

## CHAPTER ONE: INTRODUCTION

### 1.1 Background

Human-wildlife conflict (HWC) is fast becoming a critical threat to the survival of many globally endangered species, in particular to large and rare mammals such as the Sumatran tiger (*Panthera tigris sumatrae*) and the Asian lion (*Panthera leo persica*), but also to less endangered species such as the snow leopard (*Uncia uncia*) and the Red colobus monkey (*Procolobus kirkii*). The numerous cases from countries all over the world demonstrate the severity of human-wildlife conflict and suggest that an in depth analysis is essential to understand the problem and support the conservation prospects of threatened and potentially endangered species.

Protected areas, the cornerstone of modern biodiversity conservation, go some way to protecting species (Bruner et al., 2001). However, they do not completely resolve human wildlife conflicts since they do not always exclude destructive human impacts (Liu et al., 2001). Equally, protected areas often only protect a part of an ecosystem or species range, and wildlife dispersal from such areas may increase conflict with man (Woodroffe & Ginsberg, 1998). Even as alternative forms of land use, such as wildlife tourism, are implemented in an attempt to derive sustainable benefits from wildlife, conflict may remain (Roe et al., 1997; Goodwin et al., 1998).

However what is the exact definition of HWC, when and where does it usually occur? According to the World Conservation Union (World Park Congress 2003), it occurs when wildlife's requirements overlap with those of human populations, creating costs to residents and wild animals. Decker et al. 2000, defines Human-wildlife conflicts as interactions between humans and wildlife where negative consequences, whether perceived or real, exist for one or both parties (Decker et al. 2002). Direct contact with wildlife occurs in both urban and rural areas, but it is generally more common inside and around protected areas, where wildlife population density is higher and animals often stray into adjacent cultivated fields or grazing areas. A set of global trends has contributed to the escalation of HWC worldwide. These can be grouped into human population growth, land use transformation, species habitat loss, degradation and fragmentation, growing interest in ecotourism and increasing access to nature

reserves, increasing livestock populations and competitive exclusion of wild herbivores, abundance and distribution of wild prey, increasing wildlife population as a result of conservation programmes, climatic factors and stochastic events.

HWC has far reaching environmental impacts. Species most exposed to conflict are shown to be more prone to extinction (Ogada *et al.*,2003)because of injury and death caused by humans; these can be either accidental, such as road traffic and railway accidents, capture in snares set for other species or from falling into farm wells, or intentional, caused by retaliatory shooting, poison or capture. Such human-induced mortality affects not only the population viability of some of the most endangered species, but also has broader environmental impacts on ecosystem equilibrium and biodiversity preservation.

Human-wildlife conflicts undermine human welfare, health and safety, and have economic and social costs. Nuisance encounters with small animals, exposure to zoonotic diseases, physical injury or even death caused by large predators' attacks have high financial costs for individuals and society in the form of medical treatments to cure and prevent infections transmitted from animals through human contact (Ministry of Water, Land and Air Protection, British Columbia, 2003). Humans can be economically affected through destruction and damage to property and infrastructure (e.g. agricultural crops, orchards, grain stores, water installation, fencing, and pipes), livestock depredation, transmission of domestic animal diseases, such as foot and mouth. Negative social impacts include missed school and work, additional labour costs, loss of sleep, fear, restriction of travel or loss of pets (Hoare, 1992; Human-Elephant Conflict Working Group, HECWG).

Such broad environmental, human health and safety, economic and social impacts suggest that governments, wildlife managers, scientists and local communities need to be aware of the problem and adopt measures to resolve them in the interest of humans, wild animals and the environment. The aim of this research therefore, was to facilitate the coexistence of humans and wildlife and assist affected communities of Chiyaba GMA in applying best management practices through Environmental Education. However, the point to note is that, there is no simple or single solution. Different circumstances, beliefs and values are to be taken into account in evaluating which approaches are the best.

## **1.2 A BRIEF HISTORY OF HUMAN-WILDLIFE CONFLICT**

Fossil records show that the first hominids fell prey to the animals with which they shared their habitats and shelters. Forensic evidence has recently demonstrated that the “Taung skull”, perhaps the most famous hominid fossil, which was discovered in South Africa in 1924, belonged to a child who was killed by an eagle two million years ago (Berger and Clarke, 1995; Berger, 2006).

Crocodiles have an ancient lineage dating back to the Mesozoic era, and have remained functionally unchanged for longer than the human species has been in existence. It is likely that crocodiles have attacked and eaten humans and their predecessors in Africa over the last four million years. Egyptian historical records reveal that in 2000 BC, hippopotamuses in the Nile delta in Egypt fed on cultivated crops while crocodiles ate livestock and occasionally humans. It is no coincidence that the Egyptian god of evil was depicted as the crocodile-headed deity Sobek.

Human-elephant conflict is as old as agriculture in Africa (Treves and Naughton-Treves, 1999). San or Bushman rock art in Africa frequently portrays people fleeing from predators or other large animals. Pre-colonial and early nineteenth century historians describe areas in Africa and other parts of the world where elephants invaded human cultivations, causing food shortages and leading to the displacement of settlements (Barnes, 1996). Some authors blame colonialism for ruining traditionally harmonious relations between wildlife and local people (Adams and McShane, 1992). In actual fact, from the eighteenth to the mid-twentieth centuries, the larger African mammals were regarded more as a resource to be exploited than a major threat. Ivory formed a cornerstone of the early trade with Europe and the Orient, while meat and hides were essential products both for the African people and colonialists alike. In the twentieth century, with the expansion and development of modern agriculture, exploitation diminished and interaction with large wildlife species came to be increasingly dominated by conflict.

## **1.3 EVOLUTION OF THE WILDLIFE LEGISLATIVE PROCESS IN ZAMBIA**

Before the British Government colonized Zambia, wildlife was controlled and managed by indigenous people through Chiefs. Under the leadership of Chiefs, wildlife was used for the benefit of the community and formed an integral part of their lives. At the turn of the last century when Britain colonized Zambia, wildlife ceased to be under the custodianship of the indigenous people. It was placed under centralized state protection and management. For this purpose the Game Ordinance, Chapter 106, was enacted on 1st January 1943, making wildlife

the property of the state and governing its use. The subsequent amendments, repeals and replacements of the wildlife legislation were made essentially to keep such wildlife legislation up to date in line with government requirements. The process of updating wildlife legislation has been ongoing to ensure that it provides for the protection, management and use of National Parks and promotion of sound ecologically and socio-economically based conservation. If the legislation is not reviewed from time to time, it may become ineffective such as most statutes in Zambia, which have not been reviewed since the 1960s and 1970s, rendering them obsolete and moribund (Child, G. & Lee, D. 1992).

The earliest recorded piece of legislation relating to wildlife conservation in Zambia was enacted in 1912 when the Ostrich Export Prohibition, Chapter 115 of the Laws came into force on 16th March 1912 (NRG, 1948a). Later on, the Plumage Birds Protection, Chapter 117 of the Laws came into force on 27th November 1915. In 1941 Ordinance number 41 was enacted but this was later replaced by the Game Ordinance Chapter 106 of the Laws on 1st January 1943 (NRG, 1948a).

Part II, Section 3 of the Game Ordinance had a provision for establishing a National Park. It stated, that the Governor by proclamation with the consent of the Legislative Council signified by resolution may declare any area of land to be a National Park and may in like manner, define or alter the limits of any such areas. It was during this time that the Governor evoked powers vested on him under Section 3 of CAP 106 to declare Kafue National Park under Government Notice 108 of 1950 (NRG, 1948a). Chapter 106 of 1943 made no mention of game areas until in 1954 when the Fauna Conservation Ordinance No. 43 was enacted which provided for the declaration of four additional game areas.

In 1964 the former British colony of Northern Rhodesia became an independent state. The new government of the Republic of Zambia repealed and replaced the two Ordinances with the National Parks and Wildlife Act Chapter 316 in 1968, which became operational in 1971. Twenty-three years later, the National Parks and Wildlife Act was repealed and replaced by the National Parks and Wildlife Act No. 10 of 1991. In 1998, the National Parks and Wildlife Act No. 10 of 1991 was repealed and replaced by the Zambia Wildlife Act No. 12 of 1998 which is currently being used. The wildlife legislation has been repealed and replaced three times since the inception of the wildlife institution. Act no. 12 of 1998 is currently under review so as to repeal and replace it with a contemporary version that will consider the role of the private sector and the paradigm shift where the private sector is expected to play a major

role through Private Public Partnerships (PPP) as a way of tapping into the skills and financial resources of the private sector. It will also provide for the additional categories of protected areas to permit active participation of the private sector, consolidate the latest gains made in Community Based Natural Resources Management (CBNRM) and management of the impacts of global climate change on wildlife (GRZ, 1971).

#### **1.4 Statement of the problem**

Human-animal conflict, particularly human-carnivore conflict, is a growing problem in today's crowded world, and can have significant impacts on both human and wildlife populations. For instance, species most exposed to conflict are shown to be more prone to extinction (Ogada *et al.*, 2003) because of injury and death caused by humans; these can be either accidental, such as road traffic and railway accidents, capture in snares set for other species or from falling into farm wells, or intentional, caused by retaliatory shooting, poison or capture. Such human-induced mortality affects not only the population viability of some of the most endangered species, but also has broader environmental impacts on ecosystem equilibrium and biodiversity preservation.

Human-wildlife conflicts undermine human welfare, health and safety, and have economic and social costs. Nuisance encounters with small animals, exposure to zoonotic diseases, physical injury or even death caused by large predators' attacks have high financial costs for individuals and society in the form of medical treatments to cure and prevent infections transmitted from animals through human contact (Ministry of Water, Land and Air Protection, British Columbia, 2003). Humans can be economically affected through destruction and damage to property and infrastructure (e.g. agricultural crops, orchards, grain stores, water installation, fencing, and pipes), livestock depredation, transmission of domestic animal diseases, such as foot and mouth. Negative social impacts include missed school and work, additional labour costs, loss of sleep, fear, restriction of travel or loss of pets (Hoare, 1992; Human-Elephant Conflict Working Group, HECWG).

Despite the application of different management practices, both locally and globally, the problem still exists. This calls for techniques and innovative approaches that could make a meaningful contribution to resolving such a long-term problem. One such technique and innovation is environmental education which in the context of this study was applied to address the problem in Zambia's Chiyaba Game Management Area. Being an innovation,

environmental education and its role in the community was not yet known or understood by key players in the human-animal conflict of Chiyaba. Such a situation posed a problem which needed to be investigated and, hence, the present study.

### **1.5 Purpose of the study**

In view of the problem stated above, the aim of this study was to establish the role that Environmental Education could play in addressing human-animal conflict in Chiyaba Game Management Area.

### **1.6 General Objective**

To establish the role that EE could play in addressing human-animal conflict in Chiyaba Game management area.

#### **1.6.1 Specific Objectives**

- To find out how local people perceive wildlife of Chiyaba Game management area.
- To assess the effectiveness of measures that have been put in place to minimize human-animal conflict in Chiyaba GMA.
- To determine local people's awareness of the role that EE could play in addressing human-animal conflict in Chiyaba GMA.
- To establish the specific role EE could play in addressing human-animal conflict in Chiyaba GMA

#### **1.6.2 Specific Research Questions**

The following specific research questions formed the basis of this study as a way of addressing the general research question:-

- How do local people perceive wildlife of Chiyaba Game management area?
- How effective are measures that have been put in place to minimize human-animal conflict in Chiyaba GMA?
- Are the local people aware of the role that EE could play in addressing human-animal conflict in Chiyaba GMA?
- What specific role could EE play in addressing human-animal conflict in Chiyaba GMA?

### **1.7 Significance of the Study**

The present study is significant in that it may fill the knowledge gap that exists regarding the role that Environmental Education is expected to play in addressing human-animal conflict. It is also hoped that the study may contribute information that may help governments, wildlife managers, scientists and local communities ensure positive coexistence between people and animals in the interest of human and environmental well being.

### **1.8 Limitations of the Study**

Some of the information was inaccessible in some government departments because it was either not available for public use or the person in charge of providing it was on leave. As such the researcher could not access the latest (2014) cases on human- animal conflict in Chiyaba GMA but was able to access cases from the previous year (2013)and before, hence managed to fill up the information gap.

Being a case study of only one of the Zambia's thirty-six (36) game management areas, the findings of the study may not be generalised to all other GMAs in Zambia.

### **1.9 Definition of Terms**

**Biodiversity:** The term 'biodiversity' will in this study be used to describe the number, variety and variability of living organisms

**Communities:** all the people found around Chiyaba game management area, members of the Zambia Wildlife Authority agency (ZAWA), members of the Community Resource Boards (CRB), pastoralists and agro-pastoralists, chiefs and so on, who experience and have the in-depth knowledge of human animal conflict in this area.

**Conservation:** Preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife.

**Drivers/determinants of conflict:** agents, factors or simply causes of conflict.

**Ecosystem:** An ecosystem is made up of plants, animals, microorganisms, soil, rocks, minerals, water sources and the local atmosphere interacting with one another.

**Endangered species:** a native species that faces a significant risk of extinction in the near future throughout all or a significant portion of its range. Such species may be declining in

number due to threats such as habitat destruction, climate change, or pressure from invasive species.

**Environment:** An interaction between the physical surroundings and the social, political and economic forces that organize people in the context of these surroundings.

**Environmental Education:** a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

**Human-animal conflict:** a range of direct and indirect negative interactions between human and-wildlife.

**Mitigate:** To moderate, lessen.

**Park:** an enclosed piece of ground stocked with game and held by royal prescription or grant

**Perception:** the feelings, understandings of the people of Kafue game management area concerning human animal conflict.

**Species:** a class of individuals having some common characteristics or qualities; distinct sort or kind.

**Sustainable:** Conserving an ecological balance by avoiding depletion of natural resources.

**Wildlife:** traditionally refers to non-domesticated vertebrates, but has come to broadly reference to all wild plants, animals and other organisms, for this study it will only refer to wild animals.

## **1.10 Dissertation Structure**

The dissertation is broken down into seven independent but connected chapters. Each chapter deals with arguments that are logically presented from section to section. The link and logic among the seven chapters is given due consideration while being dealt with. Here is the outline of chapters of this dissertation.

**Chapter one** has a primary focus on the background and purpose statement of the research, objectives and research questions, significance of the study, study site and operational definitions, and the outline of the thesis.

The **second chapter** deliberates on literature review employed in the research. Most of the literature reviewed a confirmation of the existence of human-animal conflict world over and about different management and preventive measures carried out in other parts of the world concerning human-animal conflict.

The **third chapter** gives a description of the study area. In this regard, a brief discussion is presented about Chiyaba GMA geographic location and the biological and physical characteristics.

The **fourth chapter** is on research methodology.

The **fifth Chapter** presents research findings (research results) gathered from the interviews, focus group discussions and observations that were carried out. Each result table or figure is accompanied by a result interpretation.

The **sixth chapter** presents the discussion and interpretation of the results in chapter five.

Finally, the **seventh chapter** draws the conclusion and makes some recommendations. The seventh chapter provides the conclusion of the study in the context of research findings and literature review. It further includes the implication for future research.

### **1.11 Summary**

Chapter one has laid a foundation of how the research study will unfold; among other things it has stated the problem, the objectives and the significance of the study. The next chapter reviews the literature.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Overview of the Human-Wildlife Conflict Worldwide**

This chapter reviews a selection of cases to provide a better understanding of HWC worldwide and to highlight common problems across local, regional and national levels. The case studies cover Europe, Africa, North America and Asia and demonstrate that HWC is more intense in the tropics and in developing countries where livestock holdings and agriculture are an important part of rural people's livelihoods and incomes. In these regions, competition between local communities and wild animals, for the use of natural resources, is particularly intense and direct and resident human populations are very vulnerable. Of course, the relative impact of wildlife damage on farm production and household income varies greatly according to the amount of land owned and people's economic dependence on rural activities (Messmer, 2000). Clearly people with a low standard of living are particularly at risk, as are agro-pastoralists who depend exclusively on production and income from their land.

This overview confirms that conflict is particularly common in reserve borders, where species that rely on extensive territories come into contact with human settlements. In effect, border zones of protected areas may be considered population sinks: critical zones in which conflict is the major cause of totality (Woodroffe and Ginsberg, 1998). These case studies also demonstrate that conflict is most acute in zones in which a wide range of species coexists with high-density human populations (Ogada *et al.*, 2003). Nature reserves that encompass densely populated human settlements seem to pose the greatest challenge. Many of the cases reported here are from India, where 69 % of the reserves support an estimated local population of more than three million people, who engage in agriculture, livestock grazing and extraction of forest products (Madhusudan, 2003) or Kenya, where the largest park system of the country, Tsavo National Park buffer zone (ca.20, 000km<sup>2</sup>) supports almost 250,000 people (Patterson *et al.*, 2004).

The cases briefly described below are sorted by geographical regions, taking into consideration many different species and subspecies and helping explain a specific issue, dimension or aspect of HWC. A small paragraph before each case study explains the reasons for their inclusion in the review. When the species' conservation status is of particular interest, it is specified according to the World Conservation Union (IUCN) Red List of threatened species (2003).

It is important to note that most of the species concerned are carnivores and large home range species, which are important from a conservation point of view. In fact, they have a profound influence on biological communities and often alter the structure and function of the entire ecosystem via interspecific competition and regulation of prey population density (Treves and Karanth, 2003b). If large home range and keystone species are not protected, the entire biodiversity conservation is undermined.

In addition to the species discussed in this report, there are some well-known groups of invasive vertebrates such as rodents, dogs, birds (blackbird, pigeon) and snakes causing problems in urban and rural areas; they will not be mentioned because numerous comprehensive overviews of conflict, technical information and management options have been recently published (Fall and Jackson, 2002).

## **2.2 AFRICA**

Many communities in Africa bear the costs of coexisting with wildlife without receiving any benefits (O'Connell-Rodwell *et al.*, 2000) and often the costs are very considerable in relation to their standards of living.

### **2.2.1 Lion and Other Carnivore Conflict in Zimbabwe**[Lion (*Panthera leo*), vulnerable; Leopard (*Panthera pardus*), endangered]

In Zimbabwe, many areas of traditional agro-pastoralism bordering protected areas suffer from livestock depredation. In particular, in the Gowke communal land, neighbouring the Sengwa Wildlife Research Area, rural villagers experience a negative impact from the close proximity to the reserve, wild carnivores attack domestic livestock and the conflict is severe. It was reported that, between January 1993 and June 1996, in a study area of 33Km<sup>2</sup>, 241 livestock were killed by baboons, lions and leopards, which contributed respectively to 52%, 34% and 12% of the kills.

Their predation techniques are different, as baboons attack by day and usually kill small-stock such as goats and sheep, while lions and leopards attack at night, with lions killing larger prey such as cattle and donkeys. The average loss in that time period was quite consistent, with an annual loss per household equivalent to 12% of the total family's income. It is worthy pointing out the fact that despite baboons killing more animals, lions caused the greatest economic loss because of the high value of cattle (Butler, 2000).

### **2.2.2 Lion and Other Carnivore Conflict in Kenya [Lion (*Panthera leo*), vulnerable; Cheetah(*Acynonyx jubatus*), vulnerable; spotted hyenas (*Crocuta crocuta*), lower risk: conservation dependent]**

HWC not only affects rural and vulnerable communities, but also commercial cattle ranches. In this regard, Patterson et al. (2004) evaluated the level of impact of two private cattle ranches that lie adjacent to the boundary of the Tsavo East National Park in Kenya. In this study area, three carnivore species were determined to be responsible for attacks: lions and spotted hyenas, which target large domestic animals such as cows, bulls, steers; and cheetahs, which take only smaller adult stock and young cattle. In a four-year study the ranches have lost an average of 2.4% of the total herd per annum which represented 2.6% of their economic value and amounted to US\$ 8,749.

A local population's perception of conflict does not always correspond to reality; in some cases negative impact is only perceived and may result from confounding ecological factors (monkey conflict in Zanzibar case study below) or exaggerated by socio-economic variables (wildlife conflict in Uganda case study).

### **2.2.3 Monkey Conflict in Zanzibar [Red colobus (*Procolopus kirkii*), endangered]**

Of particular interest, in this regard is the red colobus (*Procolopus kirkii*) conflict in Zanzibar. On this island, farmers consider most medium and large-size mammals as a threat to their crops and name the red colobus as the third most serious vertebrate pest. This case deserves particular attention because the red colobus is one of the most endangered primates in Africa and in Zanzibar its presence is limited to only 1,500-2,000 individuals, which reside on the island of Unguja (Siex *et al.*, 1999).

A study was undertaken because villagers in agricultural areas adjacent to the southern border of the Jozani Forest Reserve claimed the red colobus' consumption of coconuts (*Cocos nucifera*) to be the cause of serious crop yield losses. The authors found out that, contrary to villagers' perceptions and predictions, the monkeys are not a limiting factor, but instead contributed to a slight increase in the final coconut tree yields. In fact, they accounted for a 2.8% increase in the potential harvest through pruning small and immature coconuts. In addition, the primates are a source of income through tourism. It has been concluded that farmers may have incorrectly blamed the red colobus monkeys for crop damage caused by another less visible species, the Sykes monkey (*Cercopithecus mitis albogularis*); or have

intentionally exaggerated their losses in order to receive a greater percentage of the Jozani Forest Reserve's tourism revenue (Siex *et al.*,1999).

#### **2.3.4 Wildlife Conflict in Uganda [(*Loxodonta africana*), endangered]**

Naughton-Treves (1997) analyzed the incidence of socio-economic variables on local perception of the conflict around the Kibale National Park, where 54% of the land within 1Km from the National Park's border is cultivated. The study area was almost entirely confined within 200m from the edge of the park where farmers lost an average of 4-7% of their crop per season and reported the use of defensive strategies (mainly guarding and to a lesser extent fencing and trenches).

The researcher compared the farmers' assessment of crop losses with systematic measurements of crop damage by wildlife and found that their perception did not correspond closely to the monitored records. The main factors influencing local risk perception were labour investment, potential for total loss, gender identity and an animal's ability to destroy large crop areas. Farmers ranked maize and sweet potato as the two most vulnerable crops out of ten different cultivated plants, despite monitored records demonstrating that banana suffered the highest percentage of damage. Their perception was influenced by the fact that maize and sweet potato crop could have been destroyed in a single depredation event, while banana fields were never entirely devastated. Moreover, women were principally responsible for cultivating food crops and complained more often about damage to cassava, while men dedicate themselves to cash crops and identified banana as one of the most vulnerable crops. Likewise, the most damaging animals identified were olive baboons (*Papio cynocephalus*), bush pigs (*Potamochoerus sp.*) and elephants (*Loxodonta africana*), in reality the redbellied monkey (*Cercopithecus ascanius*) was the species most frequently visiting agricultural fields, while the species mentioned were those capable of causing the greatest percentage of damage (Naughton-Treves, 1997).

The following case reveals that the conflict can be exacerbated by local people's lack of access to natural resources, substantiating the concept of conflict co-management as a means to achieve sustainable wildlife conservation (Weladji & Tchamba, 2003).

### **2.2.5 Wildlife Conflict in Cameroon [Elephant (*Loxodonta africana*), endangered]**

In the North of Cameroon, the creation of the Benoue National Park, in 1968 imposed great restrictions on land use, which was formerly a hunting wildlife reserve owned by local communities and controlled by village leaders. At present, local people's activities, such as small-scale agriculture, livestock rearing, fishing, hunting and gold mining, are restricted to a transitional area surrounding the park's border. The communities surveyed had limited rights to land and lost an estimated 31% of the annual crop income and 18% of annual livestock income per household. The most affected crops were reported to be maize (*Zea mays*), millet (*Sorghum* spp.), yam (*Dioscorea rotundata*) and cotton (*Gossipium* spp.), while the species inflicting most of the losses were elephants, baboons (*Papio anubis*), green parrots (*Poicephalus senegalus*) and warthog (*Phacochoerus aethiopicus*).

In an area where wildlife is causing major damage to crops and livestock, the most affected crops are staple foods, and bush meat constitutes about 24% of the animal protein intake, the people are attempting to secure their livelihoods through illegal encroachment of farms and poaching (Weladji and Tchamba, 2003). The authors provide evidence that excluding local population from access to land and resources, such as fuel wood, fish, bush meat and pasture, may have long-term negative effects on conservation and result in an intensification of the conflict. They suggest that the strategy for conflict resolution is to involve local communities in wildlife management and to deliver a greater number of tangible benefits to communities.

The selection from Africa will be concluded by a case study demonstrating the conflict that can arise from protected areas that are unable to sustain the actual number of large home range animals. This seems to be a typical situation in many African countries (O'Connell-Rodwell *et al.*, 2000).

### **2.2.6 Elephant and Lion Conflict in Namibia [Elephant (*Loxodonta africana*), endangered; Lion (*Panthera leo*), vulnerable]**

The Caprivi region of Namibia is of particular interest because of its high density of human and elephant populations, which are relying on and competing for the same water and land resources. The conflict in this region is so problematic because it maintains a population of 5,000 elephants, which is the single largest free ranging population of elephants in Africa and is aggravated by the fact that elephants are not confined to the two East Caprivi National Parks, but often stray onto areas outside the park. Most of the conflict occurred in villages

bordering those reserves and elephants were responsible for twice as much aggression as lions and attacked over a larger area, however, lions caused the greatest financial impact. Elephant crop damage, between 1991 and 1995, amounted to a total economical loss of US\$ 70,570(O'Connell--Rodwell *et al.*, 2000).

### **2.2.7 Cases of Human-animal Conflict in Chiyaba GMA (i.e. study area) and Zambia at Large**

Since the establishment of the GMAs in Zambia in 1938 then called Controlled Hunting Areas, conflicts between human beings and wild animals have always occurred. The GMAs were established in areas considered by the Wildlife Department to contain significant numbers of game animals (Astle, 1999). The GMAs were established on land used for subsistence cropping or grazing by local inhabitants. The principal objective was to prevent disruptive land use practices while conserving wildlife within these areas at optimum variety and abundance commensurate with other land uses (Matenga, 2002). The colonial administration policy in the GMAs was to separate people from wildlife in the reserves, and special regulations were instituted that permitted local people to hunt game animals. The colonial administration did not hesitate to gun down any animal that threatened crops, livestock or humans.

HWC is a growing problem in Zambia's GMAs since wild animals destroy people's crops and kill or threaten their lives, and this problem is not restricted to a particular geographical area or climatic region, but is common to all areas where wildlife and humans share limited resources. This is demonstrated by the following cases;

In Lupande GMA for example, increased human population has led to the expansion of human settlements in protected wildlife habitats, this has led into the constriction of species into wildlife habitats. The animal population has increased which has resulted in many animals straying out on people's field crops. Still in Lupande GMA, it has been reported that human-wildlife conflicts has been on the increase where animals damage people's crops and are a threat to their lives. For example, in the year 2000, 63 cases were reported increasing to 233 in 2003 and to 267 in 2004 (ZAWA, 2003).

Conflicts are particularly common near conservation areas bordering densely populated human settlements. In 1998, the local people in South Luangwa marched to the Warden's Office demanding that more elephants be cropped. This was following a death incident, which

occurred on the seventh November 1998 (LIRD, 1998). ZAWA (2013) further reported that HWC was on the increase and needed to be given due consideration in order to minimize future conflicts as HWC can have adverse impact on wildlife and humans alike.

According to the Zambia Daily Mail Newspaper dated 15 April 2013, Zambia had continued to experience the human-animal conflict at an alarming rate and hundreds of people had continued being killed by wildlife. The same Newspaper further stated that this conflict was largely caused by human beings encroaching and settling in natural habitats of wildlife. As a result, human beings were attacked by wildlife and in the process lost their lives or were left permanently impaired. For instance, a rampaging elephant was reported to have had killed three people in Kazungula and sent villagers scampering for safety. It was therefore very cardinal that the Zambia Wildlife Authority enhanced educative campaigns for people in the areas where human-animal conflict was likely to arise.

Still on the same matter, the Times of Zambia Newspaper dated January 2, 2014 reported that Nyimba District Commissioner, George Phiri had said that human-animal conflict in Nyimba District prevented some children from going to school. He said children that attended school at Kalongomwape, Muliro, Mshalira and Ambo were among the most affected because the schools were in the Game Management Areas. Mr. Phiri said that at the Eastern Province Development Coordinating Committee meeting that was held in Chipata.

Chiyaba GMA had not been left out in this conflict, as there was increased demand for resources and consequently the growing demand for access to land. This study assessed the problems related to human-wildlife conflict and developed conflict management options using environmental education for Chiyaba GMA as the situation there was no different, the table below illustrates:

**Table 1: CHIYABA GMA HWC REPORTS-2013 (ZAWA, 2013)**

<b>Species Involved</b>	<b>No. of Reports</b>	<b>Location</b>	<b>Month</b>	<b>No. of Reports Attended to.</b>	<b>Type of Damage</b>	<b>Action Taken</b>	<b>No. of Animals killed on Control</b>
Elephant	7	Chimusambo village, Kandoko village, Mugulamano village Chibuye village, Kusemwa village, Maunda village, Chiyaba village,	Jan, 2013	6	Threat to humans/ Crop damage	Scared using fireworks/live ammunitions	0
Hippo	7	Chimusambo village, Kandoko village, Mugulamano village, Chilimanga village, Chiyaba village, gundudza village, Kalipano village	Jan, 2013	6	Threat to humans/ Crop damage	Scared using fireworks/live ammunitions	0
Elephant	9	Muyanje Village Chiyaba village, gundudza village, Kalipano village Kusemwa village, Maunda village,	Feb, 2013	8	Crop damage	Scared using fireworks/live ammunitions	0
Hippo	10	Muyanje Village, Malabanyika village, Kalipano	Feb, 2013	8	Crop damage/ Threat to	Scared using fireworks/live ammunitions	0

		village, Mafungautsi village, Kusemwa village, Maunda village, Chiawa village, gundudza village, Kalipano village			humans/ Crop damage		
Elephant	9	Kalombo village, Muyanje Village, Kalombo village, Muyanje Village Kusemwa village, Maunda village, Chiawa village, gundudza village, Kalipano village	March, 2013	7	Crop damage/ Threat to humans	Scared using fireworks/live ammunitions	0
Hippo	9	Chibuye village Chiyaba village, Kusemwa village, Maunda village, gundudza village, Kalipano village Mugurameno village,	Mar, 2013	6	Crop damage/Th reat to humans	Killing/ Assessment/ Blasting	2
Crocodile	4	Mafungausi crossing point	March, 2013	4	Threat to humans	Controlled by killing	1
Baboon	5	Kalombo Village	March, 2013	4	Destroying maize crop	Scared using fireworks/live ammunitions	0
Elephant	9	Chijata village	April, 2013	5	Threat to humans	Scared using fireworks/live ammunitions	0

Crocodile	3	Mafungausi crossing point	April, 2013	3	Threat to humans	Hunted but not seen/Controlled by killing	1
Baboon	6	Chijata Village	April, 2013	4	Destroying maize crop	Blasting	0
Hippo	5	Katuma village, Mupinga Village	Jun, 2013	5	Crop damage	Scared using fireworks/Live ammunitions	0
Elephant	11	Mugulamano Village, Maunda village	Aug, 2013	7	Destroying foodstore/ Crop damage/ Threat to humans	Scared using fireworks/live ammunitions	0
Hippo	6	Chiyaba village Gota-Gota village Kanyenze Village Mufurusa village Katuma village	Aug, 2013	4	Crop damage/ Threat to humans	Blasting/Assessment/ Scaring using fireworks and live ammunitions	0
Hippo	5	Katuma village Kusemwa village, Maunda village, Chiyaba village, Kalipano village	Sep, 2013	3	Crop damage	Scared using fireworks/live ammunitions	0
Buffalo	1	Maunda Village	Sep, 2013	1	Wounded by wire snare	Controlled by killing	1
Hippo	6	Katuma village Mupinga Village Kusemwa village, Chiyaba village, gundudza village, Kalipano village	Oct, 2013	5	Crop damage	Scared using fireworks/Live ammunitions	0

Elephant	7	Muyanje village Kusemwa village, Maunda village, Chiyaba village, Mugulamano	Nov, 2013	5	Threat to humans	Scared using fireworks/live ammunitions	0
Hippo	5	Kusemwa village, Maunda village, Chiyaba village, gundudza village, Kalipano village	Nov, 2013	3	Crop damage	Scared using fireworks/live ammunitions	0
Buffalo	1	Kandoko Village	Nov, 2013	1	Killed a person	Controlled by killing	1
Elephant	7	Mudzama village/Gundudza village/Mugulama no village/Chilimang a village	Dec, 2013	5	Threat to humans/ Crop damage	Scared using fireworks/live ammunitions	0
Hippo	6	Malabanyika village/ Katuma village Kusemwa village, Maunda village, Chiyaba village,	Dec, 2013	4	Crop damage	Scared using fireworks/live ammunitions	0
Lion	3	ZamBeef farm	Dec, 2013	3	Threat to humans	Hunted but not found	0
Total	141			107			6

## **2.3 ASIA**

In India, traditions and cultural/religious attitudes towards wild animals make local people more tolerant towards wildlife, despite the damage to crops and livestock it causes. Orthodox Hindus for instance consider monkeys to be sacred animals, to be revered and protected. This religious belief and traditional attachment to monkeys greatly influences people's perception of the conflict, resulting in its partial acceptance (Imam and Malik, 2000).

The general reverence towards plants and animals in some Indian regions has often been reported to be the main reason for people not persecuting large carnivores and a positive attitude towards wildlife and nature reserves, (Madhusudan,2003;Sekhar,1998;Mishra *et al.*,2003;Vijayan and Pati,2000),as the research below demonstrates:

### **2.3.1 Snow Leopard Conflict in India and Mongolia [Snow leopard (*Uncia uncia*), endangered; Tibetan wolf (*Canis lupus chanku*), vulnerable]**

In the Indian state of Himachal Pradesh, around Kibber Wildlife Sanctuary, despite the fact that conflict among agro-pastoralists and wildlife is increasing in relation to the growing livestock population, villagers have not resorted to killing the main source of the problem: the snow leopard. In 1995, wild carnivores killed 18% of the total livestock holding. Almost all the deaths were caused by the snow leopard, which is not persecuted. However, retaliatory action is performed against the Tibetan wolf, whose pups were reported to have been captured and killed almost every year in the 1980s (Mishra,1997).Nevertheless, such a response has been reported elsewhere. In Mongolia where encounters with snow leopard and wolf are common and losses economically serious, the pastoralists retaliate by killing and persecuting both species (Mishra *et al.*, 2003).

### **2.3.2 Lion and Leopard Conflict in India [Asian lion (*Panthera leo persica*) critically endangered; Leopard (*Panthera pardus*), endangered]**

In India, in the state of Gujarat, in the proximity of Gir National Park and Sanctuary, the Asian lion (*Panthera leo persica*) and leopard (*Panthera pardus*) use the extensive plantations of sugarcane and mango to find shelter and water and to hunt prey such as buffaloes, cows, pigs and dogs.

Several lions are reported to have strayed outside the park boundary and into plantations for more than a week, while leopards have chosen it as permanent habitat and even breed in cultivated fields bordering the edge of the park (Vijayan and Pati, 2002).

Once again, the overlapping of wild animals' home ranges with human settlements has resulted in cattle depredation and attacks on farmers and laborers. The problem in this area is of similar nature to the others described above: the safety of rural people is threatened, livestock depredation is common and the overall ability to address the conflict is weak.

The following case illustrates a situation where integrated wildlife habitat conservation and rural community development has played an important role in reducing the pressure of indigenous people on elephant habitats.

### **2.3.3 Asian Elephant Conflict in China [Asian elephant (*Elephas maximus*), endangered]**

In the mountain area of Simao, China, in proximity to Xishuang Banna Nature Reserve, a group of 19-24 Asian elephants is responsible for large-scale crop and property damage. The conflict arises from the degradation and fragmentation of the elephant's habitat, the evergreen forest, which at present sustains only a few plant species that the elephants rely on. As a consequence of natural food shortages, the elephants forage on food crops such as wheat, rice, banana and bamboo.

In 2000, rural inhabitants claimed that elephant damage encountered for 28% to 48% of the community's annual income and the total economic losses between 1996 and 1999 amounted to US\$ 314,600.

In this context, the International Fund for Animal Welfare (IFAW) implemented an elephant habitat conservation and local community development project aimed at enhancing the coexistence of indigenous people and wildlife. The project entailed micro-credit loans, environmental education, and dissemination of alternative farming techniques, human safety awareness and habitat conservation.

At completion of the pilot phase, the loans had been paid back; indigenous people had shifted to alternative farming and reduced the pressure on forests, while better tolerating elephants' damage (Zang and Wang, 2003).

Tigers and Asian elephants are a principal source of conflict in much of Asia (Nyhus & Tilson, 2004a) and, as the following research confirms, have a consistent impact on the livelihoods of local populations.

### **2.3.4 Tiger and Asian elephant Conflict in India [Tigers (*Panthera tigris*), endangered; Asian elephants (*Elephas maximus*), endangered]**

In the Southern Indian state of Karnataka, the Bhadra Tiger Reserve hosts a large number of mammalian fauna as well as a population of 3,000 people. Data collection and surveys performed in the region between 1996 and 1999 provided evidence of resident villagers suffering from a high level of economic impact due to HWC. The overall annual loss due to large feline (tigers and leopards) depredation is reported to be approximately 12% of the total family livestock holding, which is equivalent to 16% of the average annual household income in the region. An interesting detail is that although large carnivores had a considerable negative impact on the cattle population, the villages over compensated the loss with purchases. Besides, elephant damage to crops accounted for an average loss of 14% of the total annual production (0.82 tonnes per family), in monetary terms is equal to 30% of the average annual household income in the region (Madhusudan, 2003).

A very interesting study has been carried out by Nyphus and Tilson (2004b), who characterized the extent, distribution and impact of the human-tiger conflict in Sumatra, by means of analyzing data on incidents that occurred throughout the island over a 20 year period.

### **2.3.5 Tiger Conflict in Sumatra [Sumatran tiger (*Panthera tigris sumatrae*), critically endangered]**

Nyphus and Tilson's study revealed that the tiger conflict is more common in intermediate disturbance zones such as isolated human settlements surrounded by extensive tiger habitat than in high and low disturbance zones. In fact, as the authors underline, the overlap between tigers and humans is less common in logged, degraded and heavily used areas, or in protected forests such as in the Way Kambas National Park, where tigers are unable to leave the forest and human access is discouraged by natural barriers and the presence of forestry guards. However, this lack of conflict seems to be an exception in Sumatra, as numerous reports of attacks by tigers have been recorded around different national parks where a spatial separation is not assured by natural barriers: Gunung Leuser, Bukit Barisan Selatan, Berbak, Kerinci, and Bukit Tigapuluh (Nyphus and Tilson, 2004a). The same authors conclude that priority should be given to large carnivore conflict around reserve borders and in buffer zones around protected zones that are playing an increasingly important role in the conservation of species like tigers.

The selection of cases from Asia will be concluded by the following case study, which provides well-defined figures on the economic losses faced by rural populations in Northern India. It has been included in the collection because it gives evidence in support of the opinion

that losses can vary according to the type of crop cultivated and the distance from a protected area.

### **2.3.6 Wildlife Conflict in India [Tigers (*Panthera tigris*), endangered; Leopard (*Panthera pardus*), endangered]**

In the Indian state of Rajasthan, the Sariska Tiger Reserve supports a population of about 107,770 people distributed in 117 villages, which are located in and around the protected area. The study quantifies the cost of living in close proximity to a nature reserve and estimates the extent of crop and livestock losses, given that agriculture and livestock keeping are the main economic activities.

Many species of wild herbivores are blamed for crop raiding in this region: Nilgai (*Boselaphus tragocamelus*) and wild boar (*Sus scrofa*) are reported to be responsible for at least 50% of the damage, while other species as sambar (*Cervus unicolor*), chital (*Axis axis*), common langur (*Presbytis entellus*), rhesus monkey (*Macaca mulatta*) and parakeets (*Psittacula krameri*) accounted for the rest. Nilgai usually raids crops in the evening and tends to favour the degraded edges of forest villages. Wild boar instead, acts at night, while other ungulates such as sambar and chital are usually confined to forest cores. The data on crop damage relevant from 1996-1997 revealed that the annual crop losses varied according to the type of crop grown, in fact the annual loss for chickpeas (*Cicer arietinum*) 10-27% per hectare (ha), maize (*Zea mays*) 12-24% per ha and mustard (*Brassica campestris*) 10-27% were higher than for wheat (*Triticum aestivum*) 6-14% per ha and pearl millet (*Pennisetum typhoideum*) 6-15% per ha. The percentages ranged so broadly because the distance between the reserve border and the household surveyed varied from 0 to 3 Km and in general the depredation increased with closer proximity to the reserve. In monetary terms, the annual average value of crop losses in that period of time, corresponded to 3,280 Indian Rupees(Rs)(US\$ 91)per household located inside the reserve, and Rs.2,430(US\$ 67) per household located 2.5 Km away(Sekhar,1998).

Among wild carnivores, the main livestock predators were reported to be tigers and leopards, with the former preying on large domestic animals such as cattle and buffaloes and the latter on smaller animals like goats, sheep and calves. Tigers were reported to be a major threat in villages located inside and close to the reserve; leopards instead, avoided competition with tigers and frequented areas further outside the villages. The calculation of the economic impact was based on domestic animal prices provided by those agro-pastoralists interviewed

during the survey, which revealed that between 1994 and 1996, the annual family loss amounted to Rs.270-610(US\$ 7-17).This is much less than crop losses and is certainly enhanced by the villagers taking their domestic animals into the reserve for grazing throughout the year (Sekhar, 1998).

## **2.4 SOUTH AMERICA**

A positive correlation between distance from a protected area and level of wildlife damage has been previously noted (Sekhar, 1998); in this regard the case study below is of additional interest and confirms this relationship.

### **2.4.1 Wildlife conflict in Peru [Brazilian tapir (*Tapirus terrestris*) vulnerable]**

In Peru, in the Amazon Province of Tambopata, a population of 3,200 people live inside the northern border of the 1.5 million ha protected area of Tambopata-Candamo Reserve. The villagers are engaged in different activities such as slash-and-burn agriculture, fishing, hunting and logging and as a result they experience a certain level of conflict with wildlife. The principal wild herbivores responsible for the damage are the Brazilian tapir (*Tapirus terrestris*), tayra (*Eira barbara*) and capybara (*Hydrochaeris hydrochaeris*); less harmful, but very frequent visitors are the collared peccary (*Tayassu tajacu*), paca (*Agouti paca*) and brown agouti (*Dasyprocta variegata*).Among predators ocelot (*Leopardus pardalis*), hawks (*Accipiter* spp., *Leucopternis* spp.), jaguars (*Panthera onca*) and pumas (*Puma concolor*) were blamed for causing most of the depredation (Naughton-Treves *et al.*, 2003).

During July 1998 and January 2000, the average value of crop loss per planting season was US\$ 13, while the annual reported loss was, respectively, US\$ 45 and US\$ 148 for livestock attacks by small and large carnivores. These figures represent only a rough calculation of the total losses, because those farmers living in remote areas suffered a consistent level of impact compared to farmers neighbouring degraded habitats. This is due to the fact that the largest animal species are often the most devastating species, as they thrive in undisturbed habitats, and encroach onto adjacent agricultural lands. However, farmers living in remote forests managed to compensate their losses with bush meat gains. Unfortunately hunting big game in degraded habitats was not rewarding enough as anthropogenic activities have reduced the biomass and diversity of wild animals. This demonstrates that conflict occurs at a negligible level in more degraded agro-forest habitats (Naughton-Treves *et al.*, 2003).

## **2.5 NORTH AMERICA**

Competition between humans and wolves for ungulates is an ancient struggle originating in hunter societies (Musiani et al., 2003) and nowadays continuing where livestock is raised for household and commercial income.

### **2.5.1 Wolf Conflict in Canada and USA**

In Alberta, Canada, over a period of 14 years(1982-1996) wolves(*Canis lupus*) caused 2,086 deaths among domestic animals, mainly cattle and to a lesser extent dogs, horses, sheep, chickens, bison, goats, geese and turkeys. In Idaho, Montana and Wyoming (USA), during a similar time period (1987-2001) wolves killed fewer animals (728), which mainly consisted of sheep and cattle.

Interestingly, in both countries there is a positive correlation between the number of domestic animals killed each year and the number of wolves eliminated by government authorities. However human tolerance was greater in the United States where 14 wolves were killed for every 100 livestock deaths, compared to Canada where the ratio was 38/100(Musiani *et al.*, 2003).

## **2.6 EUROPE**

The following case demonstrates that predator problems could be greatly reduced with simple foresight and common sense such as livestock protection at grazing areas or in a predator's habitat.

### **2.6.1 Wolf Conflict in Italy**

Predation of domestic livestock by the wolf (*Canis lupus*) is a problem in some parts of the Abruzzo region in Italy, where the rural economy is characterized by small-scale farming and cattle, sheep, goats and horses are the main stock-rearing activities. Despite both wolves and bears (*Ursus arctos*) being present in the area, wolves are alleged to cause most of the killings (94%). Notably the majority of sheep and goats (68.7%) horses (76.7%) and cattle (73.5%) that fall prey when grazing in proximity to shrub or woodland cover. Particular, a significant proportion of the attacks (13%) took place when the animals were lost or drawn away from the main grazing route. Obviously, a great proportion of the losses in Abruzzo occur at pasture and pastoralists' vulnerability is associated with their inability to keep predators away from herded animals.

Little attention has been paid to the socio-economic dimension, in which the conflict happens and the amount for economic losses relative to the average family's income is not known (Cozza *et al.*1996).

## **2.7 MIDDLE EAST**

The following research demonstrates that the increased food availability from agricultural production and illegal refuse dumps can disturb ecological equilibriums through maintenance of a large predator population above a habitat's natural carrying capacity.

### **2.7.1 Golden Jackal Conflict in Israel**

In Israel, a third of the Golan grassland plateau is managed as pasture for grazing cattle and it is inhabited by farmers who produce cereals, fruits, turkeys, hens and dairy products. The farmers claim to loss an average of 1.5-1.9% of the calves born each year to golden jackal (*Canis aureus*) predation. The economic value of the total cattle losses in 1993 was estimated to be about US\$ 42,000 (Yom and Tom, 1995). This high predation rate is actually indirectly caused by the farmers themselves, through the illegal dumping of domestic animal carcasses, a primary source of food for the jackals, whose population has in turn thrived and augmented. As a matter of fact, in the decade 1978-1988, the number of jackals increased from a density of 0.2/Km<sup>2</sup> to 2.5 Km<sup>2</sup> and the current amount of meat dumped by farms is calculated to be enough to support a population density of 3.8/Km<sup>2</sup> predators. This means that the conflict is expected to escalate if illegal waste dumping is not prohibited and the predator population is not controlled (Yom-Tom, 1995).

## **2.8 MANAGEMENT OF CONFLICT SITUATIONS AND DIFFERENT APPROACHES: LOCAL SOLUTIONS WITH GLOBAL APPLICATION**

Considering the actual population growth rate of humans, increasing demand for natural resources and the growing pressure for access to land, it is clear that the human wildlife conflict will not be eradicated in the near future, however it needs to be managed urgently. A wide range of different management tools has been developed worldwide to address HWC, but most of these are strongly site and species/genera specific and are not widely or easily accessible (IUCN, World Park Congress 2003).

This section gives an overview of some of the most common management practices, describing their applications, examining how the methods were tested, highlighting lessons learned and successful local solutions, which could be replicated under similar conditions.

To better understand why many different remedial measures have been developed around the world but have not been implemented globally, it is essential to underscore that although the management strategies have similar goals, they are embedded in different ecological, social, cultural and economic realities; they are also targeted towards different taxonomic groups. Mitigative strategies attempt to reduce the level of impact and lessen the problem; while preventative strategies endeavor to prevent the conflict occurring in the first place and take action towards addressing its root causes. Some are efficient in the short-term while others show results only in the long-term; others are more effective within defined geographic regions or specific taxonomic groups. For each of the strategies listed below, a brief description is provided, detailing information on the species involved in the scheme, the geographical region and whether the strategy has been successful or unsuccessful. In some sections proposed potential improvements have been highlighted, as well as strengths and weaknesses.

## **2.8.1 PREVENTIVE STRATEGIES**

### **2.8.1.1 Artificial and Natural Barriers (physical and biological)**

Barriers have the function of preventing spatial overlapping among wild animals and local communities; they are usually man-made, but natural barriers such as rivers, coasts or mountain ranges may occur along a nature reserve boundary. Spatial separation has been proved to be a successful strategy when physical barriers enclose a large reserve (Nyphus and Tilson 2004b), for example, recorded limited tiger conflict around the Way Kambas National Park in Sumatra, owing to the presence of rivers along more than two-thirds of the park's boundary, which discouraged tigers from leaving the park, Polisar *et al.*, (2003), in suggesting how to promote coexistence of jaguars and pumas with cattle in Venezuela, advised on excluding cattle from the forest and maintaining adequate distance between calving areas and the big cats' territory.

However, spatial separation is not always a satisfactory solution; in India, for instance, in the state of Gujarat, chain link fencing of the eastern boundary of Gir National Park was expected to stop lions and leopards from straying out of the park and to prevent illegal grazing at the same time. Instead, it was proved not to be economically viable and was only partially successful. In the same area, other types of barriers are under experimentation, such as rubble walls and barbed wire fencing, which have been constructed along some sections of the reserve's boundary (Vijayan and Pati, 2002).

Some concern about the negative impacts of physical barriers on the ecological equilibrium of the region has been expressed by different authors, Vijayan and Pati (2002), Sekhar (1998), Hoare (1992) point out that fencing reserves may affect the population dynamics of animals and hinder their natural migratory and dispersal behaviour, especially in the case of highly territorial species like lions. It is also essential to take into consideration the different, unexpected effects that fencing may have on a wide range of non-target species.

Another option is the construction of physical barriers in human settlements to protect crop fields and livestock, while defining properties and gathering farm animals. Fencing homestead areas instead of an entire reserve boundary is not only less expensive, but allows greater wildlife dispersal. Farmers often build pens which are small enclosures with 1.5-1.8m high walls with no ceiling. They can be walls made from different materials such as stone, mud, brushwood, or high rubble, barbed wire or mesh-wire fences. The type of fence depends on locally available materials, as the farmers generally use local products.

A remarkable study was undertaken by Ogada *et al.*, (2003) who looked at Eastern African traditional systems of livestock husbandry and explored the effectiveness of various types of fencing. In Northern Kenya, Laikipia District, pastoralists used to gather their herds and keep them inside enclosures at night, when most carnivore attacks take place. They use different traditional techniques, which are popular among Maasai and Samburu local communities. The enclosures can be made of stone or wooden posts (solid), of Acacia brush (acacia), branches woven around cedar Poles (wicker) or made with 10cm wire mesh (wire).

The effectiveness of the different enclosures in defending livestock from predator attacks was investigated; it was discovered that not only did domestic animals experience a lower depredation rate when penned in corals over night, but also that the type of pen was a significant factor associated with a lower total loss for sheep and goats, being kept in wire, acacia, wicker or solid enclosures (listed from the most effective to the least). Good husbandry practices based on traditional approaches demonstrate the ability to limit depredation by large carnivores (Ogada *et al.*, 2003).

Fladry barrier is a technique traditionally used in Eastern Europe and Russia to hunt wolves. It consists of hanging flags from ropes, placed a short distance above the ground and spaced 0.5m apart; nowadays it is employed to protect domestic animals from wolf attacks (Musiani *et al.*, 2003). To evaluate the potential ability of fladry barriers in deterring wild wolves from livestock depredation, the authors conducted field and captivity experiments in Western North

America: Idaho, Montana, Wyoming (USA) and Canada. They documented the avoidance of fladry by wolves for a period of two months and demonstrated its capacity to impede the natural foraging behaviour of wolves. These findings confirm that wolves fear the fladry and do not attempt to access food sources located on the other side of the barrier.

However, concern is expressed on the practical aspects of applying fladry over a large-scale because of the maintenance required to reposition wrapped flags and to substitute flags that have been removed by cattle. Besides, it is suspected that other external variables, such as habituation or an extended period of food deprivation due to lack of alternative prey, could induce wolves to cross the barrier. To conclude, this anti-predator technique is advantageous only for managing wolf predation risk and it has never been successfully employed with other species. As Shivik *et al.*, (2003), demonstrated with an experiment in a wolf territory in Wisconsin (USA), fladry barriers (red flagging strips of 1m by 1.7cm) had limited success in deterring wolves and no effect with other big predators such as black bears (*Ursus maritimus*) and bald eagles (*Haliaeetus leucocephalus*).

Alternative barriers have been sought, for instance planted hedgerows of various spiny cacti and moat. Plant hedges have the positive aspects of being a low cost solution and are effective with both carnivores and ungulates. On the other hand, they are very slow to establish, do not deter baboons and elephants and are often made of exotic species, which can spread uncontrollably, (Hoare, 1992).

It is clear that physical barriers are not always an economical management practice. They frequently require additional labour from farmers and their family members and never ensure complete protection. The reason for this failure can be explained by the behaviour of different animal species. Burrowing animals for instance, breach the barrier and permit access to other species, as Hoare (1992) mentions, lions can use holes that have been dug by warthogs (*Phacochoerus spp.*). In Rajasthan, India, where stone wall, mud and brushwood fences were constructed, farmers claimed that nilgai (*Boselaphus tragocamelus*) could easily jump over the fence of 1.5m in height and wild boar (*Sus scrofa*) were able to dig beneath them to get into fields (Sekhar, 1998).

In Zimbabwe, in the areas of land neighbouring the Wildlife Research Area, the conflict is serious, despite the reserve being fenced and livestock being penned into fortified enclosures at night. This is because baboons, lions and leopards can pass through the reserve fence and jump into the enclosures. Improving fences with the addition of a roof would substantially

reduce the economic losses (Butler, 2000). In fact the simple act of improving defenses against predators can make a substantial difference in rural livelihoods; in India, for instance, in the state of Himachal Pradesh, farmers have covered their livestock pens with chain-link fences and reported that this chain-link ceiling is one of the anti-predator management techniques that is significantly reducing livestock kills inside rural villages (Mishra, 1997).

In addition to these conventional types, electric fencing can be considered as a more sophisticated solution. It is more durable, due to the reduced physical pressure from animals; it deters a wider range of species and is more aesthetically appealing. However, the cost of installation is higher compared to the simple fences and the maintenance implies a need for constant insulation (Hoare, 1992).

In Kenya, in Endarasha and Ol Moran villages located in Nyeri and Laikipia Districts, electric fencing is successfully being used to separate wildlife from human settlements and agricultural areas (Kenya Wildlife Service, 1996). In Namibia in the east Caprivi Region, electric fencing is an effective strategy in reducing the human-elephant conflict on a large-scale. Electric fencing has proved to be the only long-term deterrent to elephants. In fact an entire village of 31 farms was successfully protected during the first year of experimentation, in spite of close proximity to a national park and a high density of elephants. Despite the high cost of maintenance and installation, it was demonstrated that electric fencing is cost-effective to the community by means of reduced elephant attacks, which in turn resulted in crop increases and an increased income for farmers. It is anticipated that it will take four years for a return on investment to be realized (O'Connell-Rodwell *et al.*, 2000).

In conclusion, all the barriers discussed above have some limitations as they cannot deter every single species of animal and they can be breached by particularly strong or agile target species.

However, they are an optional technique for mitigating the conflict and must be used in conjunction with other approaches preventing transgression (Treves and Karanth, 2003b).

#### **2.8.1.2 Guarding**

Monitoring herds and active defense are essential features of animal husbandry in East Africa, where human herders are effective and fearless in warding off predators. In this region, herders are reported to challenge and scare away dangerous carnivores such as lions, hyenas

and cheetahs with nothing more than simple weapons like spears, knives or firearms (Patterson *et al.*, 2004).

Northern Kenya, the presence of human guards, dogs and human activity were associated with lower rates of livestock attacks by large predators (Ogada *et al.*, 2003).

Guarding is also a popular preventative strategy in some parts of India as a study in the Sariska Tiger Reserve, Rajasthan, demonstrates. In this region, the majority of the farmers ranked guarding as the most efficient and common measure to protect their crops, despite requiring additional labour at night (Sekhar, 1998). According to Treves and Karanth (2003b), the utilization of domestic guard dogs appear to be a successful strategy for managing predation risk from coyotes, black bears (*Ursus maritimus*) and even cheetahs, but less effective with wolves and grizzly bears (*Ursus arctos*). Although the effectiveness of this defence practice is dependent on humans also being present to ensure that the dogs remain with the livestock. In North America dogs are often left alone to safeguard domestic animals and are not as effective as in Europe and North Asia where shepherds and ranchers work directly with their dogs (Musiani *et al.*, 2003).

#### **2.8.1.3 Alternative High-cost Livestock Husbandry Practices**

Movement activated guard (MAG) devices and electronic training collars (EC) are deterrent systems based on aversive stimuli, they are very high-cost and cutting edge techniques. The first one relies on disrupting a predator's attack through stimuli that disturb the animal's normal behaviour; these stimuli can be gustatory (chemical), visual (light), olfactory or auditory (siren) and are activated by the animal approaching protected resources. In order to reduce the ability of wild animals becoming accustomed to the device, it is usually equipped with a variety of different recorded sounds and other alternative responses; however its usefulness is still limited because, over time, animals can become accustomed to the disruptive stimuli (Shivik *et al.*, 2003). The second device relies on an animal's ability to learn and it causes discomfort, pain or other negative experiences when the animal enters human settlements or livestock areas. The device becomes effective when the animal learns to associate the occurrence of a negative stimulus with a particular behaviour (Shivik *et al.*, 2003).

The effectiveness of these two disruptive stimuli approaches was tested in a multi-predator area in Wisconsin and also on captive wolves in Minnesota. The MAG device used a strobe

light and recorded sound effects including yelling, gunfire and helicopters. It was activated by the movement of proximal, large animals. The EC device was instead activated by wires buried underneath the perimeter of the area to be protected. It was found that, in the field, the MAG device reduced the daily consumption of carcass by wolves, black bears (*Ursus americanus*) and bald eagles (*Haliaeetus leucocephalus*) by 68%, while the consumptive behaviour of captive wolves was effectively controlled by MAG but not by EC. The latter device was difficult to use with wolves, because of their unpredictability in terms of response; some wolves were disturbed by the stimulus and ran away while others found it mildly annoying and continued in their activity. Moreover, the EC device entails some logistical, animal care and maintenance problems. In conclusion, the experiment demonstrated that the MAG device gives a greater degree of protection, is easier to manage and has a wide-scale potential application, providing the stimuli is varied and random (Shivik *et al.*, 2003).

It is clear that high-technology devices are much more expensive and complicated to use than the traditional management options discussed up until now. In addition, supplementary research is needed to better define the long-term potential contribution of high-technology devices to husbandry practices.

#### **2.8.1.4 Relocation: Voluntary Human Population Resettlement**

Where alternative land and incentives are available, relocation of local communities to areas offering better access to natural resources and socio-economic opportunities can be an adequate solution to HWC (Madhusudan, 2003). In fact, resettlement scheme aiming to prevent the overlap between wildlife and people, can be successful in the long run if some essential assumptions are met: firstly, the villagers should gain substantial benefits, such as better access to resources, secondly, they should be relocated to an area where the risk of losing property is lower and thirdly, they should not face any political, social and cultural opposition (Treves and Karanth, 2003b).

#### **2.8.1.5 Waste Management Systems that Restrict Wildlife Access to Refuse**

Good standards of waste management are important to avoid attracting wild animals to human settlements and to prevent wild populations being augmented and artificially sustained by human induced food availability. Each stage of waste handling should be addressed, from collection to transportation to disposal.

## 2.8.2 MITIGATIVE STRATEGIES

### 2.8.2.1 Compensation Systems

HWC carries significant economic costs to humans and compensation is a measure which aims to alleviate conflict by reimbursing people for their losses. Compensation systems rely on giving out monetary payments or licenses to exploit natural resources, allowing the hunting of game or the collection of fuel wood, timber and fodder from inside protected areas. Of the two methods, financial compensation is a very contentious issue and the least popular due to its inefficiency and low rate of reimbursement. This is a reality in many developing countries, which face budget constraints and usually pay on an irregular basis and to a limited extent. The second compensation scheme, also known as the “settlement of rights” to use natural resources, appears to be a more practical solution, as the following case studies demonstrate.

In India, in the state of Karnataka, financial compensation schemes are not very effective. The process of claiming compensation and the verification and approval procedures are very bureaucratic and often result in only a small portion of the claims being paid. In a survey undertaken between 1996 and 1999 an overall 11% of the total claims for livestock depredation and 26% for crop losses were refunded. Secondly, the reimbursement can take up to 6 months to be released and usually undervalues the losses, covering an average of 5% of the total loss claimed for livestock kills and 14% for crop damage (Madhusudan, 2003).

Such problems have been reported elsewhere in India, in particular in the state of Himachal Pradesh, where people are discouraged from claiming compensation because of the time and costs involved in the process. In this region, in 1995, economic losses were again marginally compensated: in that year, only half of the agro-pastoralists claiming compensation for losses from snow leopard attacks received monetary reimbursement, which covered only 3% of the total annual loss (Mishra, 1997).

In Kenya, compensation schemes are very problematic. The government has not provided any reimbursement for crop and livestock losses since 1989 and it neither replaces nor repairs any installations that are destroyed by wild animals. Moreover, the compensation received for loss of human life or injury is not sufficient to cover funeral expenses or hospital bills. It also does not take into consideration the impact of such incidents on dependent children who are often taken out of school because of the lack of funds to pay their fees (Kenya Wildlife Service, 1996).

Obviously, this type of compensation scheme can do little to reduce the HWC and needs to be modernized in order to become less bureaucratic, more reactive and transparent. The calculation of the amount of cash to be reimbursed should be proportional to the loss, the number of family dependants, their school fees, and hospital and burial costs (Kenya Wildlife Service, 1996).

However, there is some concern about improving and enforcing this system because it is suspected that a well-developed compensation scheme would result in inflated claims and attract people from outside the affected areas thus increasing the pressure and the problem (Sekhar, 1998). In addition, this is not a sustainable solution as it depends heavily on the final budget of the local governing bodies and it does not encourage villagers to protect their holdings and to coexist with wild animals.

An alternative approach, the “settlement of rights”, appears to be a better strategy. It fixes a quota of commodities that can be exploited, it clearly demarcates reserve zones that are accessible to local villagers and it legitimizes their rights to those resources. Indeed, the benefits derived from the legitimate collection of natural resources influence the attitudes and perceptions of rural residents towards wildlife and conservation, while promoting responsibility and awareness (Sekhar, 1998).

#### **2.8.2.2 Insurance Programmes**

Livestock and crop insurance is often proposed as an innovative solution to mitigating the impact of HWC, but it is yet to be experimented broadly. It covers crops and livestock from the risk of wildlife attacks and involves the villagers and local governing bodies paying a premium share of the insurance and allows rural inhabitants to make a minimum annual cost and to be refunded in the event of crop or livestock losses. In addition, the local governing bodies or the forest department are relieved of significant financial expenses, from not having to administer compensation schemes (Madhusudan, 2003).

Despite the fact that this approach has not yet been experimented over a large scale, a collaborative insurance programme is in progress in the state of Himachal Pradesh, India, where it seems to be implemented successfully. In fact, villagers contribute monthly to the insurance programme and receive compensation in proportion to the total number of livestock killed and the total amount paid into the insurance fund during the year. Moreover, they get monetary rewards for better ant predatory herding and have learned simple rules to reduce

domestic animal vulnerability, such as being aware of sick, young or pregnant animals and not to collect the carcasses of killed yaks, horses, cattle or donkeys. As a result they have become progressively more responsible in safeguarding wildlife and have modified their husbandry and guarding behaviour (Mishra *et al.*, 2003).

#### **2.8.2.3 Incentive Programmes**

Incentive programmes are based on subsidies. They offset the cost of conservation and demand the adoption of conservation-friendly practices, creating tolerance towards wildlife through the exchange of benefits.

Two interesting incentive programmes have been developed in India and Mongolia, where agro pastoralists and pastoralists live within the snow leopard's territory (Mishra *et al.*, 2003). In India in the state of Himachal Pradesh, the programme succeeded in reducing the forage overlap among wild herbivores and livestock through the clearance of an area of 500 ha from livestock grazing and other human use. The villagers received financial benefits for their loss of herding land and the money was used for collective work. As a consequence, wild herbivore densities increased, resulting in more naturally available prey for predators and thus reducing the pressure of carnivores on livestock (Mishra *et al.*, 2003).

In Mongolia, the programme did not permit pastoralists to poach the snow leopard and its prey. The loss of income from poaching was offset by the sale of wool handicrafts, made by the women, to the Snow Leopard Enterprises. Income generation from handicrafts is growing in popularity because families have been able to increase their monthly per capita income by 25%. The programme itself is expected to grow rapidly, also because marketing opportunities for the handicrafts are opening.

However one weakness of the incentives programme is the need for subsidies from external sources, from either conservation funds or governments (Mishra *et al.*, 2003).

#### **2.8.2.4 Community Based Natural Resource Management Schemes (CBNRMS)**

A CBNRMS has been established in the Caprivi region of Namibia, where the eco-tourism industry and hunting concessions are potentially valuable for developing a local economy based on wildlife related revenues. This scheme entails a system of returning benefits to rural communities in order to motivate them to protect wildlife outside protected areas and to

discourage poaching; it is still at an early stage, but it is expected to have a real potential in mitigating the conflict (O'Connell-Rodwell *et al.*, 2000).

#### **2.8.2.5 Regulated Harvest**

In many regions, HWC is managed by hunting. This is a low cost technique and has the potential to raise public tolerance towards wildlife. The money raised from the sale of licenses can fund conservation activities and the protection of human settlement (Treves and Karanth, 2003b). To be viewed as a legitimate management practice, hunting needs to be based on scientific monitoring that ensures sustainable harvests and it needs to be regulated by policies that address the timing, location and methods of hunting, as well as the distribution of benefits to all stakeholders. In reality, lethal control is considered to be an expedient to satisfy the aggrieved party and reasons for scientific skepticism are due to the lack of selection of target animals to be eliminated. As a result the individual animals killed are often not responsible for depredation and after their removal other individuals can cause trouble in the same location. It is assumed that regulated harvest is not effective in reducing crop and livestock losses and it is also likely to increase the risk of further losses when dangerous carnivores are wounded instead of being killed (Treves and Karanth, 2003).

#### **2.8.2.6 Wildlife Translocation**

Translocation consists of moving a certain number of animals from a problematic zone to a new site. In spite of seeming to be the least sensible of the solutions listed above and the risk of exporting the problem to another site, it may be a practical and acceptable approach in some cases and where there is the availability of a suitable habitat with territorial vacancies. Translocation works well when isolated individuals are unable to survive or reproduce because they are too distant from the main population and need to be moved back to their own group; or when a high density population needs to be reduced through the relocation of individuals (Treves and Karanth, 2003).

An interesting case study is from Northern India where about 260,000 rhesus monkeys (*Macaca mulatta*) live in areas of human settlement and translocation has been reported to be the best nondestructive control measure. In the state of Uttar Pradesh, Vrindaban, where the density of rhesus monkeys was extremely high (304 individual per square kilometer), their presence caused a serious nuisance to inhabitants. They reported suffering from monkeys biting, stealing, damaging and destroying property, such as cars, gardens, house furnishings,

television antennas and electric Poles. In 1997, 600 rhesus monkeys were moved from the urban area of Vrindaban to eight different semi-natural patches. Their density was reduced by 45% of the total original population and this reduced the conflict. The programme was successful as the monkeys that had been moved did not show any sign of stress and the villagers and their spiritual leaders in the site that received the monkeys accepted and tolerated their presence. Moreover, after four years the translocation took place, the monkey population in Vrindaban remained low and the conflict were resolved (Imam and Malik, 2002).

In spite of this successful programme, translocation can cause numerous problems in the case of carnivores, for example translocation into areas already occupied by individuals of the same species can lead to aggression and infanticide and a much higher death rate (Treves and Karanth, 2003b).

In most cases the conflict cannot be avoided and translocation does not seem to be an immediate and straightforward solution. However, it is encouraging that the conflict can be minimized through good management practices and housekeeping principles, such as livestock protection at night, property guarding or avoidance of a predator's home territory. It is also reassuring that some of the successful measures involve low technology tools and low cost approaches such as pens with chain link ceilings, man-made salt ponds, fladry barriers and insurance programmes. The strength of this analysis lies in the fact that all the strategies have been tested in the field and their evaluation originates from practical experimentation; the weakness is that it overlooks some management options like chilly crop barriers, fire (fires lit on periphery of fields or smoke from burning) or missiles (stones, spears).

The most sensible approach to addressing HWC is to implement a combination of two different approaches: short-term mitigation tools along with long-term preventative strategies, so as to reduce the current problems while fostering the rapid development and use of innovative approaches to address future issues and eradicate the problem. When low environmental impact strategies and traditional low cost deterrents are not successful, some invasive approaches, such as regulated harvest, wildlife translocation or human relocation may need to be implemented. Among the innovative strategies discussed in this chapter, electric fencing, natural resource use compensation systems, CBNRMS, incentive and insurance programmes seem to be the most sustainable.

Irrespective of the approaches adopted, there is a need to test them against any possible side effects, such as the restriction of an animal's requirements, effects on non-target species and

the environment as a whole and last but not least its cost-effectiveness. The best approach should ensure the participation and involvement of local populations, as their goodwill and support in wildlife conservation plays a crucial role for preventing and mitigating HWC. Co-management by rural villagers, researchers and local governing bodies has proved to be the wisest strategy for nature conservation (Weladji and Tchamba, 2003). A local community's acceptance of the problem is essential, because these case studies suggest that, although HWC can be reduced it will never be fully eliminated.

## **2.9 Summary**

This literature review supports the broadly recognized inference that the human wildlife conflict is escalating and illustrates that it is a worldwide issue, spanning Asia, with elephants destroying agricultural fields, tigers and leopards preying on domestic animals; Africa with numerous carnivores killing cattle and monkeys threatening the food security of rural people; and Europe and North America, with wolves and bears taking livestock and damaging property. The conflict is not restricted to specific geographical regions or climatic conditions but is common to all areas where wildlife and dense human populations have to coexist and share limited resources. The overall picture is very multifaceted: some management practices turned out to be unsustainable (physical barriers around reserve borders), others need to be heavily subsidized (financial compensation system) and others are very costly and complicated devices to use (MAG, EC), which will not be affordable to most individuals in disadvantaged rural communities. Preventive and mitigative strategies on their own seem not to have worked and, hence, the need to supplement them with educational strategies.

## **CHAPTER THREE: DESCRIPTION OF THE STUDY AREA**

### **3.1 Introduction**

This part of the research gives a description of the study area in terms of geographical location and the physical and biological environments. Human-animal conflicts occurs when humans and wild animals share the same landscapes and resources, hence it was important to describe and understand the space (Chiyaba GMA) in which these conflicts took place.

### **3.2 Regional Context of the Lower Zambezi Ecosystem**

The Lower Zambezi Ecosystem (LZE) is located in the South Central part of the Republic of Zambia, 26°45' – 27°57'E, 15°23' – 16°05'S, bordered by the Zambezi River on the south and Muchinga escarpment in the north, the Luangwa and Lukusashi Rivers in the east and the Kafue River on the western border. This vast and mostly mountainous area is approximately 18545 km<sup>2</sup> in size and comprising the following protected areas: Lower Zambezi National Park, Chiyaba GMA, Luano GMA and Lufunsa GMA (ZAWA, 2008 in Tembo 2010). There is also a privately owned conservancy called Lufunsa Ranch which shares borders with the LZNP on the North-western boundary. The Lower Zambezi ecosystem falls in the Kafue, Chongwe and Luangwa Districts of Lusaka Province and half of Luano GMA (Upper Luano) is in Mkushi District of Central Province. The Muchinga and Zambezi escarpments are the most significant physical features besides the three main rivers (Zambezi, Kafue and Luangwa). The Zambezi escarpment has led to the establishment of the Zambezi Biosphere Reserve. The LZE is very rich in wildlife resources, more significantly the impala and elephant are among the most common species in the area. Chiyaba and Lufunsa GMAs have the rare opportunity of elephant hunting because of the healthy population of elephants in the area (ZAWA, 2008 in Tembo 2010). Lufunsa GMA was for a long time known as the cats GMA because of its lion and leopard population and Chiyaba GMA's large herds of elephant and buffalo are a very unique phenomenon. Birdlife is also considerably high and even led to the establishment of Zambesia Ranch in Chiyaba GMA was especially established as a Bird Sanctuary and Luano GMA is also home to the famous and yet rare Zambian Parrot (Bingham, 1998 in Leigh, 2006).

### **3.3 Local Context of Chiyaba Game Management Area**

Chiyaba Game Management Area No.36 was established on 4th December, 1989 through Statutory Instrument No. 67 of 1993 Section 53 Declaration Order of Game Management Areas primarily for the conservation of the abundant and diverse biodiversity of the lower Zambezi valley and the adjoining escarpment. The Chiyaba GMA is located between the Zambezi - Kafue River confluence in the west and that of the Zambezi - Chongwe River confluence to the east. The Chiyaba GMA falls under the Lower Zambezi Area Management Unit (LZAMU), which also administers the Lower Zambezi National Park (LZNP), Luano, and Lufunsa GMAs (Bingham, 1998 in Leigh, 2006).

The GMA covers the entire Chiyaba chiefdom of the Goba people. Chiyaba GMA also forms the western buffer zone for the Lower Zambezi National Park. Part of Chiyaba GMA lies opposite Mana Pools National Park in Zimbabwe. Chiyaba GMA is therefore a very important part of the LZE forming about 13% of the total area and it is very rich in wildlife. Chiyaba GMA is one of the only three GMAs in Zambia where Elephant hunting is conducted. ChiyabaGMA has one of the highest HWC occurrence rates. Chiyaba GMA was also the first place in Zambia where winter maize growing at commercial rate was introduced. At present the GMA has banana plantations, maize farms, paprika estates and tomato gardens all at very large scale (Tembo 2010). According to the last census, Chiyaba GMA had a total population of 5,882 people, 3 107 males and 2 775 females (CSO, 2010).

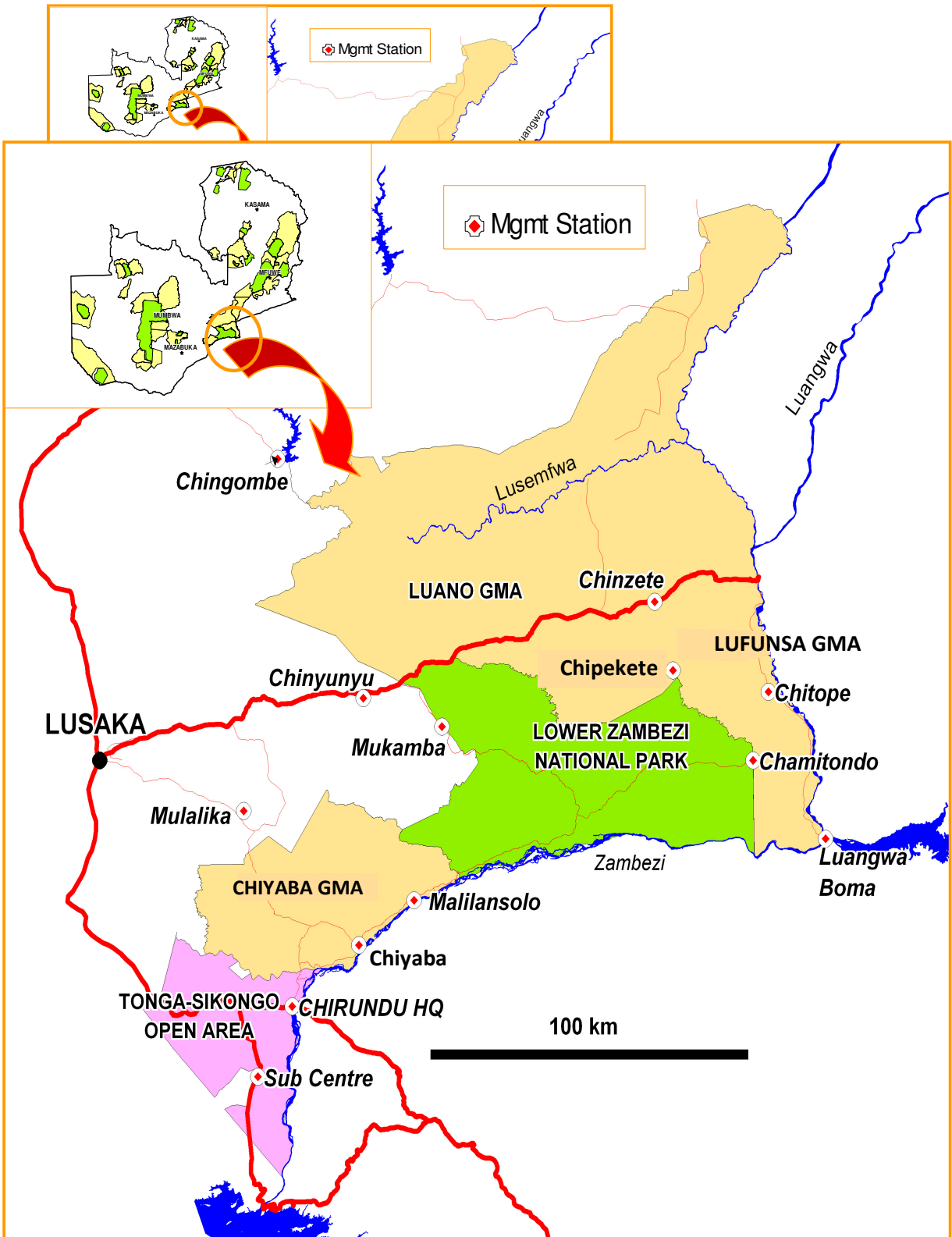
**Table2: Size of the Chiyaba GMA in Relation to Other Protected Areas in the LZAMU**

*Source: Zambia Wildlife Authority 2013, Chirundu*

Protected Area	Gazette Description - km2	GIS - km2	% of Kafue	% of Chongwe	% of Luangwa	% of Mkushi
Lower Zambezi NP	4 092	4 115	0	15	60	0
Chiyaba GMA	2 344	2 413	41	0	0	0
Rufunsa GMA	3 179	3 241	0	14	40	0
Luono GMA	8 930	8 439	0	33	0	25
Totals	18,545	18,208	41	62	100	25

*Figure 1: Location Map for Chiyaba Game Management Area*

Source: Zambia Wildlife Authority, 2013 Chirundu.





and the plateau due to differences in altitude. Mean annual rainfall in the plateau is about 800 mm while that of the valley is 400 mm or less (ZAWA, 2008). Rainfall is often erratic, unevenly spread and generally insufficient for agricultural production. Though the rainfall situation in the valley is generally low, sometimes rainfall intensities are very high and induce excessive soil erosion.

#### **3.4.1.2 Topography**

The main topographical feature of the area is the Zambezi valley. The floor of the valley varies in altitude from 350 m to 640 m above sea level while the escarpment rises up to 1,200 m above sea level. The valley is characterized by terraces of alluvial deposition. Most of the GMA is on high ground and much of this is inaccessible.

#### **3.4.1.3 Drainage**

The drainage pattern appears to be determined by lines of faults. The rugged nature of the ridges, dissected by numerous drainage lines, provides spectacular scenery, which is heightened by panoramic views over the valley floor and Zambezi River. The Zambezi River and two of its tributaries, the Kafue and the Chongwe Rivers form the major drainage of the area.

#### **3.4.1.4 Soils and Geology**

The geology of the Lower Zambezi area comprises a varied suite of rocks of various origins and ages. The youngest rocks are of colluvial materials found in the valley floor. Close to the valley floor are red sandstone, basalt and sandstone all belonging to the Karroo system. A variety of rocks, such as biotite schists, quartzite, meta-quartzite, granite gneisses calci-silicate and carbon rocks, distributed widely in the region, were produced by ancient volcanic activities and metamorphism in the region (Barr, 1971).

In the Musensshi valley are found some isolated intrusive rocks as biotite granite, gabbro, tractolite and derived amphibolite. The varying collection of rocks formed by volcanic intrusions and metamorphism mostly during the pre-Cambrian period gives the mineral wealth characteristic of Lower Zambezi region. Gold was once mined in the Chakwenga valley while a number of other gemstones such as garnet, aquamarine and tourmaline are believed to exist in the Chakwenga and Musensshi river valleys. Both of these river valleys are situated in Lusaka Province east of Chirundu (Barr, 1971).

### 3.4.1.5 Hydrology

The Kafue River is a major tributary in the area accounting for 27% of the Zambezi River basin. The point of confluence is located about 176km up river from where the Zambezi flows into Mozambique. The River is 1,310 km long. The difference in elevation measures 990m and the average riverbed slope is 1/1320. As a major tributary, Lunga River having its basin (24,000 km<sup>2</sup>) in North Western province joins the flow 130km upstream from the Kafue Hook Bridge, which is situated in Central Province. The Kafue flats are an almost completely flat area, extending over 320km from the Itezhi-tezhi dam to the area near Kafue town. The Kafue river flows across the flats, exhibiting repeated meandering. The difference in elevation of this area is only 10 to 15m, and the average riverbed slope is 1/20,000 – 30,000, representing an almost flat profile. The area between the Kafue gorge dam located about 20km downstream from Kafue town to the Zambezi river is a series of gorges over a distance of 64km, and the river drops through a height of 570m at an average riverbed slope of I = 1/110. It should be noted that the Itezhi-tezhi dam has no function of flood control, but actually its large-scale reservoir capacity works on flood mitigation for the downstream area of Kafue flats. Similarly, Kafue Gorge dam acts as a flood control for the river downstream towards Chirundu (Bingham, 1998 in Leigh, 2006).

## 3.4.2 BIOLOGICAL ENVIRONMENT

### 3.4.2.1 FLORA

The diverse vegetation types of the area are closely associated with the physiographic, geology, soils, and moisture regimes. These are zoned along topographic gradients which more or less run parallel to the course of the Zambezi River (Barr, 1971).

#### 3.4.2.1.1 Escarpment Vegetation

The vegetation on the escarpment is dominated by Miombo species, which contains a wide variety of species of the genera *Brachystegia*, *Jubernardia* and *Isoberlina*. The majority of the species are deciduous, dropping their leaves in the early dry season and flushing in August as temperatures rise. In addition to the above genera, local patches of *Combretum-Terminalia* may be present. Gorges cutting down from the escarpment to the valley floor support richer vegetation due to seepage, and include species of *Ficus*, *Commiphora marlothii*, *Azelia quanzensis*, *Kirkia acimunata*, *Terminalia sambesiaca* and *Albizia zimmermannii* (Bingham, 1998 in Leigh, 2006).

#### 3.4.2.1.2 Valley Vegetation

Several vegetation types are found in the valley section, which includes *Acacia albida*-woodland, *Colophospermum mopane* woodland and dry deciduous thickets. The dry deciduous 'jesse' thickets are most common on deep, fine to medium-grained sands, which tend to be leached of bases. These soils are acidic and have low water holding capacity. Open areas are also found in the Chiyaba GMA, the best known being the Mbombochena plains in the east of the GMA. Grass and shrub species recorded in the area include *Chloris* spp, *Cynodon* spp, *Dactyloctenium* spp, *Echinochloa colona*, *Echinochloa* spp, *Eragrotis* spp, *Phragmites* spp, *Setaria* spp, *Sporobolus* spp, *Vernonia* spp, *Sonchus* spp, and *Euphorbia hita* (Bingham, 1998 in Leigh, 2006).

#### 3.4.2.2 FAUNA

##### 3.4.2.2.1 Fish

The Zambezi and the Kafue Rivers form the major fishery of the Chiyaba Game Management Area. The two Rivers are host to a number of fish species. Of economic importance include the Tiger Fish (*Hydrocynus vittatus*), Vundu (*Heterobranchus longifilis*) and the breams belonging to the family Cichlidae (Barr, 1971).

##### 3.4.2.2.2 Reptiles

The Zambezi, Kafue and Chongwe Rivers are host to large concentrations of the Nile crocodile. Other reptile species in the area include the monitor lizard, tortoise, snakes and skinks.

##### 3.4.2.2.3 Birds

Over 300 bird species have been recorded in the Lower Zambezi Area. The riverine vegetation and the islands of the Zambezi have the greatest concentrations of birds. Bird species of the valley of local importance (on account of their rarity) include the sombre bulbul (*Andropadus importunus*) in the thicket habitat. Another species characteristic of thickets is the white-browed scrub robin *Erythropygia leucophrys zambeziana* (Barr, 1971).

##### 3.4.2.2.4 Mammals

Over 25 large mammal species have been recorded in the area which include elephants, buffalo, hippo, zebra, kudu, roan, eland, impala, waterbuck, bush buck, hyena, warthog, bush

pig, common duiker, grysbok, klipspringer, lion, leopard, jackal and lichtenstein hartebeest. Other mammals found in the area include monkey, baboon, porcupine, cerval, caracal and aardvark.

### **3.5 Summary**

Chapter three has given a description of Chiyaba GMA in terms of geographical location and the physical and biological environments. The next chapter (chapter four), describes the design of the research, data collection and analysis.

## **CHAPTER FOUR: METHODOLOGY**

### **4.1 Overview of Research methodology**

Due to the interdisciplinary nature of this research, it required the utilization of different techniques; this included semi-structured interviews, focus group discussions and unstructured observation schedule. Each of these methods will be outlined below, providing the reasons for their use, a brief background and an overview of the methodology employed, with more details provided in each of the relevant chapters. The study predominantly used a qualitative research methodology. The collected data was therefore analyzed using thematic analysis following qualitative data reduction processes and categorization (Bliss, Monk and Ogborn, 1983).

### **4.2 Research Design**

The research design refers to the researcher's overall plan for obtaining answers to the research questions and testing the research hypothesis (Polit & Hungler 1999:225). Orodho (2003) defines it as a scheme, outline or plan that is used to generate answers to research problems. For this study, the researcher employed a case study design. Compared to other methods, the strength of the case study method is its ability to examine, in-depth, a "case" within its "real-life" context. Second, one may want to illuminate a particular situation, to get a close (i.e., in-depth and first-hand) understanding of it. The case study method helps one to make direct observations and collect data in natural settings, compared to relying on "derived" data (Bromley, 1986, p. 23). The case study method is best applied when research addresses descriptive or explanatory questions and aims to produce a first-hand understanding of people and events. The above are the reasons why in conducting this research, the researcher used a case study design to intensively study factors and causes of human-animal conflict in Chiyaba GMA and alternatively address them through EE. However, the case study research has limitations in terms of subjectivity and generalisability (Ghosh, 2002).

### **4.3 Target Population**

A research population for this study was a cross section of persons or objects that were of interest to the researcher which in this research meant members of Zambia Wildlife Authority (ZAWA), currently working in Chiyaba game management area and members from Zambia Environmental Management Agency (ZEMA), members from Conservation Lower Zambezi (CLZ), local inhabitants that included key informants that is, the chief and village headmen.

#### **4.4 Sampling Procedure**

As it is often impossible to study the whole population, researchers make use of a sample to select research subjects who would represent the whole research population. A sample is therefore a subset of a population selected to participate in a research study (Polit & Hungler 1995:445; Polit *et al* 2001:234). This refers to the sum of those individuals within a specific territory, or a small portion of a population, a smaller representation of a larger whole, intended to reflect and represent the character, style or content of a population from which it is drawn (Brink 1996:133). The sample was identified using the following guidelines;

##### **4.4.1 Sample Size**

Various authors have indicated variations in the size of the sample for it to be representative of the population. For example Bless and Achola (1988) say that for a sample to be representative of the population, it has to be at least 5 percent of the population. According to High (2000), the size of the study sample is critical to producing meaningful results. When there were too few subjects, it might be too difficult to detect the effect or phenomenon understudied, thus providing inconclusive inference making. On the other hand, if there were too many subjects, even trivially small effect could be detected, but the findings would be of insignificant value, wasting valuable time and resources. This study was based on five village action groups of Chiyaba GMA. Its population included, 2 ZAWA officials, 2 members from CLZ, 2 members from ZEMA and 60 local inhabitants.

##### **4.4.2 Characteristics of the Sample**

The researcher decided that the participants should have the following attributes to be included in the research. The participants should:

- Currently be living in Chiyaba game management area and have been living there for a long time.
- Have been affected by wild animals, directly or indirectly.
- Be officials from ZEMA responsible for the preparation, designation and implementation of the EE activities.
- Be willing to take part in the research
- Be ZAWA officials mandated to be in charge of wildlife.
- Be teenagers or adults, of 18 years and above no children were included in the sample

#### 4.4.3 Sampling Technique

Non-probability sampling approach which is less likely than probability sampling to produce accurate and representative samples was used. To be specific the researcher used purposive sampling. Purposive sampling technique, also called judgment sampling, is the deliberate choice of an informant due to the qualities the informant possesses. It is a non random technique that does not need underlying theories or a set number of informants. Simply put, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Bernard 2002, Lewis & Sheppard 2006). Purposive sampling is especially exemplified through the key informant technique (Bernard 2002, Garcia 2006, Gustad *et al.* 2004, Jarvis *et al.* 2004, Lyon & Hardesty 2005), wherein one or a few individuals are solicited to act as guides to a culture. Key informants are observant, reflective members of the community of interest who know much about the culture and are both able and willing to share their knowledge (Bernard 2002, Campbell 1955, Seidler 1974, Tremblay 1957). Purposive sampling was used to decide on the Chiyaba GMA because of the high rates of human-animal conflicts prevailing in the area. EE members from ZEMA, CLZ and ZAWA were also purposively sampled based on the fact that the officers catered specific areas of environmental concerns and for the fact that these are knowledgeable experts within this study domain. It was also convenient and economical as the researcher was the only one involved in the selection. (Polit & Hungler 1999:281; Polit *et al* 2001:233).

This study used random sampling to reach out research subjects (units) in Village Action Groups (VAGs) in Chiyaba GMA. Welman *et al.* (2005) and Ghosh (2002) states that in random sampling, research subjects have equal opportunity of being selected from the population and the model is objective in nature. 12 households in each VAG were drawn using random sampling.

Chiyaba Game Management Area has a total of thirty seven (37) main villages comprising 1132 households, a total population of 5 882 persons comprising 3 107 males and 2 775 females (CSO, 2010). The GMA is divided into eastern and western. The western part of the Chiyaba is further divided into five Village Action Groups (VAGs). These are implementing agents that constitute community resource boards. Community Resource Boards and ZAWA jointly manage wildlife therein.

For the purpose of this study, 5 percent of the households representing fifty-seven (57) households were sampled. Since even numbers work well, this 57 number of households was rounded off to 60 so that it could be divided well among the 5 VAG. A total sixty (60) people were therefore interviewed twelve (12) from each VAG. Households were selected randomly using the table of random numbers after obtaining information from the village leaders in five different clusters of VAGs and these include Kabwadu, Chiyaba Central, Mugurameno, Chisakila and Gotagota. From the selected households, each household selected only one individual above the age of 18 to be interviewed. Strictly only people above the age of 18 years were targeted as they had good memory of their surroundings.

#### **4.5 Data Collection Procedure**

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. In order to collect the needed data, the researcher presented an introductory letter from the University of Zambia to the necessary institutions where the research was to be carried out. At these institutions, the letter was verified and thereafter, the researcher was directed to certain departments where she carried out the research. Finally, with regard to ethics the following were explained to subjects:-

- Type of participation expected of the respondent
- How the results would be used and published
- Identification and qualifications of the researcher
- How confidentiality, anonymity and privacy would be safeguarded
- The reason for undertaking the research
- That their participation was voluntary and that they could withdraw at any stage of the study if they felt threatened
- That no harm would be done to them

##### **4.5.1 Primary Data**

This is direct, firsthand data collection. According to Kothari (1985:11), primary data is original information collected for the first time. The primary method of data collection is the most original and authentic method of data collection. Primary data is actually unvarnished data that have never been manipulated before. Therefore, primary data were used in this research because it increases the reliability and authenticity of research. When collecting

primary data, the researcher used semi-structured interview schedule, unstructured observation schedule and focused group discussions.

#### **4.5.1.1 Interviews**

An interview is a method of data collection in which one person (the interviewer) asks questions from the other (a respondent), interviews are conducted either face-to-face or by telephone (Polit & Hungler 1991:647). The most important advantage of an interview for this research was that it was a flexible method of data collection, best suited for the particular sample of this research as many participants were illiterate or semi-illiterate. Another important advantage was that the researcher could also explain and expatiate on questions, what they implied, in case they were not clear to the participants, with the help of co researchers. The researcher decided to make use of a preplanned and compiled interview schedule, which included open and closed questions to use during the interview as many of the participants were illiterate. Unstructured or open questions were also included to allow the participants to give their own opinion, views, beliefs and other information freely.

Unfortunately interview bias was an unavoidable possibility. The researcher and co researchers interviewed the participants, and tried to stick as closely as possible to the questions included in the interview schedule. In the open questions the researcher wrote the responses of the participants verbatim. Another disadvantage was that the interview method was time consuming, as the researcher herself had to be present during the interview and give further guidelines. (Polit *et al* 2001:267). As mentioned before, after the participants were selected, they were briefed on the objectives of the research, and their rights. After the interview, the participants were asked whether they wanted to ask any questions and then they were thanked for their participation.

#### **4.5.1.2 Observation**

Observation entails the systematic noting and recording of events, behaviors, and artifacts (objects) in the social setting chosen for study. Observation is a fundamental and highly important method in all qualitative inquiry. It is used to discover complex interactions in natural social settings.

These were undertaken to verify the strategies implored by the communities about human-animal conflict. During this data gathering process, the researcher took notes on various aspects such as different activities introduced by CLZ. Literature was reviewed to understand

and appreciate the existing body of knowledge on the status of human-animal conflict in the research area.

#### **4.5.1.3 Focus Group Discussions**

In focus group discussions, the researcher is just a facilitator and the respondents provide information (Bless and Achola, 1990). Focus groups therefore, provided an opportunity for the researcher to interact with the local community and gain relevant information about their knowledge, opinions, and attitudes regarding human-wildlife conflicts. Open-ended question format was used in the focus groups to maximize exchange and better determine the potential range of responses to each topic area. Participants in the focus groups included headmen, animal control officers and the local people.

#### **4.5.2 Secondary Data**

Secondary data analysis can be literally defined as “second-hand” analysis. It is the analysis of data or information that was either gathered by someone else (e.g., researchers, institutions, other NGOs, etc.) or for some other purpose than the one currently being considered, or often a combination of the two (Cnossen 1997). Secondary data are also helpful in designing subsequent primary research and, as well, can provide a baseline with which to compare one’s primary data collection results. Therefore, it is always wise to begin any research activity with a review of the secondary data (Novak 1996). This is why the researcher used secondary data with care and diligence; as such it provided a cost-effective way of gaining a broad understanding of research questions.

Secondary data for this research was mainly from archival sources such as maps and recorded ZAWA and CRBs documents. This also covered an extensive review of existing literature; both published and unpublished, on human-wildlife conflicts all over the world. The internet was also useful on the many strategies people have employed to help mitigate and prevent human animal conflicts locally, internationally as well as globally. The idea was to collect information from as many different sources as possible and then be able to counter check the information so as to further validate the findings.

#### **4.6 Data Analysis**

Data analysis is the systematic organization and synthesis of the research data and the testing of research hypothesis using those data (Polit & Hungler 1991:643). It also entails

categorizing, ordering, manipulating and summarizing the data and describing them in meaningful terms (Brink 1996:178).

Data was analyzed qualitatively using thematic data analysis where themes and emerging patterns were analyzed. Data was later presented using graphs, tables and percentages.

#### **4.7 Validity and Reliability**

Matters of validity and reliability were adequately addressed for this study. Validity determines the trustworthiness of the research with focus on whether the research has addressed the intended objectives (Golafshani, 2003; Welman *et al.*, 2005), while reliability deals with consistence and accuracy in research evidence and the representativeness of the determined sample (Welman *et al.*, 2005).

The reliability of the instrument was ensured by clearly wording the questions included in the interview schedule. A pre-test was done to determine whether the respondents understood the questions correctly and where the questions did not seem clear enough, the necessary adjustments were made before the schedule was finalised. To ensure that the participants understood the questions correctly, the researcher with the help of co researchers, translated the questions into ‘Goba’ the language best understood by the participants.

Content validity was also tested: The researcher, experts in the field and the supervisor scrutinized the questions of the interview schedule and compared them with each dimension of the objectives of the study. Furthermore, methodological triangulations were employed. To be specific, *between method* triangulation which involves the use of different methods was used (Denzin, 1970). Among the tools the researcher used to gather primary data were semi-structured interviews, unstructured observation schedule and focus group discussions. These complemented one another.

#### **4.8 Summary**

The methodology chapter described the design of the research and how data was collected and analyzed. The next chapter displays the findings.

## **CHAPTER FIVE: PRESENTATION OF FINDINGS**

### **5.1 Introduction**

This chapter presents the findings of the study on the role of EE in addressing Human-Animal conflict in Chiyaba GMA. The findings in this chapter are presented by theme and each theme attempts to answer a particular research question of this study. Findings were obtained using focus group discussions, interviews and field observations. The findings are presented under the headings below.

### **5.2 Perceptions of Wildlife of Chiyaba GMA by Local People**

#### **5.2.1 Characteristics of Respondents**

This part of the study findings gives characteristics of the respondents. They are addressed in items 5.2.1.1 to 5.2.1.5.

##### **5.2.1.1 Gender of Respondents**

The gender of respondents was vital in getting diverse views on matters of human-animal conflict in Chiyaba GMA. The effect of gender towards perceptions of wildlife explained some variation in wildlife attitudes. The information collected from the respondents, showed that there were twenty-two (22) females representing 36.7 per cent and thirty-eight (38) males representing 63.3 per cent of the respondents.

***Table 3: Gender of Respondents***

Gender	Frequency	Percentage (%)
Male	38	63.3
Female	22	36.7
Total	60	100.0

Source: Field Data, 2014

##### **5.2.1.2 Age of Respondents**

Age was important in determining whether young people were more positive towards wildlife than old people or not. As indicated in the Table below, fourteen (14) respondents came from the age group of 18-30 accounting for 23.3 per cent of the respondents. Eighteen (18) of the

respondents came from 31-40 age group indicating 30.0 per cent and nineteen (19) respondents from 41-50 corresponding to 31.7 per cent. Furthermore, five (5) respondents came from the age group of 51-60 representing 8.3 percent and four (4) from 60 and above standing at 6.7 per cent.

**Table 4: Age of Respondents**

Age of Respondents	Frequency	Percentage (%)
18-30 years	14	23.3
31-40	18	30.0
41-50	19	31.7
51-60	5	8.3
60+	4	6.7
Total	60	100.0

Source: Field Data, 2014

#### 5.2.1.3 Period of Stay in Chiyaba GMA

The information on the period of stay is summarized in the Table below. It was vital in establishing whether the longer one stayed in a GMA correlated to either positive or negative attitudes towards wildlife. No response indicated the stay of less than one year. The responses on occupation were also important in bringing out accurate answers, as the more people stay in an area the more familiar with it they become. Responses in relation to the period of stay specified that each respondent had lived in Chiyaba GMA at a different period of time.

**Table 5: Period of Stay in Chiyaba GMA**

Period of Stay	Frequency	Percentage (%)
1-5 Years	12	20.0
6-10	3	5.0
11-15	8	13.3
16-20	9	15.0
20+	28	46.7
Total	60	100.0

Source: Field Data, 2014

#### 5.2.1.4 Educational Level Attained

Educational levels were important in trying to find out if at all a higher level of education correlates with more positive perceptions towards wildlife. Educational levels were also important in trying to assess if at all they influenced the views of the respondents concerning human-animal conflict. The table below shows the educational level of the respondents. Forty-three (43) respondents representing 71.7 per cent, attended primary school while eleven (11) representing 18.3 per cent went up to secondary education. Only six (6) respondents representing 10 per cent had tertiary education.

**Table 6: Educational Level Attained**

Level of Education	Frequency	Percentage (%)
Primary Education	43	71.7
Secondary Education	11	18.3
Tertiary Education	6	10.0
Total	60	100.0

Source: Field Data, 2014

#### 5.2.1.5 Occupation of Respondents

The occupations of respondents were crucial in establishing the economic status of the local people; and whether that had any bearing on how they viewed wildlife. The findings on the occupations of respondents showed that 63.3 percent were in farming, 1.7 in business, 3.3 in hunting, 8.3 in fishing, 13.3 in lodging and 6 in civil service. The table below provides further information on the people's occupation.

**Table 7: Occupation of Respondents**

Occupation	Frequency	Percentage (%)
Farmer	38	63.3
Business	1	1.7
Hunting	2	3.3
Fisherman	5	8.3
Lodger	8	13.3
Civil servant	6	10.0
Total	60	100.0

Source: Field Data, 2014

### 5.2.2 Problems caused by Wild Animals

It was vital to know the problems caused by wild animals in order to understand the root causes of human-animal conflicts, and thereafter, create effective strategies. And if at all these problems made the local people to have negative attitudes towards wild animals.

The majority (95%) of the people of Chiyaba bemoaned the following problems as being caused by wild animals; that their human safety was at stake: as these animals would cause them deaths and injuries; Destruction of their crops; Attacks on their domestic animals; Transmission of diseases to their livestock and/or to themselves; and other manifestations such as damaging property or creating nuisances. For instance some of the responses read as follows:-

*“Some animals will come and destroy your food storages, your fields, property...and no compensation will be given to pay off. It is really not easy living in a GMA; our colleagues have even been eaten by these animals. These had either gone fishing or collecting firewood but up to now nothing has been done as such cases die natural deaths. we are not allowed to kill these animal not even shooting or scaring them away...only at an instant where they want to kill you, even then the question will be where were you going with a gun or whatever weapon used. You know if goats eat in our fields, the reaction is different, we own them, we can handle that and control it but with wild animals our reactions are controlled, it’s not the same. Even reporting these cases is sheer waste of time because in the end it is you the reporter who ends up in problems and not the animals.”*

### 5.2.3 How Communities have dealt with these Problems

The importance of knowing how communities dealt with the problems they encountered with wild animals, was to find out if they followed the recommended laws.

The local people of Chiyaba had always reluctantly called upon the Zambia Wildlife Authority (ZAWA) but said that they were slow and ineffective in responding when called to help. Some wild animals would destroy their crops, property and nothing was given back to pay off, and as such they saw no reason why they had to report such cases. That was mainly because, the Wildlife Act had no provision for compensation regarding loss of property, injury and threat to human life caused by wildlife. In other instances, they took it upon themselves to deal with the situation in a way they deemed right.

### 5.3 Effectiveness of Measures put in Place to Minimize Human-animal Conflict in Chiyaba GMA.

#### 5.3.1 Laws of the National Park Promulgated by the Wildlife Department

This was important in finding out if there were any laws put in place by the Zambia Wildlife Authority and if the villagers had a good understanding of them.

The level of awareness on the Laws of the National Park Promulgated by the Wildlife Department is presented in the table below. The majority of the local people (80%) were aware of the laws of ZAWA, though they could not cite the specific act they said they were not allowed to shoot or kill the wild animals.

*Table 8: Level of Awareness of the laws of the National Park*

Response	Frequency	Percentage (%)
Yes	48	80.0
No	9	15.0
No Response	3	5.0
Total	60	100.0

Source: Field Data, 2014

#### 5.3.2 People's Views on the Park's Rules and Regulations

The views of local people were vital in exploring how they perceived the imposition of the park's rules and regulations that affected their options for dealing with wild animals.

Out of the total 48 number of the people that were aware of the laws of the National Park (as indicated in the table above), only 4 said they liked the laws and felt protected by them, hence presenting a minimal percentage of 8. One of the field voices read as follows:-

*“The wildlife authorities do not care about our problems, their first priorities are the wild animals. They protect these animals at our expense no wonder we do not see their value, they are not ours, they are state property. This is not to say we want these animals to be removed from the area no, all we want are effective measures to be put in place. We want to feel secured, protected and valued, otherwise we*

*will continue living a lie; when the authorities are here we say we follow their laws but when they leave, we act differently because we are the ones at risk not them.”*

### 5.3.3 Level of Awareness of Management Strategies

A question about current management strategies was used to determine the level of knowledge about management strategies in the study area.

The number of people that cited either ZAWA or CLZ as offers of different management strategies was 36 accounting for 60.0 per cent of the sample while those who showed ignorance were 22 accounting for 36.7 per cent. The table below illustrates;

**Table 9: Level of Awareness of Management Strategies**

Response	Frequency	Percentage (%)
Yes	36	60.0
No	22	36.7
No Response	2	3.3
Total	60	100.0

Source: Field Data, 2014

### 5.3.4 Nature of Management Strategies

According to ZEMA members, they did not deliberately offer strategies to the people of Chiyaba GM area or any environmental education activities on human animal conflict as that was ZAWA’s mandate. They only came in if there was a developmental project going on. They also carried out environmental assessment for certain projects which were likely to have significant effects on the environment.

According to members from ZAWA, they partnered with a number of NGOs in dealing with human-animal conflict. According to them, areas that were more problematic had more NGOs. In Chiyaba GMA, they cited Conservation Lower Zambezi (CLZ) and African Wildlife Foundation (AWF), which was founded in 1961 as the African Wildlife Leadership Foundation.

Efforts to carry out an interview with a CLZ member proved futile as by the time the researcher got to ZAWA Chirundu, the person in charge, Ian Stevenson was not around only his wife and the communication officer was on site. As such he requested that the researcher makes fresh arrangements or he would communicate to her via email.

The local people confirmed receiving management strategies from CLZ as claimed by ZAWA as one of the interviewees responses read as follows:-

*“CLZ is the only organisation that seems to help us manage these conflicts; they teach us ways that help to help reduce human-wildlife conflict by promoting conflict-mitigating activities such as chilli fencing and elephant behaviour workshops. We appreciate that but it is not enough, we need more organizations like that in the area, we expect even more from the government.”*

#### **5.3.5 Exhibition of Positive Change by Communities**

ZAWA members attested to the fact that after teaching the people ways of dealing with human-animal conflict, sometimes positive change was seen as these people were able to put them into practice. But sometimes they said that wild animals were a state property and as such was to be taken care by the state or that, that was how they had always lived (conflicting with wild animals) from time in memorial, as that was their culture, their livelihood.

The local people of Chiyaba viewed wild animals as state property unlike before the British Government colonized Zambia when wildlife was controlled and managed by indigenous people through Chiefs. Under the leadership of Chiefs, wildlife was used for the benefit of the community and formed an integral part of their lives. With such a misconception, it became very difficult for people to adhere to any rules or strategies.

#### **5.3.6 Benefits of Management Strategies**

This was important as it helped determine community support for various management strategies and hence, assess their effectiveness.

ZEMA pointed out that, the benefits were that once people were informed, they would take care of the environment. According to ZAWA, over time, their strategies would result in a change of behaviour among local populations and would contribute to reduced risks,

improvements in local livelihoods and a reduction in their vulnerability. In an optimistic scenario, education and training would promote commitment towards conservation, raise awareness of the essential role of wildlife in ecosystem functioning and its ethical and economic value, as well as its recreational and aesthetic importance.

### 5.3.7 Frequency of Providing Management Strategies

If the strategies put in place were to be effective, there was need to assess their frequency. Responses here varied, some said every month, others said termly while others said they had never been offered any strategies. The table below gives further details;

**Table 10: Frequency of Providing Management Strategies**

Responses	Frequency	Percentage (%)
Weekly	4	6.7
Monthly	16	26.7
Termly	12	20.0
Yearly	5	8.3
Never offered	20	33.3
No Response	3	5.0
Total	60	100.0

Source: Field Data, 2014

### 5.3.8 Frequency of Meetings between Community Members and ZAWA Officials

In order to determine if community members were involved in decision making or any other matters arising from wild animals, it was vital to know how often they met with officials from Zambia Wildlife Authority.

Although answers to this question somewhat varied, it is apparent from the responses that there was little contact between community members and ZAWA officials. Sixty-five (65%) percent of respondents reported that contact only occurred following reports by the community over problems caused by these wild animals, while 18% said that contact never occurred at all. The table below gives the full details;

**Table 11: Frequency of Meetings between Community Members and ZAWA Officials**

Responses	Frequency	Percentage (%)
When there are complaints	39	65.0
No meetings	11	18.3
Don't know	6	10.0
No response	4	6.7
Total	60	100.0

Source: Field Data, 2014

### 5.3.9 Proposed solutions to the Problem

In order to determine whether or not local people were willing to co-exist with wildlife provided there were effective measures put in place, there was need to ask them to propose solutions to the problem.

The table below gives responses on the best ways of resolving or minimizing the problem of human-animal conflict in the Area; forty (40%) were for the idea of the introduction of compensation, 18.3% wanted the local community to get involved in decision making, 15% for the GVT to take on the lesser role on matters of human-animal conflict, 20% for the introduction of educational campaigns and only 5% went for the relocation of either animals or people from the area.

**Table 12: Proposed solutions to the Problem**

Response	Frequency	Percentage (%)
Compensation	24	40.0
Involvement in decision making	11	18.3
Lesser role by GVT	9	15.0
Educational campaigns	12	20.0
Relocation	3	5.0
No Response	1	1.7
Total	60	100.0

Source: Field Data, 2014

## **5.4 Awareness by Local People of the Role EE could play in Addressing Human-animal Conflict in Chiyaba GMA**

### **5.4.1 Understanding the term Environmental Education**

The information on understanding the term EE was vital in finding out if the local people of Chiyaba game management area were environmentally literate with skills, knowledge and inclinations that helped them to make informed choices concerning the environment. And also find out if they understood that, as humans we are part of the natural system to which these wild animals belonged and that our role therefore is to be part of it, not in control of it. The information on understanding EE was also critical in assessing how much still needed to be done in terms of filling in gaps related to conceptions of EE in Chiyaba GMA.

Responses on the understanding of the phrase EE are shown below. The data revealed that the majority (90%) of the respondents had no idea about the meaning of the phrase EE only 10 percent understood the phrase under discussion. This is illustrated in the table below;

*Table 13: Understanding the term Environmental Education*

Responses	Frequency	Percentage (%)
Yes	6	10.0
No	54	90.0
Total	60	100.0

Source: Field Data, 2014

### **5.4.2 Awareness of the Role EE could play in mitigating Human-Animal Conflict**

Since the majority (90%) of the people could not understand the meaning of the term EE, it was obvious they would not be aware of its role in mitigating human-animal conflict, and that was the case.

### **5.4.3 Mode of Teaching Environmental Education Activities**

According to ZEMA members, they engaged the community on effects of any developmental project through discussions and public hearings. ZAWA members said that they conducted awareness campaigns through print and electronic media, seminars and workshops or through any other suitable means.

#### **5.4.4 Evaluation of Environmental Education**

Members from ZEMA said they evaluated their lessons by producing Environmental Outlook Reports, though the challenge that came in was about how many people were to have access to those reports. They also went back to monitor the effects of the projects, and ensured that the developers were compliant with the laid down guidelines. According to ZAWA officials, they did send their officers in the field to do spot checks and carry out patrols, how often this happened depended on how problematic an area was. The more problematic an area was, the more attention it received.

#### **5.4.5 Challenges experienced in delivering EE**

Challenges faced by ZEMA were about not being felt all over the country, they were present in four towns; Lusaka, Ndola, Chirundu and Livingstone.

According to ZAWA, the main challenge was failure by to people adhere to any rules or strategies. They also cited lack of enough manpower and funding limitations.

### **5.5 Summary**

Findings from all the informants of the research were presented in the manner that they were obtained from either the interview schedule or from the focus group discussions. This was in an attempt to provide a foundation for appropriate interpretation of the results and to determine whether they gave answers to the research questions. Therefore, in the following chapter, the discussion of these findings will relate the results to the objectives of the study and try to answer the questions that were posed in the research.

## **CHAPTER SIX: DISCUSSION OF FINDINGS**

### **6.1 Introduction**

This chapter discusses research results established in chapter five in the context of the study's objectives. Therefore, it is structured in the perspective of the present study specific research objectives. The last chapter forms the conclusion and provides implications and recommendations for future research examination.

## **6.2 PERCEPTIONS OF WILDLIFE OF CHIYABA GMA BY LOCAL PEOPLE**

### **6.2.1 Characteristics of Respondents**

In this study, many factors were identified as being potentially important when looking at the perception of local people of Chiyaba Game Management Area towards wildlife. Although some variables are harder to quantify and investigate than others, it is important to recognize that conflict is probably multi-faceted and may well have deeper roots than those initially apparent. The importance of characteristics of respondents concerned is emphasized by other scholars, such as age (Bandara and Tisdell 2003; Lindsey *et al.* 2005b), gender (Hill 1998) and education level (De Boer and Baquete 1998). The Characteristics of the respondents are addressed in items 6.2.1.1 to 6.2.1.5

#### **6.2.1.1 Gender of Respondents**

The gender of respondents was vital in getting diverse views on matters of human-animal conflict in Chiyaba GMA. And also determining how men and women viewed wildlife. All the women (36.7%) tended to prefer lovable species and expressed more disliking for fearsome species while all the men (63.3%) showed likeness for predatory and fearsome species.

These findings are in line with the situation in Switzerland where the preference for more lovable species by women is high (Schlegel & Rupf, 2010), and also in the Netherlands (Vaske *et al.*, 2011). The idea that men are more outgoing and hunting-orientated is supported by the result that tolerance for hunting was much higher among boys and men (Borgerhoff Mulder *et al.*, 2009).

### 6.2.1.2 Age of Respondents

Age of the respondents was one of the most important characteristics in understanding their perception of wildlife; by and large age indicated level of maturity of individuals in that sense age became more important to examine the responses. It was important in determining whether young people were more positive towards wildlife than old people or not. In this study, all the respondents were matured persons aged 18 and above. As such, these were people that had good knowledge and memory about their area and issues of human animal conflicts.

Young people (53.3%) generally were more positive towards wildlife, than older people. This was the case in Norway (Røskaft *et al.*, 2007; Kleiven *et al.*, 2004), USA (Butler *et al.*, 2003) and Croatia (Majić & Bath, 2010; Majić *et al.*, 2011). Also in Uganda, young people were more positive towards problem chimpanzees (McLennan & Hill, 2012) and in the Netherlands, young people had a more mutualistic value orientation (Vaske *et al.*, 2011). This generation shift can possibly be explained by the increasing quality of education and more implementation of conservation facts (Lagendijk & Gusset, 2008; Mehta & Heinen, 2001), more influence of modern media and the decreasing importance of tradition and cultural transmission of information (Jabobs *et al.*, 2012; Lescureux *et al.*, 2011). On the other hand, a survey of the environmental attitudes among parents and teenagers in Finland revealed that teenagers were less concerned about the environment than their parents (leppenen *et al.*, 2012).

### 6.2.1.3 Period of Stay in Chiyaba GMA

The information on the period of stay was vital in establishing whether the longer one stayed in a GMA correlated to either positive or negative attitudes towards wildlife. No response indicated the stay of less than one year. Very few people (5%) opted for the relocation of either people or wild animals from the area. The rest of the people (95%) said they were ready to coexist with wild animals provided good strategies to mitigate conflicts were put in place, as they had always done so since time immemorial.

The responses on occupation were also important in bringing out accurate answers, as the more people stay in an area the more familiar with it they become. Therefore, the respondents that were captured were those that had lived in Chiyaba GMA for a long period of time and

interacted with wild animals throughout their stay. Responses in relation to the period of stay specified that each respondent had lived in Chiyaba GMA at a different period of time.

#### **6.2.1.4 Educational Level Attained**

Educational levels were important in trying to find out if at all a higher level of education correlates with more positive perceptions towards wildlife. Educational levels were also important in trying to assess if at all they influenced the views of the respondents concerning human-animal conflict.

Though the educational levels of the local people of Chiyaba were low (71.7% primary education) they had positive attitudes towards wildlife. They relied more on cultural transmission of beliefs via tradition and even myths. They had a special attachment to wild animals since they coexisted with them since time immemorial. However, a higher level of education in many cases correlated with more positive attitudes towards wildlife; like in Norway (Røskaft *et al.*, 2007), Macedonia (Lescureux *et al.*, 2011), USA (Reiter *et al.*, 1999), Nepal (Mehta & Heinen, 2001), but not in the Netherlands (Vaske *et al.*, 2011).

#### **6.2.1.5 Occupation of Respondents**

The occupations of respondents were crucial in establishing the economic status of the local people; and whether that had any bearing on how they viewed wildlife.

Small-scale farming was the major source of income and food security for the majority (63.3%) of the local people in Chiyaba GMA as is the practice in most rural areas of Zambia. For the case of Chiyaba, small-scale farming was practiced along the Kafue and the Zambezi rivers which had high densities of elephants, hippos and crocodiles. Consequently, humans and wildlife interacted and those interactions ended up in conflicts, where animals threatened human life and destroyed crops in people's land. Faced with such a situation, one would have expected the people of Chiyaba GMA to have negative attitudes towards wildlife, but that was not the case. Similarly, people in both Botswana and Kenya experienced high levels of conflicts with wildlife, but people in Botswana held much more positive attitudes than those in Kenya (Sifuna, 2010). Some scholars have argued that, economic loss experienced from wildlife interactions pulls attitudes quickly in a negative direction (Thorn, *et al.*, 2012; Røskaft *et al.*, 2007; Legendijk & Gusset; Kideghescho *et al.*, 2007).

In Chiyaba GMA, Women were particularly vulnerable to poverty and social marginality. This picture holds across most (objective) measures of economic and social status, qualitative testimony and scores on (subjective) inner wellbeing. Employment was also strongly gendered. Safari lodge work was most common, and piece works on commercial farms, but the majority workers there were men.

### 6.2.2 Problems caused by Wild Animals

The majority (95%) of the people of Chiyaba bemoaned the following problems as being caused by wild animals; that their human safety was at stake as these animals would cause them deaths and injuries and that this, although less common, was the most severe manifestations of human-wildlife conflict. Among the animals that were likely to cause death were the Buffalo, Crocodiles, lions and elephants. In most cases deaths occurred while people were protecting their crops from being raided by animals (usually at night); when people accidentally came into close contact with the animals, especially on paths near water at night; or when people encountered injured animals whose normal sense of caution was impaired. This is consistent with the Sundarbans region of eastern India which has long been a 'hotspot' for man-eating tigers, with around 100 human deaths reported annually (Sanyal 1987). While in India 100 - 200 people are killed by Asian elephants every year (Thirgood *et al.* 2005; Veeramani *et al.* 1996).

Destruction of crops: This was not a surprising result considering the fact that most cultivation was practiced along the banks of the Zambezi and Kafue rivers with high densities of crocodile, hippo and elephants. The most common form of wildlife incident involved elephants destroying crops or attacking people. Hippos were known for destroying crops along the banks of the Zambezi and Kafue rivers. Most respondents expressed frustration due to the persistence of this interaction that posed a threat to food security in Chiyaba considering that small scale farming was the major livelihood strategy adopted by households. While it is widely recognized that in most cases elephants do not inflict the most damage to subsistence agriculture, they were generally identified as the greatest threat to Chiyaba farmers. This was because Elephants could destroy a field in a single night raid. When they did so the consequences for food security were even more serious. These findings are similar to other studies done elsewhere, for example, In Wisconsin alone, white-tailed deer (*Odocoileus virginianus*) inflict more than US\$34 million worth of crop damage annually (Naughton-

Treves and Treves 2005), while studies in Latin America have found that birds and monkeys alone can destroy up to 77% of a potential crop (Perez and Pacheco 2006).

Attacks on domestic animals: Another adverse effect of the human-wildlife conflict experienced by the communities of Chiyaba GMA was the killing of domestic animals by predators. The number and type of domestic animals killed by wildlife varied according to the species, the time of year, and the availability of natural prey. For the individual stock owner, the losses were catastrophic. For a small-scale herder as well, the losses to wildlife could mean the difference between economic independence and dire poverty. Large carnivores were the principal culprits of cattle and smaller animals such as sheep and goats. Their predation techniques were different; baboons attacked by day and usually killed small stock such as goats and sheep, while lions and Buffalos attacked at night, killing larger prey such as cattle. In a recent study by Sillero-Zubiri and Laurenson (2001), predation upon livestock was the most common issue cited as causing conflict between humans and carnivores. More wild animals are reported of causing similar problems with lynx in France (Stahl et al. 2001b), brown bears in Norway (Sagor *et al.* 1997), pumas in Brazil (Mazzolli *et al.* 2002), golden jackals (*Canis aureus*) in Israel (Yom-Tov *et al.* 1995) and tigers in India (Sekhar 1998) causing just a handful of the problems reported across the globe.

Transmission of diseases to livestock and/or humans: though they were not too sure, the people of Chiyaba GMA suspected the serious diseases they suffered could have been transmitted by wildlife to domestic livestock and possibly to them (i.e. rabies). This was more so due to the education that they received from members of the Conservation Lower Zambezi Organization. Scavengers and predators, such as spotted hyenas, jackals, lions and vultures, also play a role in disseminating pathogens by opening up, dismembering and dispersing parts of infected carcasses. For example, predators ingest anthrax spores together with carcass tissue; the spores are then widely disseminated in the predators' faeces (Hugh-Jones and de Vos, 2002). This evidence correlates with Charlton et al. 1998; Thirgood *et al.* 2005; WHO 1998, as they cite a variety of carnivore species including raccoons (*Procyon lotor*), skunks (*Mephitis mephitis*) and bat-eared foxes (*Otocyon megalotis*) as being reservoirs for rabies, which is responsible for around 50 000 human deaths worldwide each year.

Other manifestations of problems caused by wild animals: Baboons and monkeys were also causing an immense nuisance in most people's homes in Chiyaba GMA. They moved during

the day and stole food directly from their homes. This evidence correlates with a study conducted on the Zimbabwean side of the Zambezi valley where baboons were a major menace in bush camps and small towns such as Chirundu and Victoria Falls, and in wildlife camps and lodges where they were not actively controlled. They would pull thatch from thatched roof buildings and would even intimidate wide-eyed tourists in order to steal food directly from the tables that they occupied (Gaynor, 2000; Kansky, 2002).

### **6.2.3 How Communities have dealt with these Problems**

People of Chiyaba GMA were always reluctant to call upon the Zambia Wildlife Authority (ZAWA) because they were slow and ineffective in responding when called to help. Some wild animals would destroy their crops, property and nothing was given back to pay off, and as such they saw no reason why they had to report such cases. This was mainly because the Wildlife Act had no provision for compensation regarding loss of property, injury and threat to human life caused by wildlife. In other instances, they took it upon themselves to deal with the situation in a way they deemed right.

Evidence for these findings was seen in Ethiopia, where persecution of Ethiopian wolves and mountain nyala (*Tragelaphus buxtoni*) was linked to frustration with distant Government officials, and the simple recognition that local peoples' problems were legitimate was enough to reduce their simmering resentment and diminish the level of wild animal persecution (Gottelli and Sillero-Zubiri 1992; Sillero-Zubiri and Laurenson 2001).

In the Democratic Republic of Congo the situation was no different when seven endangered mountain gorillas (*Gorilla gorilla beringei*) were killed in 2007 in the Virunga National Park over a seven-month period, sparking international outrage and even a UN investigation (CNN 2007). It emerged later that the killings were apparently committed by charcoal traders who were angry at Park authorities for working to limit the exploitation of local timber resources for the trade (The Telegraph 2007).

In summary, the people of Chiyaba in this study confirmed that they would not have felt good if wild animals were translocated from Chiyaba. Despite the massive threat caused to human life and property, the people of Chiyaba were found to have special attachments towards wildlife. They were found to be willing to coexist with wildlife claiming their coexistence dated back from time immemorial. These findings are in line with Sirakaya et al. (2002) cited

by Haley et al. (2005). They reported that personal attachment and values attached to natural resources had influence towards the perception of residents. It is put forward that, this evidence is consistent with social representation theory.

### **6.3 EFFECTIVENESS OF MEASURES PUT IN PLACE TO MINIMIZE HUMAN-ANIMAL CONFLICT IN CHIYABA GMA**

#### **6.3.1 Laws of the National Park Promulgated by the Wildlife Department**

ZAWA members acknowledged having provisions that help deal with human-animal conflicts vested in the Zambia wildlife Act no. 12 of 1998 which repealed and replaced the National Parks and Wildlife Act No. 10 of 1991. The new Act provided for the establishment of Zambia Wildlife Authority (ZAWA) a semi autonomous body, which replaced the Government department of National Parks and Wildlife Service (NPWS). It additionally provided for: the establishment, control and management of National Parks for the conservation and enhancement of wildlife ecosystems, biodiversity and of objects of aesthetic, prehistoric, historical, geological, archeological and scientific interest in National Parks; and for the promotion of opportunities for the equitable and sustainable use of the special qualities of National Parks; the establishment, control and management of Game Management Areas, the sustainable use of wildlife and the effective management of wildlife habitats in Game Management Areas; enhancement of the benefits of Game Management Areas both to local communities and to wildlife; involvement of local communities in the management of Game Management Areas; the development and implementation of Management Plans; the regulation of game ranching; the licensing of hunting and control of the processing, sale, import and export of wild animals and trophies; and the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Wetlands of International Importance especially as Waterfowl habitat, the Convention on Biological Diversity and the Lusaka Agreement on Cooperative Enforcement Operations directed at illegal trade in wild fauna and flora.

The majority (80%) of the local people were also aware of these laws, they said they were not allowed to shoot or kill the wild animals unless in certain instances, for example in self defense where an animal instantly wanted to kill someone, which were rare cases as at that time the victim would not be armed. Policy makers seemed to underestimate the effects such laws could have had on local people, they could be evicted, marginalized and even, such as

with poachers in Kenya, killed in order to protect wildlife resources (Brockington 2002a; Brockington and Igoe 2006; Peluso 1993). These effects could persist long after protected areas are gazetted, with people finding that they have been disenfranchised, excluded from access to their traditional resources, left without alternative livelihood strategies and impoverished (Fairhead and Leach 1994; Geisler and Sousa 2001; Schmidt-Soltau 2003). Contrary to the Zambian situation, the Wildlife Policy of Tanzania which was released in 1998 specifically promotes the devolution of control over wildlife to local people and private land owners, in order for them to directly gain fair and equitable benefits from wildlife presence on their land (Nelson et al. 2007; The United Republic of Tanzania 1998).

### **6.3.2 People's Views on the Park's Rules and Regulations**

Most (80%) of the local people felt that their lives were considered of less value than the animals and very few (8%) said they liked the laws promulgated by the Wildlife Department. They sought compensation when animals ruined their crops, but they saw the Zambia Wildlife Authority (ZAWA) as concerned to police the people and protect the animals, and they said that they were slow and ineffective in responding when called to help. According to them, the authorities had no sympathy with the communities who were facing many problems with wild animals, as there was also no compensation. They were told not to kill or shoot, but in the end they were the ones at risk, for example they said their life was full of hunger not that they were lazy but due to artificial forces. They said that with natural forces (e.g. drought) there was nothing they could do but in the Game Management area, their problems were planned by humans. Together with the fear and insecurity, there was a great deal of anger, a deep sense of disillusionment and disempowerment among the local people – that decisions were based on external criteria that local people could not influence. Out of the total 48 number of the people that were aware of the laws of the National Park (as indicated in the table above), only 4 said they liked the laws and felt protected by them. Hence presenting a minimal percentage of 8.

These findings are in line with one study conducted around Kibale National Park in Uganda that revealed high local resentment towards wildlife, as they were perceived to be the state's property and imposed upon local people by external authorities rather than voluntarily tolerated, and people also felt constrained in their ability to act to control wild animals (Naughton-Treves and Treves 2005). Similarly this was the situation in Botswana, where people reacted in whichever way they deemed fit towards wild animals as they felt that the Government benefited most from wildlife presence and therefore should be responsible for

investing in strategies to reduce livestock depredation (Hemson 2003). Another example that shows the needs of wildlife being prioritized above those of local people is that which came from a critic of the integrated conservation and development project around Ranomafana National Park in Madagascar, which was initiated to assist in lemur conservation, when he said ‘The next time you come to Madagascar there’ll be no more Malagasy. All the people will have starved to death, and a lemur will have to meet you at the airport’ (Kottak 1999, cited in Borgerhoff Mulder and Coppolillo 2005).

### **6.3.3 Level of Awareness of Management Strategies**

The percentage of people that were aware of the strategies that were offered stood at 60.0 while of those who were not aware was at 36.7. Most of the respondents cited either ZAWA or CLZ as being providers of these strategies. They requested for more such initiatives in the area as they were beneficial especially those offered by CLZ. In order to decrease the frequency and severity of interactions between humans and wildlife, there is need to put in place strategies that would prevent interactions and address conflicts appropriately. The actual and perceived level of the problem and which strategies should be implemented to address the interactions must be understood.

The need for an increase in public awareness and appreciation of effective management strategies in human-wildlife conflicts is well supported. New strategies, that help protect humans and the environment, require public outreach and support for management tactics (Treves & Karanth, 2003). The involvement of local residents will result in “public ownership in the outcome, enhanced program credibility, and realization of long term wildlife conservation goals” (Hewitt and Messmer, 1997; Messmer *et al.*, 1997, in Messmer, 2000, p. 100). Due to poor effectiveness of current strategies, there was need to search for new, publicly supported strategies embedded in environmental education.

### **6.3.4 Nature of Management Strategies**

According to ZEMA members, they did not deliberately offer strategies to people of CGM area or any environmental education activities on human animal conflict as that was ZAWA’s mandate. They would only come in if there was a developmental project going on. They carried out environmental assessment for certain projects which were likely to have significant effects on the environment by virtue, *inter alia*, of their nature, size or location, before development consent was given. These projects were likely to have negative impacts

on human beings, the fauna, the flora, the soil, water, air, the climate, the landscape, the material assets and cultural heritage, as well as the interaction between these various elements. The main purpose of an assessment of the effects of public and private projects on the environment was to attain one of the community's objectives in the sphere of the protection of the environment and the quality of life.

The projects would have been proposed by a public or private person. These projects included for example: long-distance railway lines, airports with a basic runway length of 2 100 m or more, motorways, express roads, roads of four lanes or more (of at least 10 km), waste disposal installations for hazardous waste, waste disposal installations for non-hazardous waste (with a capacity of more than 100 tonnes per day), waste water treatment plants (with a capacity exceeding 150 000 population equivalent). The developer in turn was supposed to provide the authority responsible for approving the project with the following information as a minimum: a description of the project (location, design and size); possible measures to reduce significant adverse effects; data required to assess the main effects of the project on the environment; the main alternatives considered by the developer and the main reasons for this choice; a non-technical summary of this information.

According to members from ZAWA, they partnered with a number of NGOs in dealing with human-animal conflict. According to them, areas that were more problematic had more NGOs. In Chiyaba GMA, they cited Conservation Lower Zambezi (CLZ) which was a non-profit independent conservation organization originally established by stakeholders of the Lower Zambezi National Park (LZNP) and Chiyaba Game Management Area (GMA) and registered under the Societies Act of Zambia in 1995 whose primary objective was to assist in the protection of wildlife and its habitat as a resource for the people of Zambia. Also the African Wildlife Foundation (AWF), which was founded in 1961 as the African Wildlife Leadership Foundation. When founded in 1961, its purpose was to train Africans to maintain game reserves professionally, ensuring an adequate supply of game for hunters on safari. Later, the mandate evolved to supporting western scientists in studies of protected animals in their natural habitat. More recently, the focus had been on developing sustainable systems that benefited both animals and local human communities. The goal of this Project was to support integrated and participatory micro-zoning of the Development Zone of the Chiyaba Game Management Area and improve and demonstrate value of resource protection and income

generation from the natural resource base. <http://www.csefzambia.org/african-wildlife-foundation>.

Efforts to carry out an interview with a CLZ member proved futile as by the time the researcher got to ZAWA Chirundu, the person in charge, Ian Stevenson was not around only his wife and the communication officer was on site. As such he requested that the researcher makes fresh arrangements or he would communicate to her via email.

### **6.3.5 Exhibition of Positive Change by Communities**

ZAWA members attested to the fact that after teaching the people ways of dealing with human-animal conflict, sometimes positive change was seen as these people were able to put into practice these strategies. But sometimes they said that wild animals were a state property and as such was to be taken care of by the state or that, that was how they had always lived (conflicting with wild animals) from time in memorial, as that was their culture, their livelihood.

According to the local people, they viewed wild animals as state property unlike before the British Government colonized Zambia when wildlife was controlled and managed by indigenous people through Chiefs. Under the leadership of Chiefs, wildlife was used for the benefit of the community and formed an integral part of their lives. With such a misconception, it became very difficult for people to adhere to any rules or strategies.

### **6.3.6 Benefits of Management Strategies**

The response from ZEMA was that once people were informed, they would take care of the environment. According to ZAWA, over time, their strategies would result in a change of behaviour among local populations and would contribute to reduced risks, improvements in local livelihoods and a reduction in their vulnerability. In an optimistic scenario, education and training would promote commitment towards conservation, raise awareness of the essential role of wildlife in ecosystem functioning and its ethical and economic value, as well as its recreational and aesthetic importance.

The local community said the strategies offered by CLZ were more beneficial unlike those offered by ZAWA. They said these taught them how to safely live side by side with wild animals.

### **6.3.7 Frequency of Providing Management Strategies**

Responses here varied, the true picture (61.7%) showed that strategies were being offered but not regularly as many people could not figure out the specific times. Some said these strategies were offered once per month, others said once per term, while others said they had never been offered at all. Among the providers of these strategies were CLZ and AWF.

### **6.3.8 Frequency of Meetings between Community Members and ZAWA Officials**

It is apparent from the research that there was little contact between community members and the ZAWA authority. Sixty-five (65) percent of respondents reported that contact only occurred following reports by the community over problems caused by these wild animals, while 18% said that contact never occurred at all.

Though the community was supposed to be represented by the community resource board on issues of human-animal conflict and many others, it appeared that was not the case. The CRB were to have members elected by the local community. The local authority and the Chief were represented by one person each with the Chief serving as a patron of that Board. CRBs were assisted by their village representation, the Village Action Groups (VAGs). The formation of CRBs has had two positive impacts. CRBs had provided platforms for development organizations who wished to help improve communities' welfare. Communities in turn had a forum in which to participate in development planning. Furthermore, ZAWA had returned hunting revenues which, in most GMAs, were not available to the communities before. CRBs were meant to be conduits of sharing benefits of wildlife management with residents of GMAs. According to community members however, the performance of CRBs had been generally unsatisfactory, they cited financial misapplication of community funds, lack of transparency in the administration and unfavorable influence by chiefs on expenditure of community funds.

This resentment by local people at their lack of voice or involvement in conservation issues was not only the case of Chiyaba but a widespread concern (Kallonga *et al.* 2003). Public and local support is essential for success in wildlife conservation (Bath, 1998); as illustrated with coexistence of humans and carnivores in Europe and North-America (Linnell *et al.*, 2001) and wolves in Italy (Glikman *et al.*, 2011). Involvement of public opinions in wildlife management decisions is a first step towards successful coexistence (Mehta & Heinen, 2001). Positive attitudes toward wildlife and conservation are an important fundament (Heberlein,

2012) for furthering conservation efforts. Therefore, it is essential to understand the factors involved in the formation and change of attitudes towards wildlife, and to understand how environmental education could contribute to this.

#### **6.3.9 Proposed solutions to the Problem**

A high percentage of respondents (40%) noted that compensation represented the best means for addressing human- animal conflict in Chiyaba GMA.

The local people of Chiyaba GMA also said that it would be important to involve them in every decision concerning the management of human- animal conflict as they were the ones directly involved.

These participants were adamant that local government must be involved actively in resolving such conflicts as was the case. These communities said they needed new resources to be identified and made available to them so as to help them take on a more direct response to conflicts.

Other respondents were for the idea of having educational campaigns in practical skills that would help them deal with dangerous wild animal species and acquire and develop new tools for defending themselves, their crops and livestock.

They appreciated CLZ for working closely with them to help reduce human-wildlife conflict by promoting conflict-mitigating activities such as chilli fencing and elephant behaviour workshops. In 2012, CLZ trained 30 farmers how to grow chilli and build fences and 120 community members how to understand various elephant behaviours (field survey, 2014)

Very few (5%) opted for the relocation of either people or wild animals from the area. If areas offering better access to natural resources and improved socio-economic opportunities were offered, these people said they would not hesitate to leave. The majority of the people however, believed that they had coexisted with wild animals since time immemorial and they were willing to coexist provided substantial benefits accrued to the community. This implied that, if this attachment continued, the future of nature in Chiyaba GMA and LZNP was assured.

## **6.4 AWARENESS BY LOCAL PEOPLE OF THE ROLE EE COULD PLAY IN ADDRESSING HUMAN-ANIMAL CONFLICT IN CHIYABA GMA**

### **6.4.1 Understanding the term Environmental Education**

The data revealed that the majority (90%) of the respondents had no idea about the meaning of the phrase EE only 10 percent understood the phrase under discussion. This could have been due to the fact that the majority of the people's educational level went only up to primary. The information on understanding EE was critical in assessing how much still needed to be done in terms of filling in gaps related to conceptions of EE in Chiyaba GMA.

Environmental education helps individuals to comprehend the capacity, capability as well as the constraints of the environment with respect to the broad global environment, this enables them to make collective or individual decisions that are economically as well as ecologically sound (UNESCO-UNEP, 1977). Previous research has demonstrated that the more knowledgeable people are about human-animal conflict in their area, the more tolerant they tend to be of their presence (Ericsson and Heberlein 2003). Knowledgeable people are also more likely to behave in a way that lessens the chance of conflict arising in the first place (Conover 2002). However, this is not a clear-cut relationship: studies in the US have shown that knowledge is often only weakly correlated with values and attitudes towards wildlife, with correlation coefficients of 0.30 or less (Tarrant *et al.* 1997). Despite this, misinformation and a lack of knowledge about carnivores has been linked to higher human-wolf conflicts in southern Europe (Meriggi and Lovari 1996) and more intense jaguar-human conflicts in Brazil (Conforti and de Azevedo 2003).

### **6.4.2 Awareness of the Role EE could play in mitigating Human-Animal Conflict**

Since the majority (90%) of the people could not understand the meaning of the term EE, it was obvious they would not be aware of its role in mitigating human-animal conflict, and that was the case. This could be the reason human-animal conflicts were high in Chiyaba GMA because the local people knew nothing about the important role environmental education could play in addressing the problem. Environmental Education and training activities at different levels, for instance in schools or in adult education arenas such as farmer field schools, would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of HWC.

According to Kimutai (2006), environmental education aims at providing learners with the opportunity to gain an awareness or sensitivity to the environment, knowledge and experience of the problems surrounding the environment, to acquire a set of values and positive attitudes to obtain the skills required to identify and solve environmental problems, the motivation and ability to participate. Marker and Dickman (2004) attributed some of the apparent success in improving attitudes towards cheetahs to widespread environmental education programmes, which had a particular focus on cheetahs. These studies suggest that if local people show hostility but have little knowledge about carnivores in their area, then investing in environmental education could potentially be a valuable strategy for conflict resolution (Conforti and de Azevedo 2003; Kellert *et al.* 1996). The importance of being knowledgeable about EE is emphasized by Gopal and Anand (2005), who have defined it as a process that aims at developing environmentally literate citizens. Citizens with skills, knowledge and inclinations to make informed choices concerning the environment.

However, the relationship between knowledge and positive action is a complex one, with aspects such as perceived individual control also important: people with an 'internal locus of control' expect to receive individual benefits from changing their actions, and are therefore more likely to do so than people with an 'external locus of control', who see no likely individual benefit from changing their actions and therefore are unlikely to do so (Hungerford and Volk 1990). Moreover, people with better education and more knowledge about wildlife are also those who are more likely to be employed by tourism initiatives (Ashley *et al.* 2000), which makes the true reason for any more positive views towards wildlife harder to discern.

#### **6.4.3 Mode of Teaching Environmental Education Activities**

According to ZEMA Members, they engaged the community on the effects of any developmental project through discussions and public hearings. ZAWA members said that they did conduct awareness campaigns through print and electronic media, seminars and workshops or through any other suitable means.

In line with the above findings, other scholars have cited training, educational programs, field trips, instructional materials; literature, magazines, television programs, interactive multimedia computer programs as learning tools available in environmental education (Ascione 1992, Davidson and Ritchie 1994, Lepper and Cordova 1992).

#### **6.4.4 Evaluation of Environmental Education**

Members from ZEMA said that they evaluated their lessons by producing Environmental Outlook Reports, though the challenges that came with that were about how many people were to have access to those reports. They also went back to monitor the effects of the projects, and ensured that the developers were compliant with the laid down guidelines. According to ZAWA officials, they did send their officers in the field that did spot checks and carried out patrols, how often that happened depended on how problematic an area was. The more problematic an area was, the more attention it received.

#### **6.4.5 Challenges experienced in delivering EE**

Challenges faced by ZEMA were about not being felt all over the country, they were only present in four towns; Lusaka, Ndola, Chirundu and Livingstone, as well as lack of funding. According to ZAWA, the main challenge was failure by people to adhere to any rules or strategies put in place. They also cited lack of enough manpower and funding limitations.

Everywhere else challenges in the field of EE are being felt. With the advent of standardized testing, school priorities are changing leaving very little additional time for environmental education activities and programs (Hunt & Shapiro 2004, Parlo & Butler 2007, Perrone 1991, Salmon 2000, Simmons 1997). Funding has been cut; field trip programs have been cut or reduced to preclude the loss of test preparation time (Parlo & Butler 2007, Simmons 2006, and Salmon 2000). Teachers have less class time because they are required to spend so much time on test preparation and curriculum priorities (Hunt & Shapiro 2004).

### **6.5 Specific Role that EE could play in Addressing Human-animal Conflict in Chiyaba GMA**

#### ***6.5.1 Introduction***

Attitudes towards wildlife can change due to newly developed ideas, values, insights and changes in experiences. These changes are not always in the direction of sustainable coexistence with wildlife. Many efforts have been made to educate people with a view to changing attitudes in favour of wildlife conservation. However, what is actually the aim of education, and how is it interpreted in relation to environment and wildlife? The definition of education is described by Mappin & Johnson (2005), as *'The development of the mind's capacities and character through acquisition of knowledge and abilities to assess and evaluate this knowledge'*,

Environmental education is, on the other hand, often meant to elicit behavioural change, personal change or social change (Mappin & Johnson, 2005). Here, education has the aim of changing attitudes and behaviour. It becomes more a matter of teaching *for* rather than *about* the environment (Disinger, 2005). Education for the environment suggests creating conservation friendly behaviours and generating pro-conservation attitudes (Palmer & Muscara 1991), thereby actually manipulating people. These forms of ‘education’ become much more value-laden than only the communication of scientific facts (Disinger, 2005). The question here is who decides what the right behaviour is and which underlying values, philosophies and even ideologies lay behind it.

Environmental education will here be reviewed with the purpose to change attitudes towards sustainable coexistence with wildlife. A certain degree of value-laden communication can be accepted when benefits of coexistence with wildlife is taken into account from the four main environmental value-orientations. Environmental education will therefore take into account personal gains (egocentric), benefits for future generations and the community (anthropocentric), wildlife welfare and rights (biocentric) and biodiversity and ecosystem productivity (ecocentric) (Schultz & Zenezny, 1999).

### **6.5.2. The Audience and Communication**

Effective education starts with public involvement and choosing the audience. Different groups may demand different purposes, approaches and ways of communication (Schafer & Tait, 1986; Mappin & Johnson, 2005). The motivation to change, openness to new information and willingness to participate in environmental education is crucial for positive attitude changes toward wildlife (Crano & Pristlin, 2006; Olson & Zanna, 1993).

#### ***6.5.2.1. Schools and Young People***

Young people are willing to explore new ideas and are building up their personal values and attitudes (Heberlein, 2012; Leifländer *et al.*, 2012). Especially before the age of 11, environmental education can create great success in fostering pro-environmental attitudes and affection for wildlife (Leiflänger *et al.*, 2012; Kidd & Kidd, 1996). Schools are therefore a good place to apply environmental education (Schelly *et al.*, 2012; Kidd & Kidd, 1996).

The primary purpose of schools is to provide students with knowledge that helps them understand and participate in society (Stevenson, 2007). The idea of caring for the environment and wildlife could be included in teaching social responsibility (Disinger, 2005; Stevenson, 2007). Students at schools are easily approachable via classroom programs, but also via more practical, outdoor experiences with wildlife (Easler-Dettman & Pease, 2010). The social surroundings in schools can work in advantage for positive attitudes. In groups, there is a tendency towards uniformity in attitudes, mutually reinforced by teachers and students (Schelly *et al.*, 2007; Schafer & Tait, 1986; Chaiken & Stangor, 1987).

#### **6.5.2.2. *The General Public***

The general public is more difficult to reach than students in schools, since participation in environmental education is more dependent on motivation and the possibility to participate. The purpose of environmental education is here to generate more positive attitudes, by increasing awareness of benefits gained from wildlife and creating a general understanding of wildlife.

Most people hold relatively neutral attitudes toward wildlife but attitudes can vary from strongly positive to strongly negative (Manfredo, 2008; Heberlein 2012; Røskaft *et al.*, 2007; Jacobs, 2009). The motivation to participate in environmental education programmes may be highest among people who already have a positive attitude (Heberlein, 2012; Mosler & Martens, 2008). However, also relatively neutral or slightly positive attitudes can be pulled in favour of coexistence with wildlife. Here the general level of education, gender and age may matter and can help in understanding or selecting the audience for participation in environmental education.

Different ways to approach the general public include media, like television and internet (Jacobs, 2009), zoos (Marseille *et al.*, 2012), outdoor education programs (D'Amato & Krasny, 2011) and ecotourism (Tisdell & Wilson, 2005). These last two options demand a certain degree of interest in wildlife and the environment to make people participate. For example, an educational programme for bear conservation in Ecuador reached the public via workshops, a project newsletter, a radio programme and a 'Bear Day' with interactive educational activities (Espinosa & Jacobson, 2012). This programme was however, directed to people living within the reserve and can, maybe, be more regarded as local than public.

### 6.5.2.3. *Local People*

Many educational programmes are directed to local people in conflict areas. These programmes are often focused on solving wildlife related problems or increasing tolerance (Thorn *et al.*, 2012; Sifuna, 2010; Zajac *et al.*, 2012). Hereby, it is especially important to provide relevant information and take into account the cultural and historical background of the Attitude of residents (Manfredo, 2008). This may be difficult when cultural traditions cause for example high degrees of depredation like in Norway, and alternating traditional ways of livestock keeping could particularly solve the problem (Kaczensky, 1999).

The economic and social situation of local people must be taken into consideration. Poor people are more negative towards conservation when it imposes economic costs, but are not necessarily less concerned about wildlife and the environment (Shrestha & Alavalapati, 2006). On the other hand, providing economic and personal benefits from conservation could shift these people towards more positive attitudes (Kideghesho *et al.*, 2007). Local people can be approached best via one-to-one, personal communication or in small groups. This is more effective in collaboration and fostering positive attitudes than large group or mass-media orientated educational programmes (Heberlein, 2012; Mosler & Martens, 2008; Lescureux *et al.*, 2011).

### 6.5.3. **Understanding the Audience**

The next step is to examine the attitudes held in the target group and the potential for change (Schafer & Tait, 1986). Too many educational programmes have been started without actually understanding the audience's attitudes and motivations to hold this attitude; resulting in a waste of time and money (Heberlein, 2012). Underlying values, that is, personal and social needs, cultural and situational influences, need to be addressed.

In the case of teaching young people, the focus may be more on understanding the cultural background and attitudes of their parents and their teachers at schools. When orientating more towards the public, a larger variety of attitudes may be present. Here, the focus on neutral or slightly positive attitudes may be more effective (Heberlein, 2012; Manfredo, 2008). For example, communication of future environmental problems works only on future orientated people, who already are concerned and for whom the environment is personally relevant (Carmi, 2012).

When knowing the attitudes held by the target group, the educator should not differ too much in opinion from the audience (Schafer & Tait, 1986). This may enhance credibility among the audience. Distrust among local people for educators or scientists, is a commonly encountered problem in communication with local people (Lescureux, *et al.* 2011). Especially when local information has passed through several generations and is assumed to be the truth, people can be rather skeptical towards science (Lescureux *et al.*, 2011; Heberlein, 2012). Showing respect for and interest in local people is in any case crucial (Chaiken & Stangor, 1987; Schafer & Tait, 1986; Lescureux *et al.*, 2011). Good contact with locals and eventually asking a local person with status to present the topic can be a good strategy (Lescureux *et al.*, 2011; Heberlein, 2012; Schafer & Tait, 1986). For example, acceptance of black bears was rather dependent on the feeling of trust toward bear management in rural communities. In urban communities, on the other hand, the focus on personal control over negative interactions with bears was more important (Zajac *et al.*, 2012). In any case, good communication between educators and the public is crucial for moving towards successful coexistence with wildlife (Zajac *et al.*, 2012). People need to have a feeling of control and freedom to keep their own opinions. The public must feel important and there must be space for interaction and discussion (Schafer & Tait, 1986; Kaczensky *et al.*, 2003; Bath, 1988; Majić *et al.*, 2011). Especially when focusing on attitude change, it can be important to offer the public different points of views with argumentations (Jickling, 2005). This may help people to think critically and creatively. It can help them to solve a local problem concerning wildlife and may thereby possibly change attitudes.

#### **6.5.4 Information Orientated Education**

##### **6.5.4.1 Providing Information**

When problems with wildlife occur and conservation biologists or educators try to solve it, it is often thought that just ‘educating the public’ will fix the problem (Heberlein, 2012). This is frequently done through the provision of scientific facts, but its effect is worth discussing.

Existing attitudes influence attention, selection and interpretation of information and can strengthen both positive and negative attitudes (Manfredo, 2008; Olson & Zanna, 1993; Ajzen, 2001). People who already hold a positive attitude are eager to strengthen and support their attitudes with more beliefs in line with their existing attitude (Mosler & Martens, 2008; Heberlein, 2012). The same can happen for negative attitudes (Heberlein, 2012; Ajzen, 2001). Objective information about wildlife can reveal, for example, that depredation is more serious,

or the population size of a conflict species is larger than previously believed. This might result in the opposite effect than intended and so even create more negative attitudes than positive attitudes (Linnell *et al.*, 2001).

#### **6.5.4.2. *Drawing attention and awareness***

On the other hand, information can draw attention to a problem related to wildlife like a conflict or decline of wildlife populations. It may give insight and awareness which people otherwise would not have seen. Promoting flagship species in wildlife conservation can for example increase awareness (Schlegel & Rupf, 2010). However, being aware of a problem does not mean being concerned about a problem (Kollmus & Agyeman, 2010), but awareness is at least a first step towards concern. Creating attention and awareness for wildlife implies coverage of a large group of people and usage of media or educational programmes at schools may be options.

#### **6.5.4.3 *Replacement of Wrong Beliefs***

When attitudes are based on misinformation, information provision can be enough to change neutral or already slightly positive attitudes, when no other personal needs are involved (Schafer & Tait, 1986). Information can also clarify a lot of culturally transmitted beliefs and myths that evoke fear. Fear is an important driver of negative attitudes, especially towards large carnivores (Lescureux, 2011; Røskaft, 2007; Kaczensky, 2003). Information about the behaviour of animals, but more importantly, how people can behave when confronted with a predator can reduce experiences of fear remarkably (Hudenko, 2012). This information can help when general attitudes are already positive (Kaczensky, 2003) but may not be sufficient when attitudes are negative. Information only could for example not reduce fear for snakes (Morgan & Gramann, 1989).

#### **6.5.4.4 *Problem Relevant Information***

Objective scientific information can be used to solve problems locally. Hereby it is especially important to take the situation of local people into account and listen to their opinions (Schafer & Tait, 1986). Educators can provide scientific facts and help people to interpret it and translate it into action in favour of both wildlife and humans (Mappin & Johnson, 2005). Providing information about, for example, benefits of bear conservation and the actions that can be taken to reduce conflicts, increases tolerance towards bears (Slagle *et al.*, 2013). As discussed earlier, this form of education becomes less objective and more value-laden, since

educators decide to foster wildlife tolerant attitudes and select information based on this goal (Mappin & Johnson, 2005). Education focused on solving environmental problems with the help of education can also be applied on schools and may build responsibility among students (Jickling, 2005; Stevenson, 2007; Schelly *et al.*, 2012).

### **6.5.5 Persuasion and Experience Based Education**

#### **6.5.5.1 Persuasive Messages**

The degree to which neutral, objective information about general biology of a species, contributes to the constitution of positive attitudes towards wildlife is very low (Heberlein, 2012). People with neutral attitudes often do not care about information and a lack of interest and personal, emotional relevance might prevent effective processing and remembering of information (Heberlein, 2012; Jacobs, 2009; Jacobs *et al.*, 2012). Persuasion, on the other hand, involves strategies to manipulate people's attitude and do include more than only objective information. Persuasive messages are frequently presented by a single speaker who has to appear trustworthy and credible (Olson & Zanna, 1993; Schafer & Tait, 1993). Persuasive messages can be given indirectly by giving hints and pushing people in the desired direction by giving affective cues. This is often described as the peripheral way of persuasion and avoids direct confrontation with the issue, while the central way of persuasion directly confronts people with the issue (Chaiken & Stangor, 1987). The central way of persuasion involves active, message relevant, thinking (Chaiken & Stangor, 1987).

Persuasive messages focused on key beliefs resulted in more positive attitudes among hunters for the regulation of lead shot (toxic shot in small game hunting) in USA (Schroeder *et al.*, 2012). The message supported the idea that the ban of lead shot would have benefits for wildlife, improves the hunting opportunity for hunters, the image of hunters and that it avoids unnecessary governmental regulation (Schroeder *et al.*, 2012). Structuring the message may determine effectiveness, as for including affective, personally relevant information (Olson & Zanna, 1993). For example, placing the most important argument last works best when the audience is already interested, but placing this first works best when the audience is neutral or uninterested (Olson & Zanna, 1993).

#### **6.5.5.2 Learning by Experience**

Experience and affection are some of the key factors driving attitudes, and can be used effectively in environmental education. Early outdoor experiences among children did not explain individual variation in environmental attitudes (Ewert *et al.*, 2005). However, people who actively participated in outdoor adventure education programs did experience personal growth and changes in more pro-environmental behaviours (D'Amato & Krasny, 2011). However, these effects are often not persistent over time (Heberlein, 2012). After education focused on being 'in' nature, students had more positive attitudes than with in-class education only (Dettmann-Easler & Pease, 1999). These positive attitudes were present after three (3) months, but were not present for classroom education. These effects of a more persistent pro-environmental attitude were especially prominent in children below the age of eleven (11) (Leifländer *et al.*, 2012).

Adult-focused experience based education can include wildlife related workshops (Espinosa & Jacobson, 2011), which can be relevant in promoting coexistence with wildlife at a local level. This can for example be practical workshops in alternative ways of protecting livestock or learning how to behave when confronted with a predator. Education can also be implemented in wildlife recreation experiences, of which ecotourism is a good example (Tisdell & Wilson, 2005). The problem with ecotourism is that only people who are already interested engage in these activities and educational values depend on many other factors (Reynolds & Braithwaite, 2001). However, positive experiences through ecotourism can be spread among friends and family and may raise interest and curiosity, which may possibly contribute to a more positive attitude toward wildlife.

#### **6.5.6 Affection Based Education and the Role of Art**

Affection for wildlife may mediate how outdoor and experienced based education may influence attitudes. The implementation of affection and emotional experiences in environmental education strongly reduces the objectivity, but may increase the effectiveness, of fostering positive attitudes toward wildlife.

##### **6.5.6.1 Preferences for Particular Animals**

Positive emotional experiences of seeing a wild animal or coming in contact with a wild animal are the consequence of conditioning. Firstly, the emergence of positive emotions is linked to an animal as a stimulus (Jacobs, 2009). Secondly, and maybe more importantly, is

the recognition of emotions in other animals, thereby creating empathy for the animal's feelings (Jacobs, 2009). Humans have the tendency to anthropomorphize with other animals, which can lead to misinterpretations of behaviour but can also strengthen emotional bonds (Jacobs, 2009). Innate predispositions for liking or disliking can enhance conditioning of emotional reactions towards some animals, which might explain the strong fear responses for snakes, spiders or large predators and the affective reactions on more 'lovable' species and young animals (Schlegel & Rupf, 2009).

#### ***6.5.6.2 Indirect Experiences***

Conditioning of positive experiences can be implemented in educational programs. Especially at schools young children can become familiar with animals by, for example, petting them under the supervision of adults (Kidd & Kidd, 1996). Also modern media and more indirect experiences can shape attitudes towards wildlife. Television and internet cannot only be used to create awareness and draw attention, but may also work to create more affection. Hereby the focus can lie especially on showing animals familiar to the public and by showing similarities between wild animals and pets or humans (Jacobs, 2009). This does not directly have to involve anthropomorphism, but can be based on the increasing evidence for similarities in emotions and cognition between humans and other animals (Manfredo, 2008). This argument caused for example high tolerance to problem chimpanzees, since they were seen as 'like people' (McLennan & Hill, 2012).

#### ***6.5.6.3 Art and Creation of Affection***

Several forms of art can be good ways to create affection for wildlife, based on indirect experience. Art can reach people via paintings, photography, music, stories, movies and nature documentaries. The effect of wildlife related art forms has not been explored in detail yet, but may be promising in the future. Viewing, but especially creating art evokes emotions and stimulates linking emotions, deeper lying personal values, past experiences and beliefs together (Lawrence, 2008). Thus via art, feelings towards wildlife can be linked with other personal feelings, which may give a deeper meaning to wildlife. This can make wildlife more emotionally relevant. Since emotional relevance promotes storing and remembering of information better, wildlife related art can enhance learning about wildlife (Lawrence, 2008).

A visual artist can portray animals in a different way than in reality and can evoke an emotional response in the viewer via communicating his/her own fascination for animals

though the artwork. Aesthetical experiences activate emotion related areas in the brain, while a neutral stimulus does not (Cupchick *et al.*, 2009). Humans also have an innate affection for biological movement, which can be implemented in art and evoke aesthetical experiences (Jacobs, 2009). Also showing emotions of especially ‘lovable’ animals can be depicted excellently via art by showing for example mothers with offspring, animals showing affection for each other or an animal in the battle of survival. A point of discussion can be the degree of anthropomorphism that is accepted in order to make people learn about wildlife via art. This can be a very effective way in generating empathy, but also in learning about a species via recognizing human-elements in it (Jacobs, 2009; Manfredi, 2008). However, when learning about behaviour and becoming familiar with other animals stands central, it may be best to stay close to reality, which forms a challenge for the artist.

#### ***6.5.6.4 Forms of Art Suitable for Education***

Another way to connect people with wildlife is via written stories as well as movies. Stories can create strong identification with the main character which can be a non-human animal (Bigger & Webb, 2010). Many children visiting zoos get excited by seeing clownfish, the species of the main character in the animation movie ‘Finding Nemo’ (Jacobs, 2009). Non-human animals as main characters in stories, demand a high degree of anthropomorphism, but are a powerful way to make children learn about wildlife. Wildlife related creativity could be promoted more at schools, for example in the form of creating wildlife related stories (Bigger & Webb, 2010), a wildlife film-making project (Harness & Drossman, 2011) or through photography (Farnsworth, 2011).

Other ways of bringing people in contact with art can be via links to other interests like travelling and recreation. Wildlife art can be placed in travel brochures to promote ecotourism. Zoos are also a more general form of entertainment and are not exclusively visited by environmentally concerned people (Marseille *et al.*, 2012). Art exhibitions at zoo’s can thus potentially reach a reasonable proportion of the public.

Important with art is, in the light of the discussion around indoctrination and advocacy, that it is free to be interpreted by the viewer and the artist (Lawrence, 2008). It helps people to understand and interpret their environment and helps exploring their own personal and emotional relevance of wildlife. Art can therefore be a fair medium to foster positive attitudes towards wildlife and may have a promising future.

## **6.6 Summary**

Chapter six has discussed the findings presented in chapter five by relating the results to the objectives of the study hence answering the questions that were posed in the research study.

## **CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS**

### **7.1 Introduction**

This chapter summarizes the general impression generated by the data obtained from all the informants and presents some recommendations.

### **7.2 Conclusion**

This study has confirmed the prevalent of human-animal conflict in Chiyaba GMA and that despite different measures being put in place the scourge still went on. The ZAWA act of 1998 was not solving any problem as the local people complained that their lives were considered of less value than that of animals. They sought compensation when animals ruined their crops, but they saw the Zambia Wildlife Authority (ZAWA) as concerned to police the people and protect the animals, and they said that the ZAWA officials were slow and ineffective in responding when called to help. According to them, the authorities had no sympathy with the communities who were facing many problems with wild animals, as there was also no compensation.

Most of the people said that they were willing to co-exist with these animals and all they wanted were effective measures to be put in place. Organizations such as the CLZ were being appreciated for working closely with them to help reduce human-wildlife conflict by promoting conflict-mitigating activities such as chilli fencing and elephant behaviour workshops.

Conflict alleviation is a two-sided equation. Both wildlife and people are in conflict. The goal is thus to enable coexistence and sharing of resources at the same level, and this can be achieved through EE. This is best achieved by addressing both sides of the equation and finding a balance between conservation priorities and the needs of people who live alongside wildlife. Therefore, there is need to test new solutions to human-wildlife conflicts embedded in EE such as teaching young people in schools, the public and local people about personal gains (egocentric), benefits for future generations and the community (anthropocentric), wildlife welfare and rights (biocentric) and biodiversity and ecosystem productivity. The only hope now lies in EE. This is not to say EE must be applied in exclusion from other options, every situation is different: it would be risky to extrapolate from one area to another. In all cases a combination of options is needed.

## **7.3 Recommendations**

### **7.3.1 Commitment by the Zambian Government to address the Problem through:**

#### **7.3.1.1 Improved policy**

From the study above, it has been shown that strategies or methods of addressing the HWC issue were often constrained by national laws (ZAWA Act of 1998). Moreover the ineffectiveness of some of the management practices was directly dependent on the establishment and application of policies and guidelines on a wide range of human activities. The existing wildlife policies were outdated, contradictory and required clarification. The ZAWA Act of 1998 completely centralized control and management of wildlife of the country by vesting the absolute ownership of wildlife in the President on behalf of the public. That made the local people view wildlife as state property. Unlike before the British Government colonized Zambia, wildlife was controlled and managed by indigenous people through Chiefs. Under the leadership of Chiefs, wildlife was used for the benefit of the community and formed an integral part of their lives. It is therefore recommended that these policies be strengthened and made to conform to the present national state of affairs and population requirements.

#### **7.3.1.2 Introduction of Compensation Schemes**

Based on the finding that wild animals frequently destroyed local people of Chiyaba's crops and presented a constant threat of physical injury or even death to their lives, and in turn nothing was given to pay off, it is recommended that the government introduces compensation schemes. Such schemes may increase damage tolerance levels among the affected communities and prevent them from taking direct action themselves, such as hunting down and killing the elephants, lions or other species involved. Furthermore, compensation programmes may increase the return to agriculture and may therefore be viewed as a subsidy towards crop and livestock production. Such subsidies may trigger agricultural expansion and habitat conversion, an inflow of agricultural producers from outside the affected areas, and ultimately, intensification of agricultural production.

### **7.3.1.3 Introduction of EE as a Compulsory and Separate Subject**

Arising from the finding that Environmental education could be used as a tool in fighting human-animal conflict by teaching young people in schools about personal gains (egocentric), benefits for future generations and the community (anthropocentric), wildlife welfare and rights (biocentric) and biodiversity and ecosystem productivity, the Ministry of Education, Science, Vocational Training and Early Education (MESVTEE) should introduce EE as a compulsory and separate subject at all different educational levels.

### **7.3.1.4 Implementation of EE**

Since investing in environmental education could potentially be a valuable strategy for human-animal conflict resolution, policy makers must implement EE in all major agencies like ZAWA and in Chiyaba GMA in particular.

## **7.3.2 Other measures to be considered by the Zambian government and other Stakeholders**

### **7.3.2.1 Education and training activities for local people**

The findings of the study indicated that no education and training activities were offered to the local people of Chiyaba GMA concerning human-animal conflicts. Arising from this, it is recommended that education and training activities at different levels be offered.

Education and training activities at different levels, for instance in schools or in adult education arenas such as farmer field schools, would have the objective of disseminating innovative techniques, building local capacity in conflict resolution and increasing public understanding of HWC. Educating rural villagers in practical skills would help them to deal with dangerous wild animal species and to acquire and develop new tools for defending their crops and livestock. Over time, it would result in a change of behaviour amongst local populations and would contribute to reduced risks, improvements in local livelihoods and a reduction in their vulnerability. In an optimistic scenario, education and training would promote commitment towards conservation, raise awareness on the essential role of wildlife in the ecosystem functioning and its ethical and economic value, as well as its recreational and aesthetic importance.

### **7.3.2.2 Raising awareness through EE**

Since some respondents were not aware of the role that EE could play in addressing human-animal conflict, there is need for all concerned stakeholders to raise awareness through EE.

### **7.3.2.3 Involvement of Different Stakeholders in the fight against HWC**

Arising from the finding that there was only one active organization (CLZ) helping the local people of Chiyaba with ways of managing human-animal conflict, it is recommended that different stakeholders come on board and help fight the scourge.

The success of wildlife conservation and HWC reduction largely depends on the ability of managers to recognize, embrace and incorporate differing stakeholder values, attitudes and beliefs (Messmer,2000).The commitment and coordination of different stakeholders; local governments, wildlife departments or Forestry Departments, non-governmental organization (NGOs), conservation organizations, wildlife managers, the scientific community, tour operators and the tourism industry, rural villagers and other participants, is expected to enhance the participation, contribution and support of each counterpart. Encouraging the creation of partnerships and diverse stakeholders' compliance and collaboration may make any strategy more successful, may foster mutual assistance and strengthen the possibility of resolving the HWC issue. The lack of government commitment (as attested by the people of Chiyaba GMA) often produces resentment among indigenous people, which in turn develops into a negative and uncooperative attitude towards wildlife.

## **7.4 Suggestions for Future Research**

Future interested researchers could address the following areas arising from the study:-

(a) Traditional community-based methods on human-animal conflict:

- What existing methods should be continued?
- What new methods could be tried?

(b) Education:

- What can be done to lessen the effects of human-animal conflict on children's education?

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## **APPENDICES**

**APPENDIX 1: LETTER OF CONSENT AND INTERVIEW SCHEDULE FOR  
ORDINARY COMMUNITY MEMBERS OF CHIAWA GAME MANAGEMENT AREA.**

**THE UNIVERSITY OF ZAMBIA**

**SCHOOL OF EDUCATION**

**DEPARTMENT OF SOCIAL SCIENCES**

Dear Respondent,

I am a postgraduate student at the University of Zambia in the School of Education doing a Master of Education in Environmental Education. I am conducting research on; the role of Environmental Education in addressing human-animal conflict in Zambia's Chiyaba game management area

I am humbly requesting you to take part in this research by helping with the required information. Please answer the questions below as honestly as possible.

Your responses will be confidential and completely anonymous. Be informed that they are for academic purpose only.

NOTE: Please DO NOT write your name on this document. Kindly answer all the questions by ticking or writing in the spaces provided.

**INSTRUCTIONS:** KINDLY ANSWER ALL THE QUESTIONS BY TICKING OR WRITING IN THE SPACES PROVIDED.

**Section A: Perception of wildlife by local people of Chiyaba Game management area**

1. Gender Male  Female
2. Village.....
3. Age: 20-25  26-30  31-35  36-40  41-45  46-50  51+
4. Period of stay in the study area: > 1  1-5  6-10  11<
5. Education Level attained: Primary  Secondary  Tertiary
6. Main occupation; ( )
7. What problems do wild animals cause?
8. How have you dealt with such problems?

**Section B: Effectiveness of Measures Put in Place to Minimize Human-Animal Conflict in Chiyaba GMA**

9. Are you aware of the laws of the National Park promulgated by the Wildlife Department?  
Yes  
No
10. Do you like the park's rules and regulations controlling how you deal with wild animals?  
Yes  
No
11. If your answer to 10 is No, explain why?  
.....  
.....

.....  
.....

12. Are there any strategies offered to you on how to deal with human –animal conflict?

13. If any, how often are they offered?

14. Are they beneficial?

15. How often does your community meet with a staff member to discuss any matter of concern that might arise?.....

16. Which in your view would be the best way of resolving or minimizing this problem in the area?.....

.....  
.....  
.....

**Section C: Awareness by Local People of the Role EE could play in Addressing Human-Animal Conflict in Chiyaba GMA**

17. Do you understand the meaning of the term Environmental Education?

Yes

No

18. If your answer to 17 above is yes, explain

.....  
.....

19. Are you aware of the role it could play (environmental education) in mitigating human-animal conflict?

Yes

No

20. If your answer to 19 above is yes, explain

.....  
.....

**THANK YOU FOR YOUR TIME**

**Appendix 2: Interview Guide for ZEMA Officials**

**Date**.....

**Name of Institution**.....

**Position held**.....

**Sex**.....

1. Which institution trained you in Environmental Education?
2. What position do you hold?
3. Do your institution guidelines address human-animal conflicts?
4. If not, whose mandate do you think it is?
5. Do you offer any type of Environmental Education to people living in GMAs?
6. What topics do you cover?
7. What methods do you use to evaluate your lessons?
8. In general what challenges do you experience when delivering Environmental Education?
9. What do you think are the possible benefits of providing environmental education (EE)?
10. In order to effectively mitigate human-animal conflict, what do you recommend should be done?

**THANK YOU FOR YOUR TIME**

**Appendix 3: Interview Guide for ZAWA Officials of Chiyaba Game Management area.**

**Date**.....

**Position held**.....

**Sex**.....

1. Are there laws of the National Park promulgated by the Wildlife Department to help resolve human- animal conflict?
2. If there are there, are there any agencies or organizations you are partnering with in trying to resolve human-animal conflicts?
3. Did you receive any complaints about wildlife from residents of your community? (i.e. the year 2013/2014)
4. How often do you receive these complaints?
5. How often do you meet with the community to discuss any matter of concern that might arise?
6. Does the community participate in any way possible in the management of human-animal conflict?
7. Are there any environmental management strategies involved in the mitigation of human-animal conflict?

**END OF INTERVIEW**

#### **Appendix 4: Unstructured Observation Guide**

- (i) Observation of gestures, non-verbal behaviour and mannerisms made by respondents during interviews
- (ii) Observation of management strategies put in place by the local community of Chiyaba GMA.

**Appendix5:**

**Photographs**



The researcher on her way from Chiyaba GMA  
Source: Field Data, 2014.



Banana Plantations under Threats from  
Wild Animals in Chiyaba GMA  
Source: Field Data, 2014.



Banana Plantations under Threats from Wild  
Animals in Chiyaba GMA  
Source: Field Data, 2014.



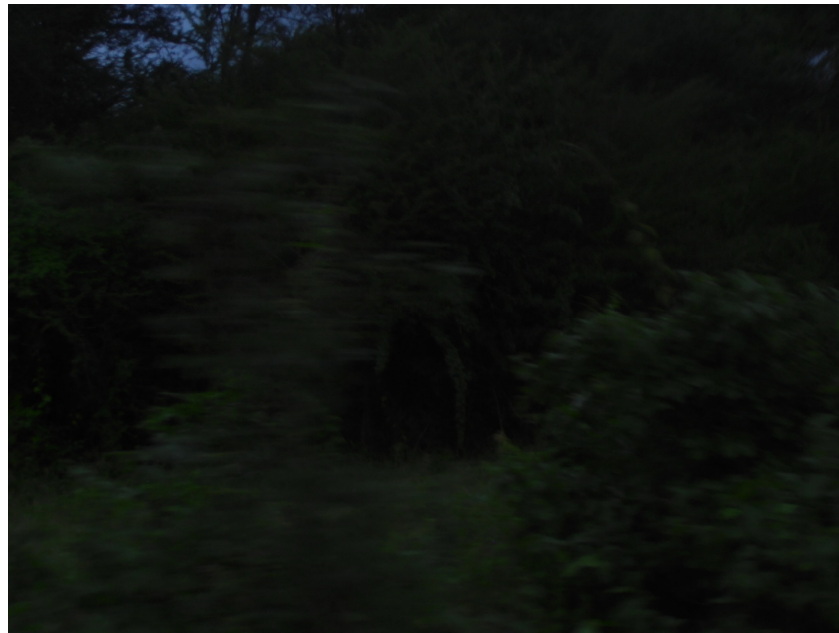
Domesticated Animals often Attacked by  
Wild Animals in Chiyaba GMA  
Source: Field Data, 2014.



Domesticated Animals often attacked by Wild Animals in Chiyaba GMA  
Source: Field Data, 2014.



Vegetation of Chiyaba GMA Dominated by Miombo Species  
Source: Field Data, 2014.



Vegetation of Chiyaba GMA Dominated by Acacia  
albida-woodland:  
Source: Field Data, 2014.