowners; NGOs		Within 5 years

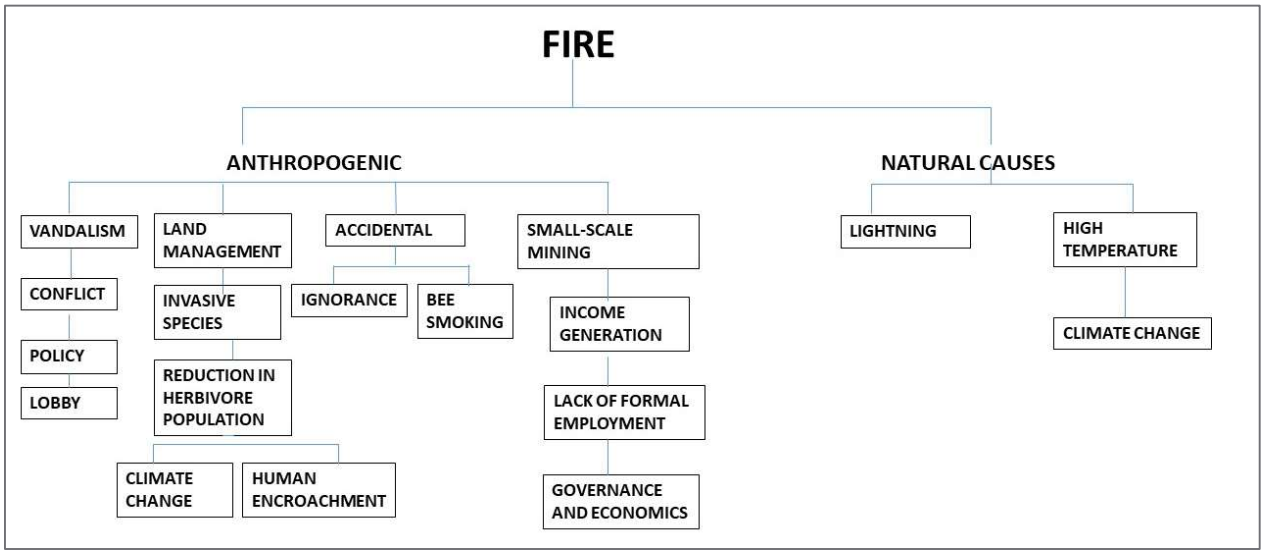


FIGURE 6 FIRE CAUSAL FLOW DIAGRAM

PROBLEM STATEMENT 2: ELECTROCUTION

SGH are at risk of electrocution from poorly maintained overhead electricity cables and transformer boxes. The socioeconomic challenges that have plagued the country for the past decades have hindered the regular maintenance and servicing of infrastructure to improve safety for wildlife. Most transformer boxes in the country are not insulated and can easily cause fatal injuries on SGH that might use them for roosting as the large trees that they utilise become increasingly scarce. SGH have also been observed utilising transformer boxes as vantage points when making their territorial calls. The increase in rural electrification using overhead cables poses an additional threat to flying birds.

TABLE 4: ACTIONS FOR ELECTROCUTION AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Action	Implementing parties	1-2 year	Long-term
Consult with ZETDC to reinforce / bird-proof transformer boxes to reduce risk.	Birdlife; ZETDC		Within 5 years
Encourage use of underground electricity cables.	Birdlife; ZETDC		Ongoing

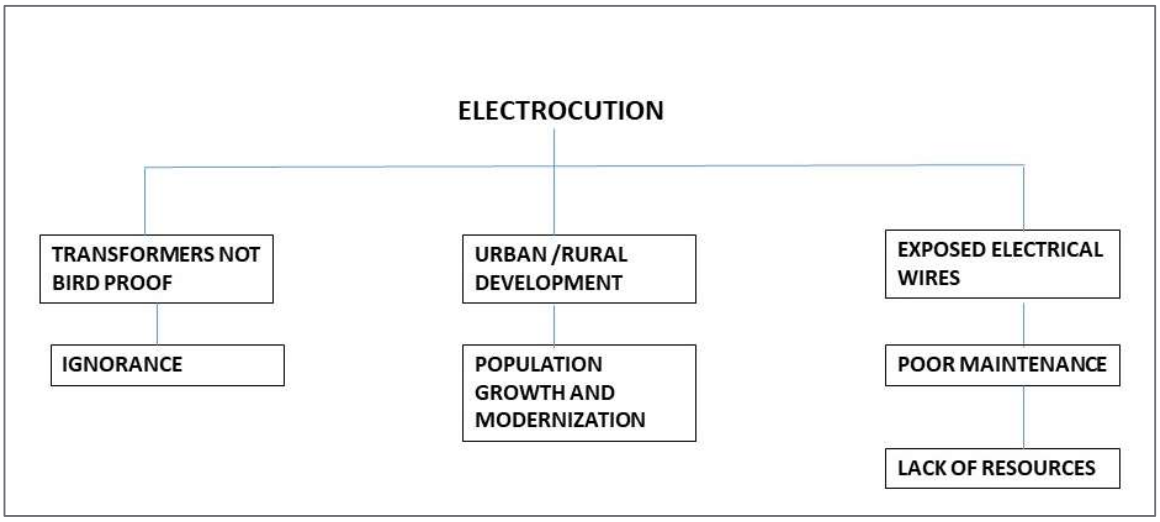


FIGURE 7 CAUSAL FLOW DIAGRAM FOR ELECTROCUTION

PROBLEM STATEMENT 3: HABITAT CHANGE

SGH populations are at risk of decline as a result of changing habitats. Negative changes include deforestation, bush encroachment, changing land use, and altered herbivore composition resulting in increased grass height.

TABLE 5: SUGGESTED ACTIONS FOR HABITAT CAHNGE AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Action	Implementing parties	1-2 years	Long term
Promote responsible afforestation programmes.	Local authorities (Forestry Commission, EMA, etc); NGOs; donors	Within 2 years	
Lobby for and implement enforcement of controls on commercial logging	Forestry Commission; local authorities; NGOs; civil society; border control		Within 5 years
Provide education and alternative land practices to reduce clearing for agriculture	Min. of Agriculture; research organisations; NGOs; local authorities; FAO etc. UNDP etc.		Within 5 years
Explore and introduce alternative fuel sources for domestic use (to replace firewood)	NGOs		Within 5 years
Implement awareness and education programmes through the media to address land management and climate change issues (e.g. controlling bush encroachment, deforestation etc).	NGOs; media houses (print, electronic, visual and audio); local authorities, UNDP,FAO	Within 2 years	
Build and install artificial nests in areas where suitable large trees are limited.	NGOs; landowners; RDCs; forestry commision		Within 5 years

Impose and enforce strict controls on mining, particularly in known or potential SGH habitat.	Ministry of Mines; land authorities; Presidential reserved mining area managers; ZRP and judiciary	In reserved areas	Within 5 years
Manipulate and / or augment wildlife (herbivore, particl. Grazers/ mega-grazers) populations to promote SGH habitats.	Private landowners; ZimParks; Forestry Commission.		Within 5 years
Lobby for policy change / improvement and/or enforcement in respect of land use.	NGOs; local authorities; relevant Ministries		Within 4 years
Develop strategies to reduce poaching (which affects habitat composition) through education and awareness, stricter penalties and introducing alternative livelihoods in community areas.	Judiciary; ZRP; local authorities; media; NGOs; schools.		Within 5 years.

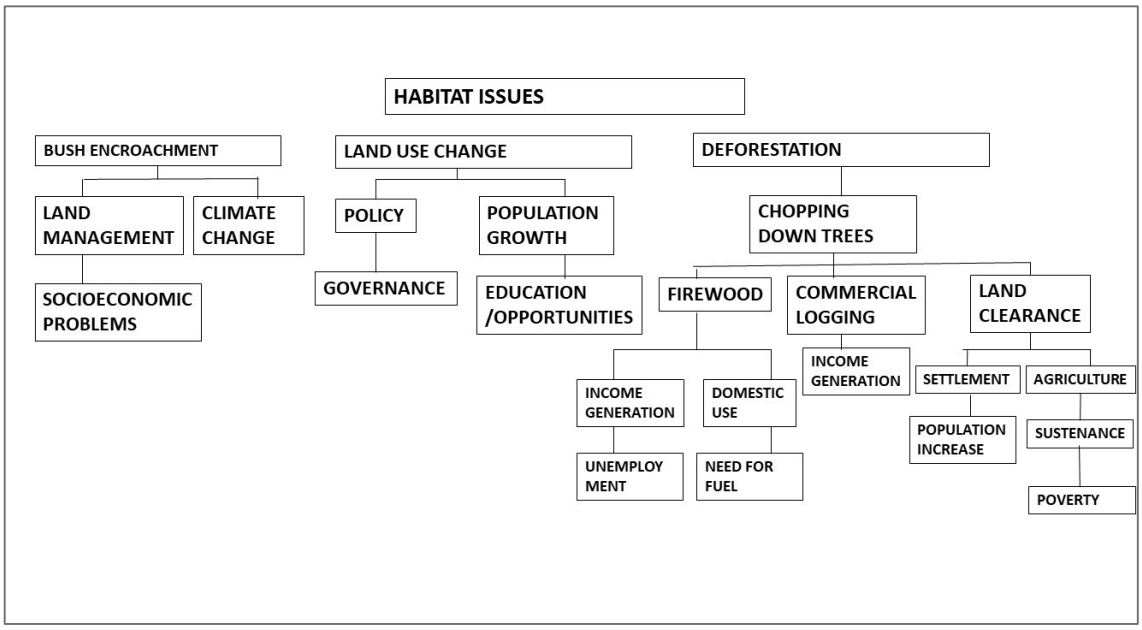


FIGURE 8 CAUSAL FLOW DIAGRAM FOR HABITAT CHANGE

PROBLEM STATEMENT 4: SNARING

There is a lack of knowledge on the importance of the Southern Ground-Hornbills hence there is ignorance to their conservation and a lack of environmental laws governing their protection. The current economic situation has led to an increase in the amount of people snaring to survive.

TABLE 6: RECOMMENDED ACTIONS FOR SNARING AND PARTIES RESPONSIBLE FOE IMPLEMENTATION

Actions	Implementing parties	1-2 years	Long-term
Education	BLZ Small groups e.g Dambari CNCZ Hwange painted dog society Hunters and Guides association Safari operators KAZA bird conservation working group Media RDCs ZimParks EMA	✓ (piggy-back / harnessing existing programs	✓
Implementing income generating projects to tackle poverty	Engaging NGOs-Donors FAO Affected communities		✓

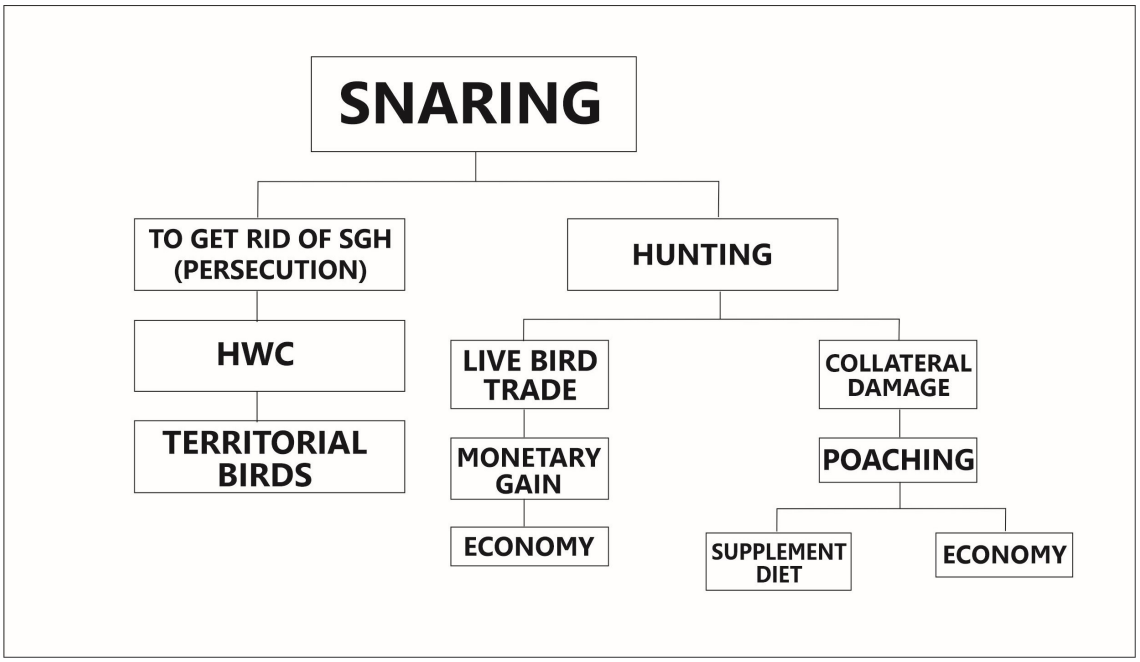


FIGURE 9 CAUSAL FLOW DIAGRAM FOR SNARING

PROBLEM STATEMENT 5: DISEASE

It is unknown if SGH in Zimbabwe are affected by common avian diseases as there is no surveillance. However, in neighbouring range states, Newcastle Disease has been found to be threats.

TABLE 7: SUGGESTED ACTIONS FOR DISEASE AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Actions	Implementing parties	1-2 years	Long-term
Education (dead/ diseased livestock disposal so not available to any wildlife)	FAO Local Farmers KAZA Government Media Educational institutions		✓
Research (any opportunity for bird-in-the-hand)	Citizen scientist Educational institution Zimparks NGOs	✓	

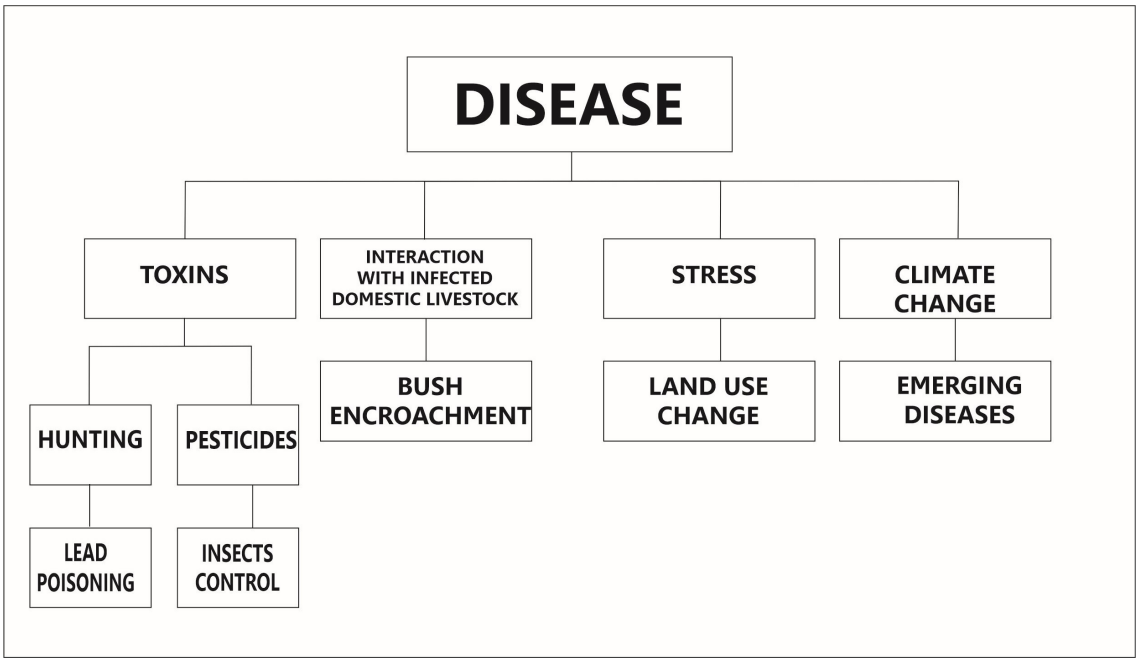


FIGURE 10 CAUSAL FLOW DIAGRAM FOR DISEASE

PROBLEM STATEMENT 6: ROAD-KILL

SGHs are often seen close to top verges of main roads feeding in the short grass in these areas. The grass is often purposefully kept short by the authorities, and is also grazed on by cattle, and razed down by fires. Individual birds have been killed by speeding vehicles (buses and trucks) whose drivers either don't know, or don't care, that they are driving through wildlife areas with SGH transiting/crossing roads.

TABLE 8 SUGGESTED ACTIONS FOR ROAD-KILLS AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Actions	Implementing parties	1-2 years	Long-term
Advocacy – on speeding	Min of Transport, Police, Traffic safety council (TFS)	✓ Harnessing existing programs	✓
Education	Min on Education, Civic Society	✓ Harnessing existing programs	✓
Advocacy -fires	EMA, Min of Environment, Civic Society	Jump on to EMA programs	✓
Fences- Cattle	Vet Services, Min of Transport		✓

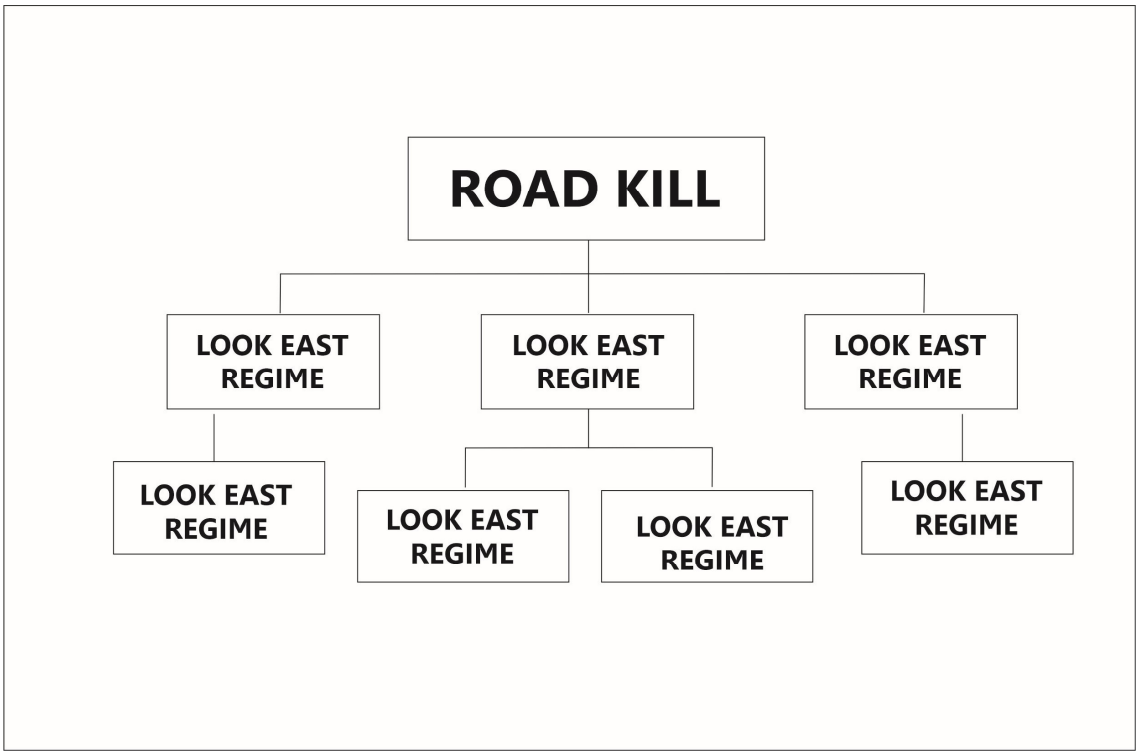


FIGURE 11 CAUSAL FLOW DIAGRAM FOR ROAD-KILL.

PROBLEM STATEMENT 7: PERSECUTION

There are various forms of wildlife persecution and most of them stem from negative interactions between humans and wildlife. People generally have limited patience with SGH that breaks windows due to its territorial nature. This is not something that humans would readily put up with.

TABLE 9: SUGGESTED ACTIONS FOR PERSECUTION AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Actions	Implementing parties	1-2 years	✔ Long-term
Income generating projects (eg cultural tourism)	-Civil society -Tourism sector (both Private and Government) -Communities bordering protected areas KAZA		✓
Engagement of traditional leaders for IKS	Chiefs, Government, communities	✓ Harnessing existing programs	✓
Covering/ Painting windows/ prevent reflections	Cooperates, NGOs, communities	✓	✓

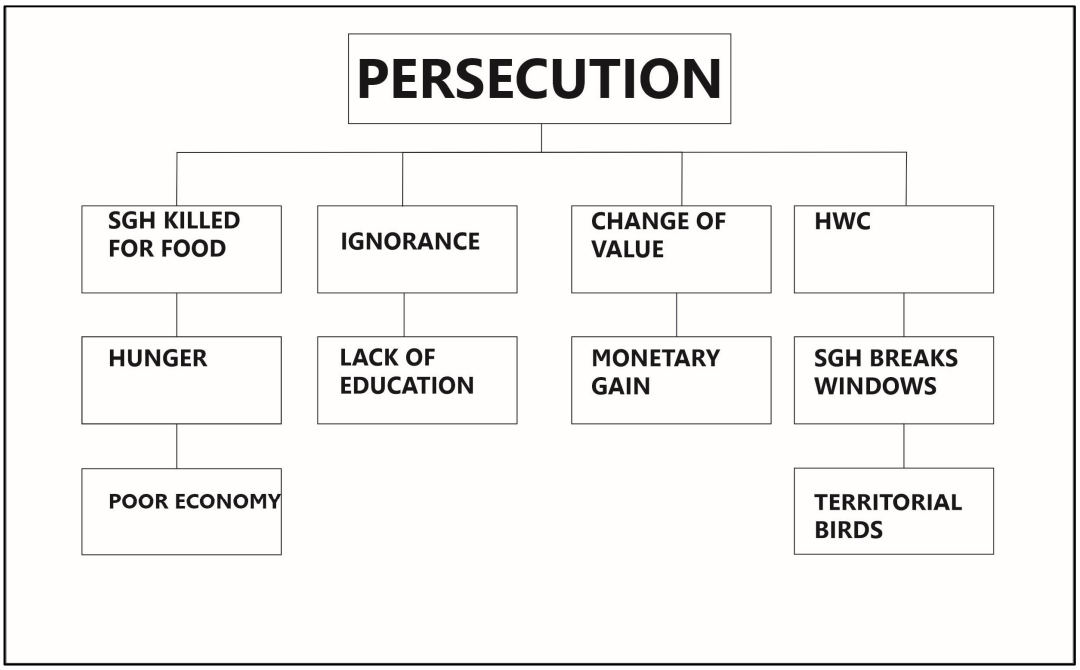


FIGURE 12 CAUSAL FLOW DIAGRAM FOR PERSECUTION

PROBLEM STATEMENT 8: IGNORANCE

The education system and environmental awareness is insufficient. The government has overlooked the importance of nature and biodiversity; both in terms of natural ecosystems and ecosystem services and the potential for sustainable development e.g livelihood and ecotourism. This has resulted in increased biodiversity loss related to activities being implemented without considering the environment and the long- and short-term implications to both people and biodiversity/ecosystems. As a result, people are less knowledgeable about nature and its importance.

TABLE 10: SUGGESTED ACTIONS FOR IGNORANCE AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Actions	Implementing parties	1-2 years	Long-term
Inclusive curriculum development advocacy and lobbying	Civil society, Min of Education, Universities, Researchers		✓
Education	-Civil Society -Campaigns around the country -Mainstream SGH issues through the media. Schools, and KAZA - Min of Education	✓ (piggy-back / harnessing existing programs	✓

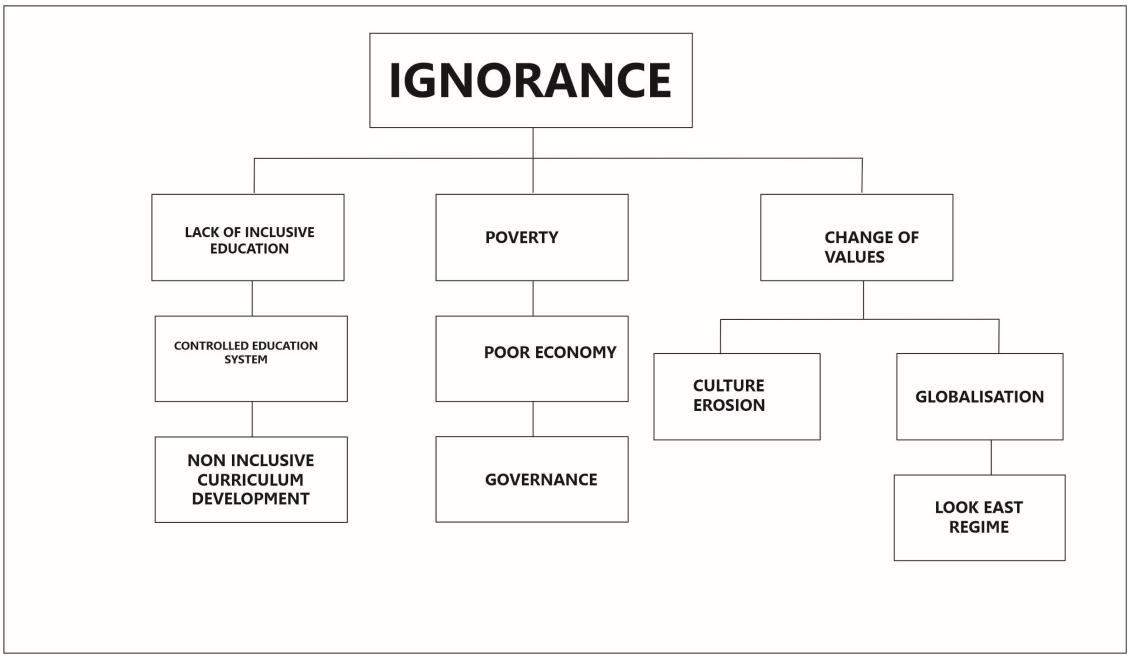


FIGURE 13 CAUSAL FLOW DIAGRAM FOR IGNORANCE

PROBLEM STATEMENT 9: SECONDARY POISONING

Unintentional poisoning of Southern Ground-hornbills in Zimbabwe through the use of lead ammunition in hunting activities, pesticides and agricultural chemicals and poisoned bait for predator control.

TABLE 11: SUGGESTED ACTIONS FOR SECONDARY POISONING AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Actions	Implementing parties	1-2	Long-term
Bio-control of pests	Ministry of Agriculture Agritex		5+ years
Education on correct chemical use	Chemical industry/distributors		ongoing
Regulation of sales and types of chemicals	Ministry of Agriculture Registration Bureau SAZ (equivalent)		✓
Alternative ammunition to Lead	ZPHG Researchers NGOs	reduction of lead available to wildlife	

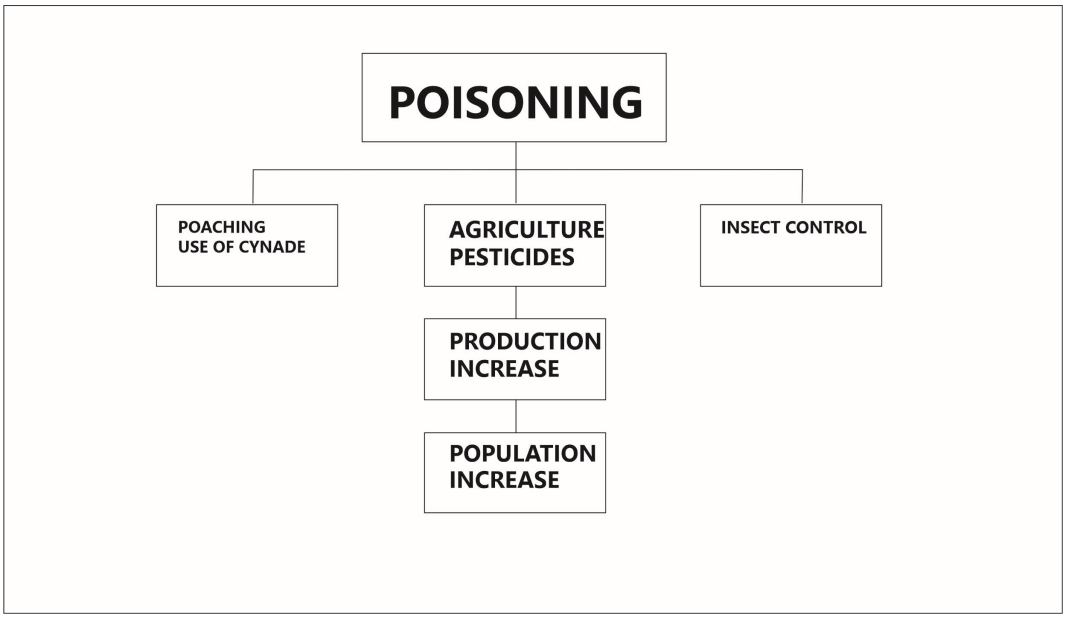


FIGURE 14 CAUSAL FLOW DIAGRAM FOR SECONDARY POISONING

PROBLEM STATEMENT 10: DECLINE IN PREY AVAILABILITY

Decrease in prey due to human activities such as monoculture and fire. SGH diet is varied, as they are opportunistic feeders. However, approximately 70% of their diet is comprised of insects. Agricultural practices such as monoculture and frequent burning have been shown to have a negative impact on the species diversity of insects in the area where it is practiced.

TABLE 12: SUGGESTED ACTIONS FOR DECLINE IN PREY AND ORGANISATIONS RESPONSIBLE FOR IMPLEMENTATION

Actions	Implementing parties	1-2	Long-term
Fire prevention	FC ZimParks EMA Land owners	✓	
Education on monocultures – to mixed cropping	Agritex EMA FC ZimParks RDC	✓	

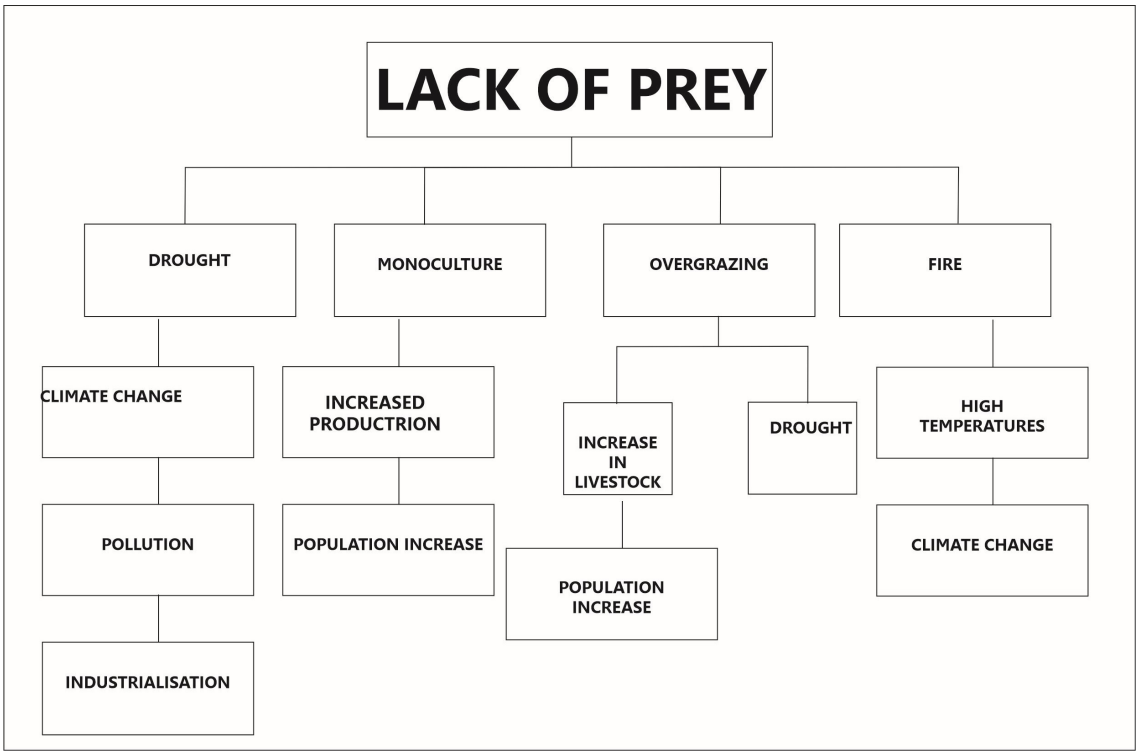


FIGURE 15 CAUSAL FLOW DIAGRAM FOR DECLINE IN PREY

PROBLEM STATEMENT 11: POTENTIAL AEROPLANE STRIKES AT AIRPORTS.

The short grass and open spaces in and around airports and airstrips are good forage areas for SGH, as there is usually a good number of insects to be found.

TABLE 13: SUGGESTED ACTIONS FOR AEROPLANE STRIKES

Action	Implementing parties	1-2	Long-term
Liaison	BLZ CAAZ	✓	

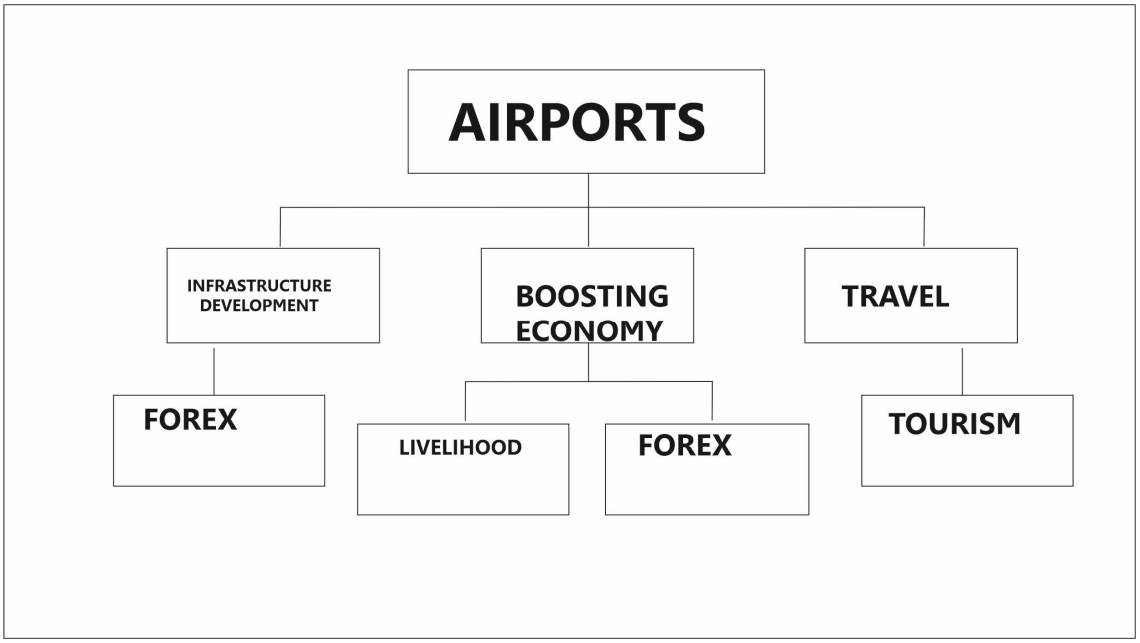


FIGURE 16 CAUSAL FLOW DIAGRAM FOR AIRPORT STRIKES

PROBLEM STATEMENT 12: NEGATIVE CULTURAL BELIEFS

SGH are used in traditional medicine in different ways by different ethnicities.

Action	Implementing parties	1-2	Long-term
Education	ZINATHA BLZ NGOs Traditional leadership Cultural villages, researchers, universities	✓	

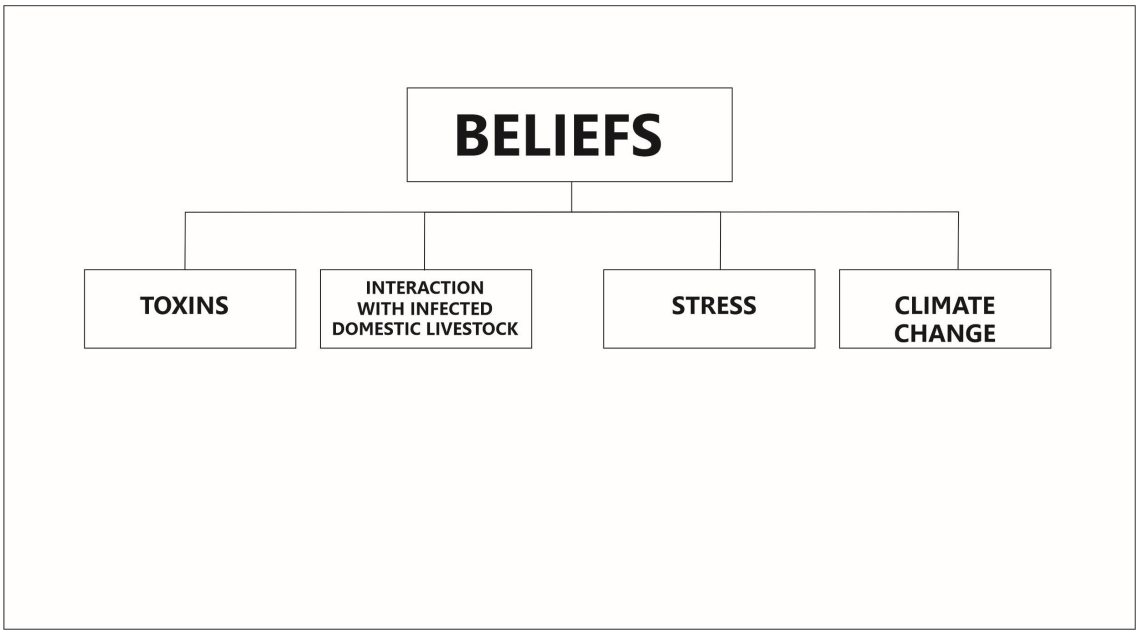


FIGURE 16: CAUSAL FLOW DIAGRAM FOR CULTURAL BELIEFS

PROBLEM STATEMENT 13: IMPACTS OF CLIMATE CHANGE ON SGH SURVIVAL IN ZIMBABWE

Climate change is affecting both the environment and the SGH as a species. Various aspects of a SGH life history is, and will be, negatively affected by climate change. These may include breeding timing and success, foraging patterns and habitat utilisation.

TABLE 14: SUGGESTED ACTIONS AND ORGANISATIONS RESPONSIBLE FOR CLIMATE CHANGE MITIGATION

Action	Implementing parties	1-2	Long-term
Artificial nest boxes in logged areas	FC		✓
Agroforestry	Agritex SAFIRE Agro… NGO		✓
Renewable energy	Ministry of energy ZETDC Private companies NGOs	✓	
Re-forestation using indigenous species	FC ZimParks NGOs EMA		✓

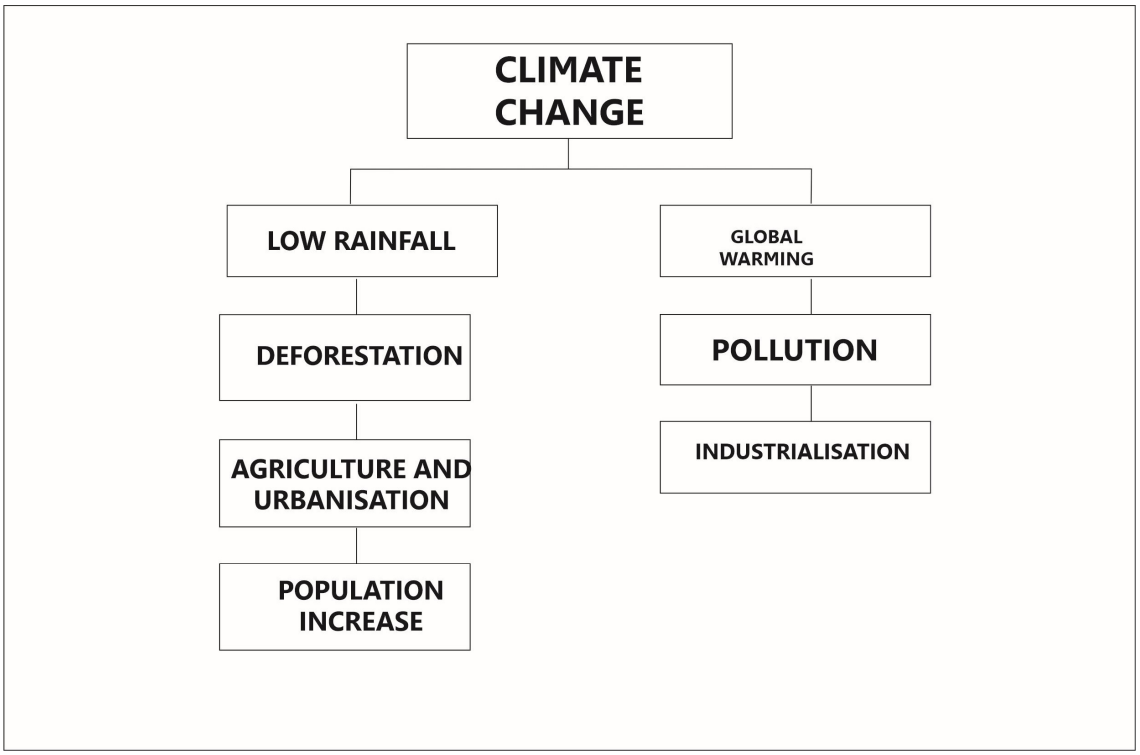


FIGURE 17 CAUSAL FLOW DIAGRAM FOR CLIMATE CHANGE

APPENDIX I: PLANNING WORKSHOP PARTICIPANTS

TABLE 15: INDIVIDUALS WHO ATTENDED THE WORKSHOP

No.	First name	Surname	Institution	Group
1.	Abigail	Karimanzira	BLZ	2
2.	Albert	Chirima	NUST	2
3.	Dean	Kendall	ZPHG	3
4.	Diana	Marewangepo	MNP	1
5.	George	Mgona	GMAC	1
6.	Josephine	Mundava	NUST	2
7.	Julia	Pierini	BLZ	2
8.	Leeroy	Moyo	BLZ	2
9.	Lorraine	Salimu	Rosslyn Safaris	1
10.	Merlyn	Nkomo	MaGHP	3
11.	Mthabisi	Khumalo	MaGHP	3
12.	Nicola	Pegg	DWT	1
13.	Patience	Shito	MGHP	3
14.	Peta	Ditchburn	SSP	2
15.	Peter	Mundy	NUST	3
16.	Peter	Makhusa	MaGHP	3
17.	Sheila	Broadley	Herpetologist	1
18.	John	Stacha	ZPWMA	1
19.	Lucy	Kemp	MGHP	facilitation

APOLOGIES

TABLE 16: INDIVIDUALS WHO WERE INVITED BUT COULD NOT ATTEND THE WORKSHOP

No.	First name	Surname	Institution	Group
1.	Evans	Mabiza	CNCZ & Rowallan Park	evannmabiza@yahoo.com
2.	Shingirai	Sakarombe	BirdLife Zimbabwe	**sakarombe90@gmail.com**
3.	Karen	Learnmonth	BLZ Matebeleland	**afspec@yoafrica.com**
4.	Kudzanai	Dhliwayo	Natural History Museum	**kudzanaid@gmail.com**
5.	Bekezela	Nxumalo	Researcher- Hwange	**bekezelanxumalo@yahoo.com**
6.	Phathisa	Nyathi	Amagugu Cultural centre	**Patisanyatho2004@yahoo.com**
7.	Lovelater	Sebele	Gwanda University	**slovelater@gmail.com**
8.	M.	Sebele	Forestry Commission Chief Ecologist	**mmsebele@ngamosafaris.co.zw**
9.	S.	Mudimba	ZPWMA	smudimba@zimparks.org.zw
10.	Ngoni	Chiweshe	CIRAD	**chiweshengoni@gmail.com**
11.	Boniface	Magwizi	n/a	**+263 773 713 391**

APPENDIX II: AGENDA FOR WORKSHOP

Conservation Planning Multi-Stakeholder Workshop
PRELIMINARY DISCUSSIONS

Southern Ground-Hornbill
ZIMBABWE

Venue: National University of Science and Technology, Bulawayo
Facilitators: Dr Lucy Kemp & Patience Shito: Mabula Ground Hornbill Project/ IUCN SSC Hornbill Specialist Group/ Conservation Planning Specialist Group

TABLE 17: PROGRAMME FOR THE WORKSHOP

Time	Programme	
09.00	Participant introductions, aims of workshop, workshop framework	All
09.30	Presentation: Lessons from 20 years of ground-hornbill conservation in South Africa.	Lucy Kemp
10.30	Tea/ Coffee break	
10.50	What do we know already? Gap analysis	Groups to plenary
11.30	What do we have where? Think Zimbabwe	All
12.00	Lunch	
13.00	Conservation priorities	Groups to plenary
15.00	Tea/ Coffee break	
15.20	Goal statement development	Groups
16.30	Close	

APPENDIX III: PHOTOS FROM THE WORKSHOP

FIGURE 18 GROUPS WORKING ON CAUSAL FLOW DIAGRAMS FOR THE IDENTIFIED THREATS

FIGURE 19 WORKSHOP PARTICIPANTS MAPPING OUT KNOWN SGHG OCCURRENCE

FIGURE 20 WORKSHOP PARTICIPANTS MAPPING OUT SGH OCCURRENCE IN ZIMBABWE

FIGURE 21 GROUP 3 DISCUSSING CAUSAL FLOW DIAGRAMS