Cape Peninsula
University of Technology

A CRITICAL INVESTIGATION OF CONSERVATION ATTITUDES OF THE LOCAL COMMUNITY LIVING ADJACENT TO AKAGERA NATIONAL PARK, RWANDA

by

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Thesis submitted in partial fulfilment of the requirements for the degree Master of Technology Tourism and Hospitality Management in the Faculty of Business at the Cape Peninsula University of Technology

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DECLARATION

I, **Gaetan Ngabonziza**, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own conclusions and not necessarily those of the Cape Peninsula University of Technology.

Signed **Date**

ABSTRACT

Over the past years, protected areas have been affected by illegal activities, which are perpetrated by humans and continuations of these activities do not only harm wildlife, but also the welfare of current, as well as, future generations. Conservation of wildlife cannot be achieved if local community support is not ensured. This study aims to find whether or not improved or positive relationships between protected area and people can effect long-term conservation of wildlife. The main objectives of the study were to investigate conservation attitudes of the Rwandan community that lives adjacent to the Akagera National Park.

A quantitative survey-based study, which used a self-administered structured and close-ended questionnaire, was undertaken within a period of a month and a half to obtain information about conservation attitudes within the local community. In addition, qualitative data was gathered through in-person unstructured interviews with key informants including local authorities and park officials in order to verify and enrich quantitative data, which was obtained from the survey. Collected data was analysed with use of the Statistical Package for Social Science (SPSS) for descriptive statistics in the form of tables and charts. In addition, statistical tests, using chi-square values at the 0.05 level of significance, were conducted to determine which factors influence the local community's conservation attitudes.

The study revealed that the local community support Akagera National Park's conservation although they participate in illegal activities within the park. Poaching and livestock grazing are the main illegal activities that take place at Akagera National Park. The study also found that people's awareness of wildlife importance does not necessarily translate into positive attitudes towards conservation. Problems caused by wildlife, combined with the absence of economic opportunities from the protected areas, are strong influencing factors regarding the local community's conservation attitudes.

The findings of this study suggest that the local community's support for conservation can only be achieved if problems that are caused by wildlife are effectively addressed and solved and people are provided with more economic opportunities, which would allow them to improve their welfare.

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DEDICATION

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GLOSSARY

ANP	**Akagera National Park**
CBD	**Convention on Biological Diversity**
CPUT	**Cape Peninsula University of Technology**
IUCN	**International Union for Conservation of Nature**
MINAGRI	**Ministry of Agriculture**
MINICOM	**Ministry of Commerce, Industry, Investment Promotions, Tourism and Co-operatives**
MINISANTE	**Ministere de la Sante (Ministry of Health)**
MINITERE	**Ministere de la Terre, Environnement et des Resources Naturelles (Ministry of Land, Environment, Natural Resources and Mines)**
NBII	**National Biological Information Infrastructure**
NGOs	**Non-Governmental Organisations**
NNP	**Nyungwe Forest National Park**
ONAPO	**Office Nationale de la Population (National Office of Population)**
ORTPN	**Office Rwandais du Tourisme et des Parcs Nationaux (Rwanda Office of Tourism and National Parks)**
PAs	**Protected Areas**
SPSS	**Statistical Package for Social Sciences**
UNEP	**United Nations Environment Programme**
VNP	**Virunga National Park**
WCS	**Wildlife Conservation Society**
WWF	**World Wildlife Fund**

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Rwanda is a land-locked, tiny country, which is located in central-east Africa (Lew, Hall & Timothy, 2008:167). Its economy is small and predominantly agricultural, while its main exports are coffee and tea (Rwanda. MINITERE, 2003:8). The tourism industry is the national third income earner after coffee and tea and it has been growing steadily over the past five years (ORTPN, 2006). The industry is built around national parks which demand conservation if the tourism industry wants to achieve a target of 70,000 tourists in 2010 (ORTPN, 2006). This study suggests that wildlife conservation management should receive priority status and support in order to ensure success of protected areas. However, management of conservation has not been an easy task in Rwanda (Rutagarama & Martin, 2006:292), which has the highest population density in Africa (310 per km^2) and a population growth rate of 3.1% per annum (Rwanda. MINISANTE, 2003:16). Local people's dependence on natural resources such as farmland, fuel wood, and bush meat is high, which compromises with the conservation goals (Rutagarama & Martin, 2006:292). According to Masozera and Alavalapati (2004:90a), dependence is associated with poverty, which is high in Rwanda.

The Akagera National Park (ANP), on which the study focuses, is situated in the east of Rwanda along the Akagera River, which is the natural border with Tanzania (Abacus African Vacations, 2006, Rwanda. MINITERE, 2003:12-13). The park was established in 1934 and was once, in terms of natural beauty, landscape, scenery and animal life, one of the best national parks in Africa (Wolanski, 1995; Abacus African Vacations, 2006; WCS, 2008 & Magic safaris, nd.). The park has, however, been reduced by two-thirds of its original surface area, which was given away for the resettlement of repatriated population mainly from Congo, Tanzania, Uganda and Burundi, following the war and genocide of 1994, which killed an estimated one million people (Abacus African Vacations, 2006; Wolanski, 1995). Wildlife was also significantly reduced during the war

between 1990 and 1994 by heavy poaching (Kanyamibwa, 1998:1400). However, the park still has significant potential for the tourism industry in Rwanda. This study suggests that natural reserves potential can be exploited only when all stakeholders have a common understanding of the importance of wildlife conservation.

This study was undertaken to reveal the attitudes of local communities, which live adjacent to the Akagera National Park, towards conservation and factors that influence their attitudes and behaviours towards wildlife conservation.

1.2 Problem statement

Illegal exploitation of wildlife by the local communities in the Akagera National Park (ANP) poses threats to the conservation of its animals and surrounding vegetation.

1.2.1 Sub-problems

The wildlife in ANP is in constant danger of disruption and killings from its surrounding communities. Illegal activities are undertaken in different forms:

- A great number of people that live adjacent to ANP are pastoralists who graze their cattle around and sometimes inside the park owing to insufficient grazing land, and therefore, threaten the wildlife. This is because these pastoralists, when grazing inside the park, are likely to kill the wild animals that are in their sanctuary in order to protect their cattle.

- The National Park serves as a place to collect wood for cooking. Cutting trees for fuel-wood threatens the vegetation, as well as the park's inhabitants, namely the wild animals.

- It is believed that wilderness areas present a major source of protein, which leads people to hunt animals illegally for meat.

Therefore, illegal activities that occur inside ANP are more likely to create conflicts between local people and local officials, as well as park managers who ultimately

impose restrictions against the consumption of the wilderness area resources. Rao, Maikhuri, Nautiyal and Saxena (2002:318) suggested that these kinds of conflicts should be dealt with urgently as a delay in conflict resolution might antagonise people to the detriment of the conservation goals, which have been set for the protected areas.

1.3 Background to the research problem

Wildlife conservation may contribute towards social and economic benefits of local communities. On the one hand, tourism-related benefits are distributed across a range of service providers as a result of visitors who participate in wildlife tourism activities in local areas (Sekhar, 2003:340). On the other hand, local communities depend strongly on wildlife for their survival and livelihoods because wilderness areas provide wood, timber, medicine and grazing areas to people who live there (Sekhar, 2003:340). However, these activities contrast with conservation practices and policies and subsequent restrictions are imposed on local communities regarding use of wilderness areas resources (Mbaiwa, 2005:145). Furthermore, animal raids from wilderness areas destroy agricultural crops on which local communities depend for their survival (Mehta & Kellert, 1998:320; Sekhar, 2003:340). These may, therefore, affect the attitudes of local communities towards conservation. In an interview with the community conservation officer, Mr Karegire (2008), he commented that local communities around the ANP have been in conflict with elephants, buffalos, hippopotamus and other wild animals that invade their agricultural crops, which strongly reduce their support for conservation.

Wildlife outside protected areas is in constant danger of threats such as poaching, snaring for bush meat trade, or harassment (Okello, 2005:567). Extreme poverty and weak institutions in many developing countries result in intense hunting pressure, the conversion and destruction of wilderness areas and conflicts between local communities and wildlife (Bulte & Rondeau, 2007:312).

According to Bruggers, Owens and Hoffman (2002:213), wildlife–human conflict issues have existed for many years, clearly are increasing, and will be around for many years to come. This situation is the result of five major trends that can be expected to continue through the coming years:

(a) increasing suburban development;
(b) adaptable and over abundant wildlife species;
(c) a shift in public attitudes towards the welfare of animals;
(d) increasing media interest in wildlife issues; and
(e) advances in wildlife science and technology (USDA, 1998; In Bruggers *et al*., 2002:213).

Together with the loss of two-thirds of ANP owing to human pressure, which resulted from resettlement of repatriated population from neighbouring countries in 1994, wildlife has been significantly reduced because of the war via heavy poaching (Kanyamibwa, 1998:1399). The park was a zone of battlefield between the government troops and former rebels from 1990 to 1994 (Rutagarama & Martin: 2006:293). An aerial survey of the park indicated that from 1994 to 2002, wildlife declined by between 50 to 80% owing to human activities, including cultivation, grazing and hunting (Lamprey, 2002:4). Local people graze their cattle near and often inside the unfenced park, which continues to undermine conservation efforts (Karegire, 2008). Competition for scarce grazing and water resources has increased, and the potential for conflicts between wildlife managers and livestock owners grow as pastoralists and agro-pastoralists move into new areas and/or live around protected areas (Gadd, 2005:51). These conflicts arise from growing human demands for natural resources use for their subsistence, and from the exclusion of local communities in the conservation activities (Beresford & Phillips, 2000:17). In order to minimise conflicts, which arise when the needs of wildlife and people clash, and as means to help people and wildlife share the same landscapes, new and better land-use management practices should be established (WCS, n.d.a). This study suggests that such establishment of better management practices may contribute to positive conservation attitudes of local communities.

1.4 Research questions

This study was undertaken to answer the following questions:

- What are the attitudes of the Rwandan community towards wildlife conservation in the ANP?

- Does the Rwandan community that live adjacent to the park benefit from wildlife conservation activities in the ANP?
- What factors influence the attitudes and behaviours of the Rwandan community towards wildlife conservation in the ANP?

1.5. Objectives of the research

A main objective of this study is to evaluate the benefits and costs, which result from wildlife tourism and conservation activities for the local communities, as it is an important element for wildlife conservation. If local communities play a key role in wildlife conservation, their attitudes and aspirations need to be studied and understood. The aim of this study is to find whether improved or positive relationships between the park and people can be translated into long-term maintenance of wildlife in ANP. Sub-objectives of the study are:

- To investigate the attitudes and behaviours of the Rwandan community that lives adjacent to the ANP towards conservation ;
- To evaluate the benefits and costs that are associated with co-habitation of wildlife and the Rwandan community ;
- To discover what factors influence the attitudes and behaviours of the Rwandan community towards wildlife conservation.

1.6 Research design and methodology

This study utilised a combination of both documentary and empirical research. Documentary research, on the one hand, focussed on examining existing literature regarding factors that influence attitudes of the local people towards conservation. A number of different documents were reviewed, which included academic journals, books and reports on various projects related to conservation.

Conversely, empirical research adopted a survey-based research methodology in which a questionnaire survey was self-administered to assess the attitudes of local communities towards wildlife conservation.

The questionnaire survey was utilised to generate quantitative data. Most attitudes-related questions were close-ended, where respondents had to select from a pre-determined list of response categories. The questionnaire also comprised a set of statements from which respondents were requested to rate their degree of agreement or disagreement with given statements on a five-point Likert scale, (namely 5=strongly agree; 4=agree; 3=average; 2=disagree; 1=strongly disagree).

Qualitative data was obtained via informal, unstructured interviews with key informants, which included local leaders, park managers, as well as other park employees. The qualitative data was collected to supplement the quantitative data, which was obtained from the survey.

1.6.1 Sampling methodology

Stratified random sampling technique was adopted to obtain data from the local population. The strata were based on the location of the household within the village. The sample was comprised of 141 households residing in different villages, which are adjacent to the ANP. The study was conducted in three districts that are adjacent to the ANP, namely Gatsibo, Nyagatare and Kayonza. In each district, two villages were selected to participate in the survey. The villages were selected based on the distance between them and the Park. One village was close to the park, while another was far from the park in order to evaluate the variance that may exist between the attitudes of communities that live close to the park and the attitudes of communities that live further from the park. A total of 20 households were randomly selected in each village to participate in the survey.

1.6.2 Unit of analysis

Among the 141 households surveyed, only one member of each selected family responded to the questionnaire. Any member of the family was eligible to complete the questionnaire provided that he or she was not a minor; stated differently all respondents were above the age of 18 years.

1.6.3. Data collection

Self-administered structured questionnaires were used during this investigation. Questionnaires were presented in both the local language (that is Kinyarwanda) and English in order to obtain an overview of the local people's attitudes towards wildlife conservation in the ANP, as well as factors that would influence them to support conservation. Questionnaires that were completed in Kinyarwanda were translated into English for statistical analysis. Data was collected over a period of a month and a half from December 2007 to January 2008. A total of 141 questionnaires were expected to be completed by the households. Each selected household was surveyed individually and, if no adult from the household was available at the time of the survey, it was skipped to another one. In conjunction with the questionnaire, direct observation was conducted to explore actual human activities in and around the park. Information was also gathered from key informants including local officials and protected areas staff.

1.6.4 Data analysis

The data gathered through the above two stated methods are presented in conjunction with available literature. All collected primary data were analysed using the Statistical Package for Social Sciences (SPSS version 16.0), which helped to analyse data, compile appropriate tables and graphs, examine relationships among variables and perform tests of statistical significance based on the research questions (Babbie, Mouton, Vorster & Prozesky, 2001:583). Once all the necessary data was captured and evaluated, the results were presented, discussed and recommendations were drawn up.

1.7 Clarification of basic terms and concepts

Community: According to Anderson, Carter and Lowe (1999:76), community is a population whose members:

- Consciously identify with each other;
- May occupy common territory;
- Engage in common activities; and

- Have some form of organisation that provide for differentiation of functions, which allows the community to adapt to its environment, thereby meeting the needs of its components. In the context of this research, a community is defined as a group of people who live in a particular local area.

Attitudes: Attitudes refer to the way a person behaves towards something or somebody, which shows how he thinks and feels (Advanced Learner's Dictionary, 2000:62).

Wildlife: It is any species of wild birds and mammals (a definition usually used by practitioners of wildlife management), all terrestrial and aquatic vertebrates, as well as all wild animals and plants (Michael, 1999:593).

Conservation: Conservation is the protection, preservation, management or restoration of natural environments and the ecological communities that inhabit them (American Heritage Science Dictionary, 2005). It is generally held to include management of human use of natural resources for current public benefit and sustainable social and economic utilisation. Conservation in the real world is not only about establishing preserves to protect Earth's diversity, but going beyond them to save wildlife on all fronts (WCS, n.d. b).

National Park: According to IUCN (1994:261), a national park is a natural area of land and/or sea, which is designated to:

- Protect the ecological integrity of one or more ecosystems for present and future generations,
- Exclude exploitation or occupation inimical to the purposes of designation of the area; and
- Provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

1.8 Underlying assumptions

Communities that live adjacent to the ANP benefit from its natural resources. They regard the wilderness area as a most appropriate area for cattle grazing, fuel-wood collection, fodder and other non-timber forest products, as well as meat from hunting. In addition, they benefit from protected areas conservation projects and tourism activities. However, introduction of conservation policy and practices in the wilderness areas tends to protect wildlife, which imposes restrictions on local communities in terms of exploiting the protected area. Consequently, local people pay indirectly not only by loss of access of resources from the protected area, but often by direct losses from crop and livestock raiding by wild animals (Sekhar, 2003:340). If the local people bear the actual cost of conservation without obtaining significant benefits from it, they will develop negative attitudes towards wildlife conservation (Borner, Mendoza & Vosti, 2007:357; Skonhoft, 2007:224). Therefore, the following hypothesises can be made:

- Rwandan community that live adjacent to the ANP are more likely to hold positive attitudes towards wildlife conservation if their benefits from conservation outweigh their costs, which result from wildlife conservation.
- Rwandan community that live adjacent to the ANP are more affected than those that live far from the park.

1.9 Delineation of the study

The survey was limited to Rwandan community that live in villages, which are adjacent to the Akagera National Park. The rest of the Rwandan community were not investigated. Only persons of 18 years and older were eligible to participate in the survey, since minors lack legal capacity to act.

1.10 Significance of the study

This study should be of particular significance to conservationists and tourism planners, and should help them to understand the attitudes of local communities towards wildlife conservation and this understanding will assist them to consider local communities'

needs while planning for any tourism development project in the area. The study should also benefit wildlife tourism in the ANP. The reason is that local people's support for conservation may increase if they are involved in tourism activities. In addition, this study should be important for the Rwandan Government owing to the fact that the National Park's protection should attract a large number of tourists who will contribute to national income through their spending.

1.11 Summary

This chapter has provided an overview of the thesis. It began by introducing the ANP location on which the study focuses, as well as past and present challenges to conservation vis-à-vis human activities.

The chapter identified problems that the local communities pose, such as threats to wildlife conservation through their illegal exploitation within the protected area. The illegal activities undertaken by the local communities include poaching, livestock grazing, as well as fuel-wood collection. The high population growth, which requires increased land, a high level of poverty, which increases the dependency of the local communities on the park resources, as well as problems that wild animals create through crops and livestock depredation, have been highlighted as background to the problems that the ANP currently faces.

This chapter also established aims of the research, which are to determine factors that affect people in their relationships with wildlife and whether or not improved or positive relationships between the park and people can be translated into long-term conservation of the ANP. The aim of the research would be attained by finding answers to key questions that are posed in the study.

In this chapter, a brief overview of the methodological approach, which was used to collect data about conservation attitudes of the local communities living adjacent to the ANP, was also provided. The research methodology is explained in detail in Chapter Three. In addition, this chapter has highlighted the delineation, as well as the significance of the study.

The rest of this research report comprises four main chapters, which are structured as follows:

Chapter Two explains the issue of wildlife conservation and its impact on local communities. It begins with highlighting the convention on biological diversity, which each United Nations member country should adhere to in an effort to preserve and maintain sustainable use of natural resources. It also provides a description of the study area and the needs for wildlife conservation. This chapter also highlights both positive and negative impacts of wildlife conservation on the local communities. Furthermore, it discusses implications for reducing conflicts between protected areas and the local communities. These include, among others, active participation of local communities in wildlife conservation and benefits that may be accessed through tourism activities.

Chapter Three provides details of the research methodology, which was conducted for the purposes of this study. It presents methods that were used in the study comprising the study design, study population and sampling method. It also describes data collection methods and analysis techniques, which were utilised in the process. The chapter also presented limitations, which were encountered in the process.

Chapter Four presents and discusses results of the study.

Finally, the last chapter, which is Chapter Five, provides a summary of the study. It concludes and suggests recommendations for implementation, and finally, provides suggestions for future research.

CHAPTER TWO

WILDLIFE CONSERVATION AND ITS IMPACT ON THE LOCAL COMMUNITIES

2.1 Introduction

This chapter provides a theoretical background, which is necessary to be able to investigate conservation attitudes of local communities that live adjacent to the ANP. The chapter highlights the convention on biological diversity, which each United Nations member country should adhere to in an effort to preserve and maintain a sustainable use of natural resources. It also provides a brief description of the area of study, followed by a review of the need for wildlife conservation. The impacts of wildlife conservation on local communities that live adjacent to the protected area, as well as the role of local communities in wildlife conservation, are discussed. The chapter also examines the extent to which local communities engage in illegal activities that infringe on the rights of wildlife in their habitats; lastly, the extent of tourism activities that take place in Rwandan National Parks is also highlighted. Owing to an inadequacy of literature in Rwanda, most of the literature reviewed focuses on international studies.

2.2 Convention on biological diversity

Amid growing pressure on biological diversity by human activities, which have resulted in destruction of natural resources, the United Nations Environment Programme (UNEP) launched an initiative in order to prepare an international legal instrument for the conservation and sustainable use of biological diversity (Rwanda. MINITERE, 2003:1-2). Subsequently, on the 22 May 1992, UNEP organised the Nairobi United Nations Conference, which adopted the agreed text for the convention of Biodiversity Conservation with three fundamental objectives, namely:

- Conservation of biodiversity
- Sustainable use of its components; and
- Fair and equitable sharing of benefits arising from utilisation of genetic resources.

After its adoption, the “Convention on Biological Diversity” (CBD) was open for signature on 5 June 1992 at the United Nations Conference on Environment and Development. It remained open until 4 June 1993 by which time it received 168 signatures. The Convention’s resolutions were implemented on 29 December 1993 (Rwanda. MINITERE, 2003:1-2; CBD secretariat, n.d.).

Rwanda signed the International Convention on Biological Diversity in Rio on 10 June 1992 and ratified it on 18 March 1995. This Act offered a formal framework that enabled the Government of Rwanda to confirm its concerns for conservation of its biological diversity since the 1920s with the creation of national parks (Akagera National Park 1934, the Volcanoes National Park 1925) and forest reserves (the Nyungwe Forest Reserve 1933) (Rwanda. MINITERE, 2003:1-2).

Upon ratification, Rwanda, like other signatories of this Convention, undertook to implement the provisions of the Convention on Biological Diversity including Articles 6 and 7, which relate to the general measures for conservation and sustainable use, as well as identification and monitoring (Rwanda. MINITERE, 2003:1-2).

2.3 Description of the study area

This research was conducted in Rwandan communities, which are situated adjacent to the ANP in Rwanda. The ANP is located in the eastern province of Rwanda between the borders of Tanzania (Figure 2.2 and Figure 2.3); it is a landscape of rolling hills with altitudes that range from 1250m to 1825m (WCS, 2008). It is known to be one of the most diverse avifauna of the continent of Africa, with over 500 bird species recorded (Kanyamibwa 1998:1401; Lamprey, 2002:3). The eastern part of the national park is bordered by a vast wetland consisting of the Akagera river-lake depression that represents a typical immersion landscape (Rwanda. MINITERE, 2003:13).

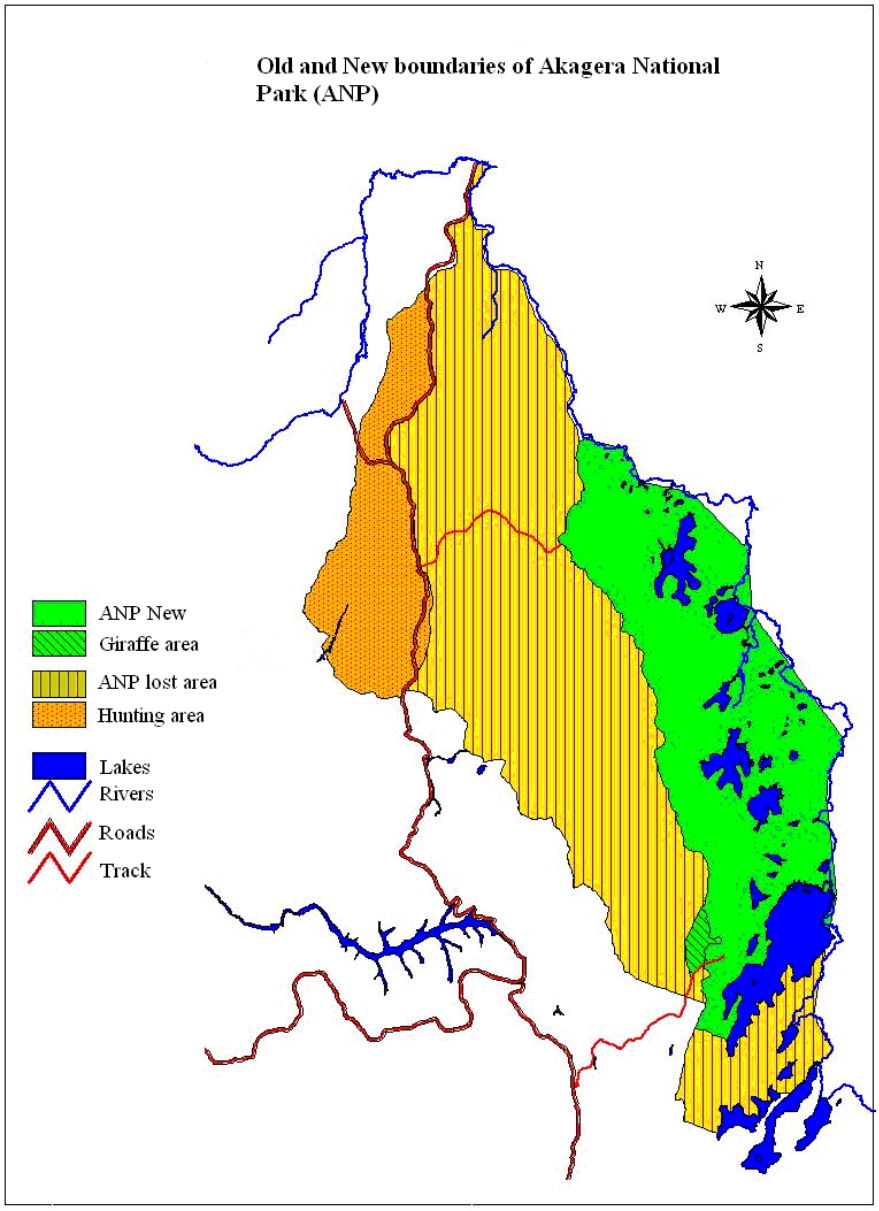


Figure 2.1 Spatial evolution of Akagera National Park (1992-2003) (Adapted from ORTPN, 2005:97)

The park was established in 1934 to protect an area covering 280,000 ha, including 30,000 ha of the adjacent Mukura Hunting Reserve (Kanyamibwa, 1998:1400; Rwanyiziri, 2007:4; WCS, 2008). The park (Figure 2.1) has, together with the removal of the Mukura Hunting Reserve, been de-gazetted by two-thirds of its original territory (only 90,000 ha now remain) owing to human pressure from resettlements of the repatriated population, which came mainly from Congo, Tanzania, Uganda and Burundi, following

the war and genocide of 1994 when an estimated number of one million people were killed (Wolanski, 1995; Kanyamibwa, 1998:1400; Rutagarama & Martin, 2006:291-292).

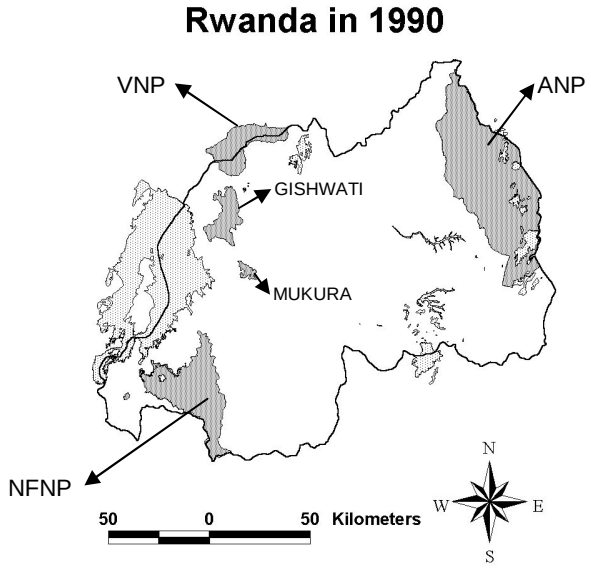
Although most reports on the Rwandan war understandably have focused only on human suffering, the war has also resulted in enormous loss with regard to the environment and wildlife (Kanyamibwa, 1998:1400). A large number of animals that previously inhabited this park were reduced owing to poaching by local communities and soldiers for food on the one hand and for the protection of their cattle, on the other hand (Kanyamibwa, 1998:1400; Plumptre, Masozera & Vedder: 2001:17). An aerial survey of the park indicated that from 1994 to 2002, wildlife declined by between 50 to 80% owing to human activities, including cultivation, grazing and hunting (Lamprey, 2002:4). These illegal activities were mostly undertaken during and shortly after the civil war of 1990 to 1994. According to Karegire (2008), local people graze their cattle near and often inside the unfenced park, which continues to undermine conservation efforts.

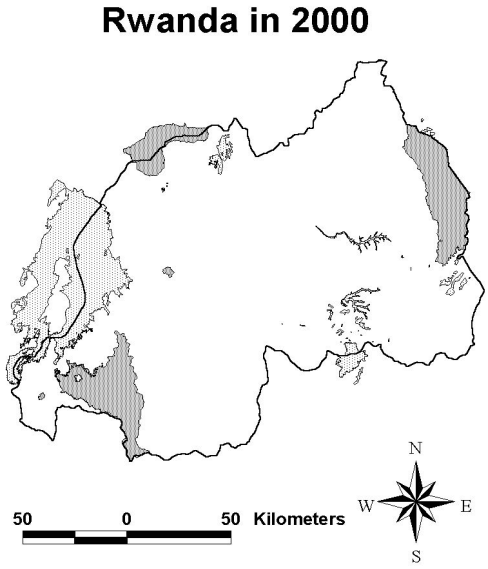
2.4 Need for wildlife conservation

Rwanda's tourism industry is the national third income earner after coffee and tea and it has grown steadily over the past five years (ORTPN, 2006). The industry is built on wildlife, which is concentrated in protected areas that cover 8.4% of the total land area of 26338 km^2 (Rwanda. MINAGRI, 2003:4). The protected areas in Rwanda comprise three National Parks (See Figure 2.2 and Figure 2.3) including Akagera National Park (ANP, 90,000 ha) on which this study focuses, Nyungwe National Park (NNP, 97 000 ha) and the Volcanoes National Park (VNP, 12 760 ha) (Rutagarama & Martin, 2006:291-292). The Nyungwe and Volcanoes parks form part of the Albertine Rift biodiversity 'hotspot' (Myers, Mittermeier, Da Fonensca & Kent, 2000:854). However, these three parks have lost more than 51% of their land area since their creation (Rwanyiziri, 2007:5).

A reduction in the size of these parks is mainly because of the high increase of the Rwanda's population, which began in 1940, leaving no free land for habitation (Rwanda. MINISANTE, 2003:15). In fact, from 1,595,400 inhabitants in 1934, the population reached a number of 2,694,990 in 1960, then 4,831,527 in 1978 and 7,157,551 in 1991. A socio-demographic survey conducted in 1996, after the genocide of 1994, estimated a

volume of 6,167,500 inhabitants. The projections showed that Rwanda's population will attain 11,284,000 inhabitants by 2012 (Rwanda. MINISANTE, 2003:15). A majority of this population live in rural areas where the level of poverty is high. In 2002 83.4% of the population lived in rural areas with the highest rural density of the continent comprising 309 inhabitants per square kilometres in 2002 (Rwanda. MINISANTE, 2003:19; Rwanyiriri, 2007:4).





Figures 2.2 Rwanda National Parks in 1990 (Adapted from Plumptre *et al.*, 2001)

Figure 2.3 Rwanda National Parks in 2000

Wildlife, as part of nature, plays a crucial role within the ecosystem (Patrick, 1997:15; Center Conservation Incentives, 2007); hence a need for biodiversity conservation. According to Borner, Mendoza and Vosti (2007:357), the growing demand for crop and livestock products increases the pressure on natural resources that provide ecosystem services particularly in areas amenable to agriculture. These ecosystem services are biodiversity, carbon sequestration and regulation of water and nutrient cycles most of which contribute to sustainable human life at local, regional and even global scales (Metzger, Rounsevell, Michlik, Leems & Schroter, 2006:70). In addition, biodiversity is regarded as a pharmacy that provides us with essential medicines, since more than a

third of pharmaceuticals originate from wild plants, for example, common drugs such as aspirin and life-saving medicines such as Vincristine, which has considerably reduced childhood deaths (Rainforest Facts, 1996; Center for Conservation Incentives, 2007). Furthermore, for most people, the existence of several species is important because their physiological differences furnish various sources of food, clothing and shelter for humans (Patrick, 1997:15).

Growing human populations, combined with a high level of poverty in Rwanda, are likely to increase pressure on the land, in general, and on the National Park in particular, in spite of the ecosystem services provided by the natural habitats (Rwanyiziri, 2007:5). A loss of two thirds of the initial territory of ANP portrays the extent to which the protected areas are under pressure by human beings in Rwanda, which may result in environmental degradation (Figure 2.1).

Deforestation problems are commonly found in developing countries where the level of poverty is high and whose population depends highly on agriculture (Laurance, Alonso, Lee & Campbell, 2006:454-455). Deforestation for cropland presents a serious danger to the environment and hence the degradation of population welfare (Taylor, 2004). In two centuries, humans have altered terrestrial and marine ecosystems on the planet and have seriously reduced the flows of their life-essential goods and services (Taylor, 2004; Millenium Ecosystem Assessment, 2005; cited in Aronson, Milton, Blignaut, & Clewell, 2006:260). In addition, as forests, wetlands, prairies and other habitats are transformed into residential, commercial or agricultural use and other types of development, wild plant and animals disappear (Center for Conservation Incentives, 2007). In their study, Van der Linde, Oglethorpe, Sandwith, Snelson and Tessema (2001:14) argue that wildlife suffers from extreme weather conditions if it is already confined in marginal areas and competing with livestock. Furthermore, it is argued that human alteration of the global environment has brought about enormous changes in the abundance and distribution of organisms (Olff & Ritchie, 2002:84).

In Rwanda, for instance, deforestation that followed the genocide and war in 1994 caused dramatic changes on the environment with dramatic environmental degradation shown by rainfall shortages in certain regions (Rwanda, 2007). This is the case of

Bugesera region, which supplied agricultural products to the entire country but which experienced a serious drought that might have been caused by tree cutting for fire wood and construction of house by the displaced population in that region. It was highlighted that the welfare of a majority of people has declined in the past 35 years owing to humans activities on natural resources (Saul, 2005; Cited in Aronson *et al.*, 2006:261).

In order to obtain a sustainable lifestyle of diversity, biodiversity conservation should be a priority of all stakeholders including government organs, conservationists, environmentalists and local communities (Beresford & Philips, 2000:15-16). National and international agencies recognise that establishment of protected areas in most parts of the world is the most widely accepted means of attaining biodiversity conservation (Sekhar, 2003:340). However, growing human populations, combined with a high level of poverty in Rwanda, continually increased the pressure on land, in general and on National Parks in particular, in spite of ecosystem services provided by the natural habitats (Rutagarama, 2006:292-293). Biological diversity, known as biodiversity, enriches people's lives by making the world a beautiful and interesting place in which to live and when plants and animal are abolished, people lose something, which is irreplaceable (Center for Conservation Incentives, 2007). Thus, the study recognises a need of wildlife conservation for sustainable lifestyle of human beings and other forms of biodiversity.

Researchers have endorsed the need for biodiversity conservation arguing that the worst thing that can happen is not depletion, economic collapse, limited nuclear war, or conquest by a totalitarian government (Wilson, 1984:121; Taylor, 2004; Center for Conservation Incentives, 2007; Rusello, 2007 & Buddycom, n.d.). Damages caused by natural catastrophes can be repaired within few generations but the increasing loss of genetic, species diversity by destruction of natural habitats will take millions of years to correct, and this is an unforgivable mistake from our descendants (Wilson, 1984:121; Taylor, 2004; Center for Conservation Incentives, 2007; Rusello, 2007 & Buddycom, n.d.). This study suggests that communities living adjacent to protected areas should understand the importance of wildlife conservation as part of the natural habitats, which may lead to their sustainable welfare. However, for a considerable segment of the public, the desire to conserve natural areas is still based largely on aesthetic values, and

not necessarily on the value of those areas in the greater scheme of life (Joubert, 2007:8). It is, therefore, the ultimate responsibility of bodies such as National Parks boards to sensitise and convince people surrounding the park of their dependence on natural resources and to promote acceptance of a conservation code of ethics in addition to being merely aesthetic (Joubert, 2007:8). Undoubtedly, the conservation of natural resources such as wildlife is highly desirable and essential for the future existence of human societies (Gadd, 2005:50-51).

2.5 Impacts of wildlife conservation on the local communities

Wildlife conservation provides both positive and negative impacts on the local communities (Sekhar, 2003:340). Positive impacts occur in the form of benefits that are received from activities that take place in the wilderness areas; while negative impacts may result from prevention of utilisation of wilderness resources, which are imposed on people, as well as loss of subsistence resources, which lead to wildlife depredation (Sekhar, 2003:340; Gadd, 2005:50-51).

2.5.1 Positive impacts

This study attempts to investigate benefits that wildlife provides to local communities living adjacent to protected areas. These benefits comprise biomass resources, park funds diverted into local villages by state agencies and revenues from wildlife tourism distributed by a range of service providers as a result of visitors participating in wildlife tourism activities (Sekhar, 2003:339). Tourism activities have potential to generate revenues that can improve the livelihoods of local people and, therefore, contributes to the protection wilderness areas (Sekhar, 2003:341). Gossling (1999:303) suggested that tourism activities and its high revenue generation can play an important role as an incentive for conservation. In addition, Tourism in natural reserves encourages environmental awareness, provides direct benefits for conservation, financially benefits and empowers local people, and fosters respect for local culture (Honey, 1999:22–25). It has been argued that benefits, which are derived from the protected areas, provide an important factor for local communities to perceive conservation positively (Walpole & Goodwin, 2001:164). However, given that tourism generates a lot of revenue, it does not guarantee long-term support for conservation from local communities owing to their little

economic benefits from tourist activities (Okello, 2005:558). In addition, participants may be supportive of tourism activities but may be negative about wildlife conservation (Metha & Kellert, 1998:329-330; Walpole & Goodwin, 2001:164). Moreover, people may receive and appreciate benefits, but may not recognise their source (Archabald & Naughton-Treves, 2001:137).

Revenue sharing has been viewed as a means of distribution of revenue from tourism to local communities in an attempt to improve their welfare and enhance their support for conservation (Archabald & Naughton-Treves, 2001:143). For instance, tourism revenue sharing has generated US$ 4,000 for each of the 21 villages, which border the Bwindi Impenetrable National Park in Uganda (Archibald & Naughton-Treves, 2001:137). However, it is difficult to link economic benefits to conservation where wildlife is in high danger, pressure on biomass resources is high and benefits from the parks are fewer while the number of beneficiaries is large (Sekhar, 2003:341). This may be the case of Akagera National Park where the demand for land for agriculture and grazing is high, while benefits are limited (Karegire, 2008).

2.5.2 Negative impacts

Whereas benefits generated from tourism activities may contribute to protection and restoration efforts, it may be difficult to achieve a balance between economic gains and unacceptable impacts, which are brought about by establishment of protected areas (Cihar & Stankova, 2006:274).

Local communities are vulnerable to the establishment of protected areas (Ramutsindela, 2003:41), particularly in developing countries since their livelihoods are dependent on them (Gadgil, 1990:132). According to Shrestha and Alavalapati (2006:71), establishment of national parks is associated with imposing strict rules on the use of wildlife resources by local communities. Initially, colonial governors allowed African settlements to coexist with wildlife where they were effectively equated with wildlife and were allowed to remain on the land for that basis (Ramutsindela, 2003:41).

However, it was realised that joint occupancy of land by African livelihood seekers and wildlife was impossible, if wildlife was to be preserved for recreational needs such as the

safari (Schroeder, 1999:363). Presently, most of the communities that live adjacent to national parks and game reserves are denied access to the land, which they previously used for either hunting, gathering, agriculture or settlement purposes (Mbaiwa, 2005:145). In addition to losing access to natural resources from the protected areas, local communities are vulnerable to wildlife damage (Mbaiwa, 2005:145). According to Conover (2001), anything that wildlife does to cause human injuries or illness, loss of economic productivity, physical danger, or a reduction in quality of life or well-being is considered to be wildlife damage.

The present study suggests that the loss of access to natural resources by local communities may trigger their resentments over wildlife. Major costs of living near wildlife areas include factors, which are outlined in the following section.

2.5.2.1 Crop loss and damage to property

Loss of crops to wildlife is one of the major costs of conservation of lands that are adjacent to the park and it leads to negative attitudes of people regarding wildlife (Arjunan, Holmes, Puyravaud, & Davidar, 2006:192). They found that farmers lose crops to animals such as birds, buffalos, hippopotamus, antelopes, elephants and others. For example, up to 70% of crop production loss was attributed to elephants in Cameroon, while farmers in Tanzania and Zimbabwe rank wildlife first among 30 obstacles to improvement of their livelihood (Bulte & Rondeau, 2007:312). In an interview with the ANP community conservation officer, Mr Karegire (2008), he commented that small and less dangerous wildlife such as baboons may also be responsible for as much, if not more, crop damages as large mammals that are reported.

While loss of human life owing to wildlife is most of the time immediately reported to local authorities and the public at large, loss of subsistence resources and economic opportunities to local inhabitants in and around the protected areas, are rarely raised (Rao *et al.*, 2002:318). These losses are likely to create antagonism between local communities towards wildlife and may, therefore, jeopardise conservation goals that are set for the protected areas.

2.5.2.2 Wildlife poses threats to people's safety

Farmers also suffer from attacks by wildlife (Karegire, 2008). In the Indian states of Jharkhand and Assam, confrontations with elephants increased to 300 between the years 2000 and 2004 and to 605 between the years 1994 and 2006 (Bulte & Rondeau, 2007: 312). Attacks by wild animals on people do not only cause their death, but also cause injuries, which subsequently, entail heavy medical costs (Karegire, 2008).

Table 2.1: State of damages caused by wildlife to local communities (Karegire, 2008)

Year			2004	2005	2006	2007
Wildlife threats to people and their livestock	People killed		1	2	3	7
	People Injured		2	8	8	14
	Livestock killed	Cow	17	10	19	34
		Goats	15	-	-	-
	Livestock injured	Cow	3	-	5	-

Table 2.1 indicates the extents to which communities that live adjacent to ANP, are harmed by wildlife, which may lead them to negative attitudes towards wildlife conservation.

2.5.2.3 Loss of livestock, disease transmission and competition for water and grazing land

People, who keep livestock in proximity to wildlife, experience a number of problems. Wild animals such lions, hyenas, leopards, and other animals frequently prey upon their stock (Table 2.1). Bulte and Rondeau (2007:312), reported that annual losses attributable to livestock predation range from 1% to 25% of potential revenue.

Diseases are transmitted from wild herbivores and carnivores to domestic stock and pastoralists are confronted with high costs of treating these livestock when they become infected with diseases, which are transmitted from wildlife (NBII, 2009). According to Simpson (2002:128), wild animals often act as reservoirs of infectious agents that affect farm livestock, domestic pets or other species kept in captivity.

Moreover, livestock is lost while the pastoralists themselves end up paying huge fines for trespassing (Karegire, 2008).

Costs, which are associated with wildlife conservation, trigger conflicts between local communities and wildlife (Rao *et al.*, 2002:318). In addition, conflict between carnivores and humans is a threat to local carnivore populations, a factor limiting carnivore meta-population viability and a cause of anti-wildlife conservation sentiment that can undermine other conservation initiatives (Sillero-Zubiri & Laurenson, 2001). According to Graham (2009:2718), depredation on livestock is an important cause of human intolerance for large carnivores, frequently leading to their extermination. Rao *et al.* (2002:318) argued that risks of wildlife-imposed damages provide strong incentives for farmers to hunt and to defend their crops. It was indicated that most of the 265 elephants that died in Assam between 1994 and 2006 were killed in retaliation for destroyed crops by angry villagers who used poison-laced food (Bulte & Rondeau, 2007:312).

Johannesen and Skonhoft (2005:221) assert that if local communities bear the real costs of conservation without obtaining any significant benefits from it, one should understand why a negative attitude against wildlife conservation has emerged among local communities in Sub-Saharan Africa, as well as in other places. According to Kiss (1990:216), a decline in African wildlife is linked to the displacement of poor rural communities as local people have lost their traditional right to use wildlife resources without receiving any compensation, hence they saw little incentive in conserving it.

Local people are an important aspect in wildlife conservation and their needs for wildlife resources should not be ignored in order to avoid conflicts between protected area managers and local inhabitants (Rao *et al.*, 2002:317). There should be mechanisms, which reduce socioeconomic costs, compensating local residents, or investing more in community development, otherwise attitude and support from local communities towards conservation may not be attainable (Shrestha & Alavalapati, 2006:70; Bulte & Rondeau, 2007:312). Individual's familiarity and knowledge of issues, and socio-economic characteristics affect their opinions and attitudes (Karanth, Kramer, Quian & Christensen, 2008:2357). Factors such as age, gender, education, and income level often influence people's support for conservation (Kaczensky & Gossow, 2004:661;

Kleinven & Kaltenborn, 2004:1657; Pratt, Mac Millan & Gordon, 2004:612). Other factors, which influence conservation attitudes, include personal environment, value of open spaces, and experiential events (Kellert, 1991:307)

In recent years, the idea of compensating farmers for wildlife damages has gained popularity among conservation groups, governments and communities that are affected (Bulte & Rondeau, 2007:312). The World Wildlife Fund for nature states that: “One of the simplest ways to mitigate conflict without affecting elephant behaviour or population size is to compensate people for the damages that they have suffered or would have suffered had they not protected their crops (WWF, 2000). The performance of compensation programs has, however, often been disappointing because of a lack of funds, fraudulent claims, bureaucratic inadequacies, and practical barriers that illiterate farmers from remote areas should overcome to produce a claim (WWF, 2000).

Compensation is a widely recommended and often used technique to reduce the economic impact of loss to wildlife in an effort to buy tolerance of problems caused by wild animals (Madhusudan, 2003:474; Nyhus, Fischer, Madden & Osofsky, 2003:37). According to Graham (2009:2718), countries such as Kenya, Botswana, Malawi and Zimbabwe are examples of the few African countries that have implemented state-run compensation schemes in the last quarter of a century. Unless compensation provides an explicit incentive to encourage better livestock care some argue that it can result in the neglect of preventative measures (Dyar and Wagner, 2003:521). Moreover, Bulte and Rondeau (2005:312) asserted that compensation can lead to “excessive damages” as people put their livestock (especially sick animals) into situations where they will be killed in order to qualify for compensation.

In Rwanda particularly, the law does not make any provision of compensation for losses caused by wildlife depredation (Rwanda. MINITERE, 2003:49). In other words, any loss to wildlife depredation is born by the local communities. However, according to Karegire (2008), the new law governing the administration of Rwandese National parks is under review to address the shortcomings of the existing law.

2.6 Role of local communities in wildlife conservation

Local communities are important factor in the execution of a successful wildlife conservation project (Rao *et al*., 2002:317). They should be involved in any decisions regarding the management of protected areas (Beresford & Philips, 2000:24). Their participation in local government committees, conservation activities, tourism-revenue sharing programs, and other planning and management programs, are reported to affect how they feel about protected areas (Archabald & Naughton-Treves, 2001:143; Mehta & Heinen, 2001:174). Similarly, poor relationships between protected area authorities and a lack of technical or financial support are also factors that contribute to negative attitudes towards conservation (Archabald & Naughton-Treves, 2001:143). According to authors such as Abbot, Thomas, Gardner, Neba and Khen (2001:1129), Metha and Heinen (2001:174), as well as Jim and Xu (2002:328), if there is a history of community-initiated conservation or the longer the community participates in related programs, the more likely community members display favourable conservation attitudes.

A main approach to recent wildlife management schemes has been to include local people to gain their cooperation and support, which has resulted in the so-called integrated conservation and development program (ICDP), with a presumption that the voices of local people should be heard, whilst involving them in decision making processes, which will compensate for the loss of livelihood to conservation and contribute to sustainable practices (Schwartzman, Moreira & Nepstad, 2000: 1353; Abbot *et al.*, 2001:1115; Sekhar, 2003:340; Shrestha & Alavalapati, 2006:81). Integrated conservation and development projects (ICDPs) attempt to promote wildlife conservation and economic development among local communities (Johannesen & Skonhoft, 2005:225). This approach aims to reconcile an even distribution of the costs and benefits of conservation (Shrestha & Alavalapati, 2006:70). Other researchers have suggested that decisions on conservation issues cannot be taken without accounting for the needs, attitudes and aspirations of the people who are an integral component of all systems (Davies, Grossman & Rammutla, 1994:258; Van der Linde *et* al 2001:32). ICDPs are increasingly promoted to encourage communities living in the vicinity of natural habitat to have sustainable harvest of wildlife in return for alternate sources of income (Bulte & Horan, 2003: 129). In practice, there has been considerable diversity in the philosophy

and strategies of some ICDPs (Mahanty, 2002:1369). For example, some projects have supported very strict limitations on resource utilisation with strengthened enforcement, while others have been conceived around the sustainable use of resources within Pas and buffer zones (Mahanty, 2002:1369).

Development programs involve varying levels of local participation, which range from pure benefits sharing such as transfers from wildlife-rated activities, to a more far-reaching design of community based management in which local communities are trained to manage and control resources (Johannesen & Skonhoft, 2005:209). In addition, the programs assume that local people will forgo harvesting in the protected area if they are offered development projects such as schools, dispensaries and roads as incentives or that local people harvest in the protected areas because they have no alternative, and they will stop if alternatives are provided (Tisen & Meredith, 2000).

During the last two decades, Community-based Wildlife Management (CWM) has been developed and promoted worldwide as an important element of conservation policy (Taia, 2007:1187). The main objective of CWM is to create, through the community's participation approach, conditions whereby the majority of community members are involved in conservation practice, and there is integration of both biodiversity conservation and socio-economic development objectives (Songorwa, 1999: 2061; Willcox & Nambu, 2007:251). The approach strives to change local people's attitudes (Gibson & Marks, 1995:941) and use those people and their new attitudes as a vehicle to attain conservation goals (Metcalfe, 1994:191). In principle, CWM relies heavily on active community participation not only in wildlife utilisation but also in overall wildlife management that involves problem identification, implementation, monitoring and evaluation (Songorwa, 1999:2061). Songorwa (1999:2061) suggested that one condition for the success of CWM is that equitable amount of revenues must remain in the hands of the local communities so that they can increase their interest in conserving wildlife. However, CWM does not intend to give total ownership of wildlife to communities, which are put behind fences thus leaving the wildlife to roam freely (Songorwa, 1999:2079).

Although a community based conservation approach is not a panacea for managing protected areas (Masozera, Alavalapati, Jacobson & Shrestha, 2005:71), studies

suggest that this approach can be successful if carefully planned and implemented (Poteete & Ostrom, 2004:435). Hence, one can say that the extent to which local people participate in decision-making plays a key role in influencing their attitude towards wildlife conservation.

Nevertheless, conservation benefits are often limited at the local level, increase at regional and national levels, and become even higher at the global level (Arjun *et al*., 2005:109; Shrestha & Alavalapati, 2006:70). Conversely, the social costs of conservation tend follow an opposite trend, being substantial at the local level and very little at the global level (Brown, 1998:86). Therefore, integrating conservation and development projects has become popular as a means of alleviating costs to the local communities in terms of loss of access to resources (Kiss, 1990:12). The incentives provided by development projects are estimated to fulfil the dual objective of compensating the loss of livelihood and increasing sustainable practices (Holmes, 2003:180). According to Nepal (2000:680), the challenge is to strike a balance between development and conservation in a way that negative aspects of tourism are greatly reduced while the positive outputs are maximised. Moreover, Nepal (2000:680) pointed out that it has been proven that without some immediate tangible benefits local communities remain indifferent to long-term development and research activities.

The challenge in Rwanda is to move towards implementation of protected areas strategic action plans by involving partnerships among different role players (Rutagarama & Martin, 2006:295). Overall management responsibility for protected areas is entrusted to the Rwanda Office of Tourism and National Parks (ORTPN), which is attached to the Ministry of Commerce, Industry and Tourism (MINICOM) (Rwanda. MINITERE, 2003:26). At policy level, ORTPN is also supported by the Ministry of Resources and Environmental Protection, whilst funding passes through the Ministry of Finance (Rutagarama & Martin, 2006:295).

A number of international conservation organisations support ORTPN but there are also national institutions and NGO involved in biodiversity conservation (Rwanda. MINITERE, 2003:27-37). Local government is currently only consulted to deal with problems when they occur; whilst community based organisations (CBOs) have few responsibilities and

are yet to develop the institutional capacity for involvement. Sensitisation activities occur around the parks but this is done without a strategic view to widening participation in conservation (Rwanda. MINITERE, 2003:49). In addition, the insufficient budget allocated to sensitisation and education makes it difficult to implement objectives, which are set with regard to community sensitisation (Karegire, 2008). In order for wildlife conservation policies to attain its goals, all stakeholders including the local communities, should actively participate in all levels of decision-making.

2.7. Wildlife exploitation

Wildlife is threatened by many factors, of which habitat conversion to other uses such as farming, urban development and human exploitation are best known and most notorious (Bulte & Horan, 2003:107). Exploitation of wildlife resources is as old as humanity, and an essential condition of our existence (Worm, 2008:1522). He asserted that through hunting, fishing and forest exploitation, humans have transformed most ecosystems in the sea, fresh water and on land. To date there is a great concern over the increasing human exploitation of the remaining wild living resources, which continues to be one of the dominating factors of ecological change worldwide (Setsaas, Holmen, Mwakalebe, Stokke & Roskaft, 2007: 563; Worm, 2008:1522).

The situation is increasingly exacerbating in Africa, where the number of consumers for wildlife resources has increased from 100 million in 1900 to over 800 million in 2000, and is expected to reach 1.6 billion in less than 25 years (Apaza, Wilkie, Byron, Huanca, Leonard, Perez, Reyes-Garcý'a, Vadez, & Godoy 2002:382). Over-exploitation of wildlife combined with habitat destruction is believed to threaten about one-third of the world's endangered mammals and birds (Bulte & Horan, 2003:107).

As pressure on natural resources increases, there is a need to separate wildlife from threatening activities. Matt, Hayward and Kerleyc (2009:2), point out that fencing is one strategy conservationists can employ to protect wildlife. They asserted that fencing for conservation can achieve conservation goals by separating threatening processes from threatened biodiversity. For instance, a fence that stops an elephant from crop-raiding

will reduce the likelihood of farmers to kill elephant and thereby benefit their conservation.

Nevertheless, South African experiences suggest that wildlife exploitation and conservation efforts do not necessarily conflict (Bulte & Horan, 2003:128). They argued that allowing local people to utilise wildlife as a renewable resources may raise incentives to carefully manage wildlife as a valuable asset and to allocate land to its conservation. Wildlife utilisation contributes greatly to the livelihood of people that live adjacent to the wilderness areas (Sekhar, 2003:340). It provides resources such as medicine, hunting opportunities as well as revenue from tourists visiting the wildlife (Sekhar, 2003:340; Shrestha & Alavalapati, 2006:80-81).

Table 2.2 below portrays the state of illegal activities that take place in the Akagera National Park.

Table 2.2: State of illegal activities in ANP (Karegire, 2008)

Year		2000	2001	2002	2003	2004	2005	2006
Illegal activities	Animals found in snares	5	-	38	367	68	23	66
	Livestock confiscated by the park authorities		20,000	45	2847	1363	1768	5043
	Poachers captured	176	130	921	367	142	88	164
	Snares found		518	398	573	756	706	721

Hunting is the most important form of resources use and contributes significantly to the income of the local communities, which results from the sales of game meat (Johannesen & Skonhoft, 2005:209-210). However, the former Mukura Hunting Reserve adjacent to the ANP accommodates the resettlement of repatriated people after the war and genocide of 1994; hence the Park was rendered vulnerable to illegal exploitation by the community (Kanyamibwa, 1998:1400). Illegal exploitation includes grazing, as well as poaching in the Park, which are strictly prohibited and punishable offences (Karegire, 2008).

Illegal killing of wild animals poses threat to their survival and involves enormous cruelty, suffering and death of animals (Johannesen & Skonhoft, 2005:209-210). Table 2.2 shows an extent to which wildlife is at risk of poaching.

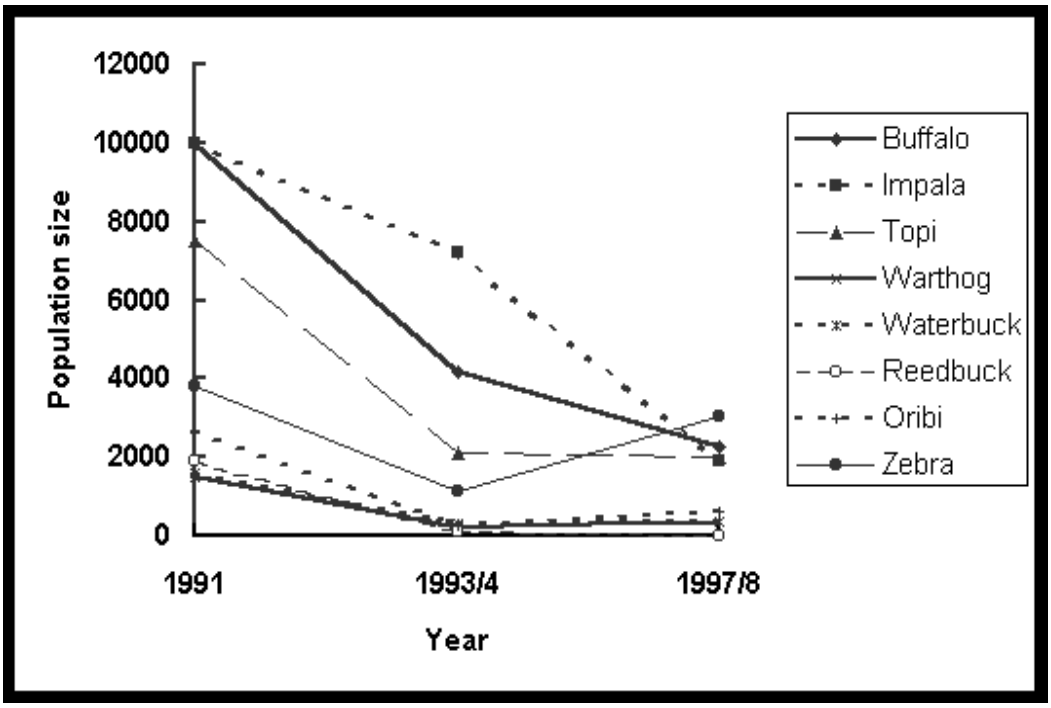


Figure 2.4: Changes in large mammal populations between 1991 and 1997/98. (Adapted from Williams and Ntayombya, 1999; Cited in Plumptre, Masozera, Veddel, 2001:18) (Impala populations are plotted as one third their actual sizes to allow them to fit on the figure)

Poaching activities in the ANP are not only conducted by local community, but also communities outside Rwanda (Kanyamibwa, 1998:1400). The Banyambo, the community from Tanzania, poses the routine dangers to the park inhabitants and its guards.

Estimates of large mammal densities from 1991 and 1997/98 show large reductions in numbers (Figure 2.4) to about 30% of the original population size. This is both a result of heavy hunting during the war, and also the loss of critical habitat to cattle following the war. During the war of 1990, administration and activities to protect the park were no longer viable, hence the Banyambo took advantage of the situation and poaching increased (Kanyamibwa, 1998:1400). Wildlife was significantly reduced during the war by poaching. For example the park was extremely rich in large mammals, and

particularly important for the conservation of *Sitatunga* (*Tragelaphus spekei*) and Roan (*Hippotragus equinus*) antelope (Plumptre *et al.*, 2001). However, the number of aquatic duiker (*Sitatunga*) was dramatically reduced by Banyambo during the war (Kanyamibwa, 1998:1400). In addition, before the war, ANP was characterised by a high density of antelopes, buffalos, impalas, lions and other typical animals of eastern African savannas (Vande Weghe, 1991:72). Several animals were killed in this park between 1990 and 1993 (Kanyamibwa, 1998:1400) as a result of the presence of military personnel in this park who actively hunted animals to feed themselves (Plumptre *et al.*, 2001:18)

The decline in wild animals in ANP (Figure 2.4) is directly linked to illegal killing of wild animals for meat, namely the so-called use and trade of bush meat (Kanyamibwa, 1998:1400; Plumptre *et al.*, 2001:17). It was estimated that the park lost about 90 % of its big mammals, with important losses and changes in habitats (Kanyamibwa, 1998:1401).

Wildlife disruption in the ANP was not only limited to poaching, but also to human settlement in the park (Kanyamibwa, 1998:1400; Plumptre *et al.*, 2001:17). Following the genocide in 1994 and the change of government, official policy allowed several of the repatriated population to occupy a major sector of the park, since most of them came back with cattle that required grazing land and this was the only land where anyone could be settled easily (Plumptre *et al.*, 2001:17). The park has, subsequently, lost two thirds of its initial territory (Wolanski, 1995; Kanyamibwa, 1998:1400; Rutagarama, 2006:291-292). The resettlement of repatriated refugees has inflicted a huge loss to wildlife by communities defending themselves against large predators such lions that attacked their livestock (Kanyamibwa, 1998:1401). The conflict between local communities and predators led to almost extinctions of lions in the Akagera National Park (Kanyamibwa, 1998:1401). The absence of large predators such as lions has, subsequently, rendered the park safe for illegal livestock grazing (Table 2.1). However, huge punishments are inflicted on pastoralists who are caught grazing in the park (Karegire, 2008).

According to Shrestha and Alavalapati (2006:70) illegal exploitation of wildlife has affected biodiversity negatively and with rapidly increasing human populations placing even greater pressure on natural resources, the situation may become more severe

unless strict and urgent actions are taken. The present study suggests cooperation between officials, park managers and the local communities towards effective wildlife conservation.

2.8 Tourism activities in protected areas

Protected areas generate economic benefits through tourism activities that occur in the area (Sekhar, 2003:340). In his study, Wunder (2000:479) concluded that local communities have generally profited significantly from tourism directed towards adjacent protected areas by selling handicrafts, providing accommodation and other services. The importance of nature in attracting tourists is significant, and as stated by William (1992:15), “nature represents a competitive advantage for many areas, and a chance to see wildlife and undisturbed nature is rated as a very important reason for visits to PAs”. Ferreira (2006:166) pointed out that National Parks and nature reserves are one of the most important components of tourism in Africa and are thus a major source of foreign exchange in the African continent. In addition, Ferreira (2006:166) suggested that expansion of nature based tourism can contribute enormously to an improvement in the quality of all people in the region particularly those living around the parks. According to Kepe (2001:155), Tourism to areas of natural beauty has recently been seen as one of the fastest growing tourism activities across the world.

Westerners have been promoting tourism as the salvation for Africa’s poverty and underdevelopment for many years (Bonner, 1993:119). The conservation of Africa’s natural heritage is, therefore, of paramount importance. Chadwick (1996:4) argued that the remaining wilderness of Africa may be its only hope for reducing its poverty and strongly competing in the global economy. Ferreira (2006;167) stressed that unless conservation is made to pay for itself and be seen to be doing so, not only will Africa’s natural heritage be destroyed, but also the cornerstone of its tourism potential will disappear. However, Ferreira (2006:167) pointed out that conservation is not achievable in circumstances where local people are confronting with starvation. In this regard, Tosun (2005:337) argued that the basic needs for food and shelter constitute the major concern for people in local tourist destination.

One of the main arguments for the continuing development of wildlife tourism attractions is that they help to achieve long-term wildlife conservation (Reynolds & Braithwaite, 2001:31; Wilson & Tisdell, 2001:288). It was suggested that if wildlife tourism is carefully designed, managed and delivered, it has the potential to influence the conservation knowledge, attitudes and behaviour of visitors (Ballantyne & Packer, 2005:22; Ballantyne, Parker, Hughes & Dierking, 2007:382). In certain circumstances, however, wildlife visitation may leave imprints that can have substantial negative impacts on wildlife (Marion & Reid, 2007:26). These impacts include injury, stress or death of animals; disruption to nesting or breeding behaviour; habituation to humans; destruction or alteration of animals' habitat; and changes to animal feeding patterns through deliberate or unintentional provision of food (Chin, Moore, Wallington & Dowling, 2000:34; Green & Higginbottom, 2000:183).

Rwanda's tourism industry, coinciding with conservation and preservation efforts, has been based on the country's natural resources (Mazimhaka, 2004:494). A majority of its natural attractions are located within its three national parks, namely, the Akagera National Park (ANP), the Nyungwe National Park (NNP) and the Volcanoes National Park (VNP) shown in Figure 2.3. In 1990, these parks fell under the management of ORTPN as properties for conservation as well as development (Mazimhaka, 2007:494). The parks have, up to the present day, been the country's major tourist attractions as is the case in several African countries.

However, the war in Rwanda from 1990 to 1994 has enormously reduced tourist visits to national parks (Plumptre *et al.*, 2001:19). Prior to the war, in 1989, Rwandan parks received over 23,000 visitors whereas between 1990 and 2000, numbers remained below 5000, but have begun to recover strongly and numbered over 16,000 in 2003 (ORTPN, 2004:56), which were split almost equally between VNP (44%), and ANP (45%), whilst NNP accounted merely for 11% of park visitors. The increase of visits to national parks is likely to continue in line with the growing tourism industry in Rwanda (ORTPN, 2004:56). Nevertheless, existing conflicts between wildlife and the local communities may put the future of wildlife in danger, which may impact on wildlife tourism. This study suggests, therefore, that wildlife and human conflicts should be effectively resolved in order to enhance local support for conservation.

2.9 Summary

Wildlife forms part of natural habitat that provides important ecosystem services such as biodiversity, carbon sequestration and regulation of water and nutrient cycles most of which contribute to and sustain human life at a local, regional and even global level (Metzger *et al.*, 2006:70). However, in spite of the services it provides to the people, it has been and continue to be threatened by growing populations worldwide. Wildlife does not only provide social basic needs to human life, but also provides economic benefits to people that live adjacent to protected areas through revenue sharing and job opportunities, which are created by tourism activities in those areas. It should, therefore, be preserved to generate such benefits on a continual basis. On the one hand, the local communities benefit from wilderness areas; while on the other hand, they incur heavy costs, which are associated with wildlife conservation. They pay indirectly not only by loss of access to resources such as fuel wood, fodder and other non timber forest products, but often by direct losses from crops and livestock, which are damaged by wild animals dispersing from PAs (Sekhar, 2003:340), which result in conflicts between communities that live adjacent to protected areas and wildlife. Several studies have concluded that costs that are associated with conservation such as wildlife depredation of crops and livestock, have negative effects on local attitudes, whilst benefits from conservation may have positive effects (Heinen, 1993:25; Fiallo & Jacabson, 1995:246; Nepal & Weber, 1995:12; Walpole & Goodwin, 2001:164 and Sekhar, 2003:345).

Despite the importance of wildlife to human beings, illegal activities such as poaching, fishing, snaring for the bush meat trade and grazing are undertaken in the park and pose serious threats to the future of wildlife.

Local communities' support is an important factor in wildlife conservation. They should, therefore, be involved in protected areas management decision making. Without local communities' participation in conservation activities, as well as in protected areas management, the future of wildlife is threatened and conservation action plans are unlikely to succeed.

The following chapter outline the study's research methodology and explains means by which the research was conducted.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This research was undertaken to investigate conservation attitudes of the Rwandan community that live adjacent to the ANP and to suggest possible solutions for problems pertaining to threats that are posed by human beings to wildlife conservation in the ANP. The protection and maintenance of the ANP is not only important for the survival of its habitats, but also for the local communities owing to the benefits that it creates (Sekhar, 2003:340). These benefits range from the clean environment to economic benefits that it provides to the local communities.

The research of this nature was, therefore, deemed important in attempt to suggest means of improvements of the local communities' attitudes towards wildlife conservation in the ANP, which will benefit the country, in general, and the local communities, in particular, through tourism activities.

Research has a direct effect on social, as well as economic activities in our daily life. Major decisions, which affect people's lives, are based on research results from research projects conducted in both private and public sectors (Bayat, 2007:229). However, the validity of research findings depends on the soundness of the research methodology adopted (Kumar, 2005:4).

This chapter provides the theoretical aspect of research methodology prior to describing the actual research methodology, which was employed in the present study.

The research methodology includes a background of research setting, study design, study population and sampling method, as well as methods of data collection. The chapter also provides an explanation on data collection procedures; and methods through which data analysis was executed, are also described. In addition, limitations encountered in the process are highlighted and, finally, a summary of the chapter is provided.

3.2 Theoretical aspect of research methodology

Research is defined as one of several ways of collecting and understanding information and finding answers to questions (Kumar, 2005:14). The difference between research and other ways of obtaining answers to questions is that, in a process that is classified as research, one works within a framework of a set of philosophies, uses methods that have been tested for validity and reliability, and attempts to be unbiased and objective (Kumar, 2005:14).

According to Leedy (1980:1), research is:
"… the manner in which we attempt to solve problems in a systematic effort to push back the frontiers of human ignorance or to confirm the validity of the solution to problems others have presumed solved. Research is circular in the sense that the researcher seeks facts, which seem pertinent to the solution of the researchable problem, and which is potentially fact-laden. The collected data is then organised, analysed, and interpreted in order to facilitate the solution of the researchable problem that gave rise to the research effort originally, and the research cycle is thus completed. However, it may be more realistic to see this cyclical concept as a helical (spiral) concept as research frequently gives rise to further unexplored problems, which then require a repeat of the research cycle for the solution…" (Leedy, 1980:7).

According to Kothari (2005:7), research methodology is a new way to systematically solve the research problem. It is a path to finding answers to research questions (Kumar, 2005:16). It is, therefore, essential to know how the research is conducted. The importance of knowing the methodology of research or how research is conducted stems from the following considerations (Kothari, 2005:10):

1) For one who is preparing himself for a career within research, the importance of understanding research methodology and research techniques is obvious, since the same constitutes the tools of his or her trade. The knowledge of methodology provides good training especially to the new research worker and enables him or her to conduct better research. It helps him/her to develop disciplined thinking or a "bent of mind" to observe the field objectively. Hence, those aspiring for a

career in research should develop the skill of using research techniques and should thoroughly understand the logic behind them.

2) The knowledge of how to conduct research will inculcate an ability to evaluate and use research results with reasonable confidence. In other words, one can state that the knowledge of research methodology is helpful in various fields such as government or business administration, community development and social work where persons are increasingly called upon to evaluate and use research results for actions.
3) When one knows how research is done, then one may have the satisfaction of acquiring a new intellectual tool, which can become a way of looking at the world and of judging every day experience. Accordingly, it enables use of making intelligent decisions concerning problems facing one in practical life at different points in time. Thus, knowledge of research methodology provides tools to view life objectively.

3.3 Research settings

The study was conducted within Rwandan communities that live adjacent to the Akagera National Park (ANP) in the Eastern province of Rwanda (Figure 2.2 and Figure 2.3). The ANP was established in 1934 with a land area of 280,000 ha, including 30,000 ha of the Adjacent Mukura Hunting Reserve. However, the park was de-gazetted by two thirds of its original territory for the resettlement of returning refugees following the war and genocide of 1994 (Kanyamibwa, 1998:1400; Plumptree *et al.*, 2001:17). The eastern province comprises seven districts, three of which were selected to participate in this study. The selected districts were Kayonza, Gatsibo and Nyagatare, which share the boarders with the ANP (Appendix D). It is important to note that the entire areas of the park form part of the districts' territory under the study.

3.4 Research design

A quantitative survey-based study using self-administered structured questionnaires over a period of a month and a half, and guided by the researcher, was utilised (Appendix A and B) to discover the attitudes of local communities towards conservation.

This type of research attempts to answer questions regarding the current status of the subject or topic of the study and involves studying preferences and practices of some groups of people (Gay & Airasan, 1999:48). In addition, Hofstee (2006:122) argues that a survey can be an excellent way of discovering people's opinions, desires and attitudes. The presence of the researcher at the time when the questionnaire is completed may, however, lead to a certain level of information bias. In certain instances, respondents were doubtful about the identity of the interviewer. According to Newmark, Leonard, Sariko and Gamassa (1993:178), respondents may view the interviewer as being affiliated to the wildlife and national park department and thus might not have freely expressed their opinions. However, provision of the researcher's identity card when approaching respondents convinced them of the nature and purpose of the survey and this may have lead to limited response bias. Furthermore, to avoid response bias, anonymity was assured as respondents were not required to identify themselves.

Qualitative data were also gathered through unstructured and open-ended interviews with local authorities. In addition, an unstructured interview was also held with the official in charge of community conservation at the ANP who provided information about attitudes of local communities towards conservation and what park officials do to enhance sustainable conservation of wildlife among local communities. The qualitative data were sought to verify and enrich the quantitative data, which was obtained from the survey.

3.5. Study population and sampling

3.5.1 Sample size

The study population comprised local communities that live in villages that are adjacent to the ANP. However, there was no reliable census figure regarding the population size within the area of research, which might have caused uncertainty of the sample-representation of the entire population. The sample comprised of 141 households, with one adult member of each household eligible to participate in the survey.

3.5.2 Sampling technique

A stratified random sampling technique, based on the location of the village, was utilised to draw a sample from communities that live adjacent to the ANP. This was important to ensure equal chances of selection of households of both residing close and far from the national park.

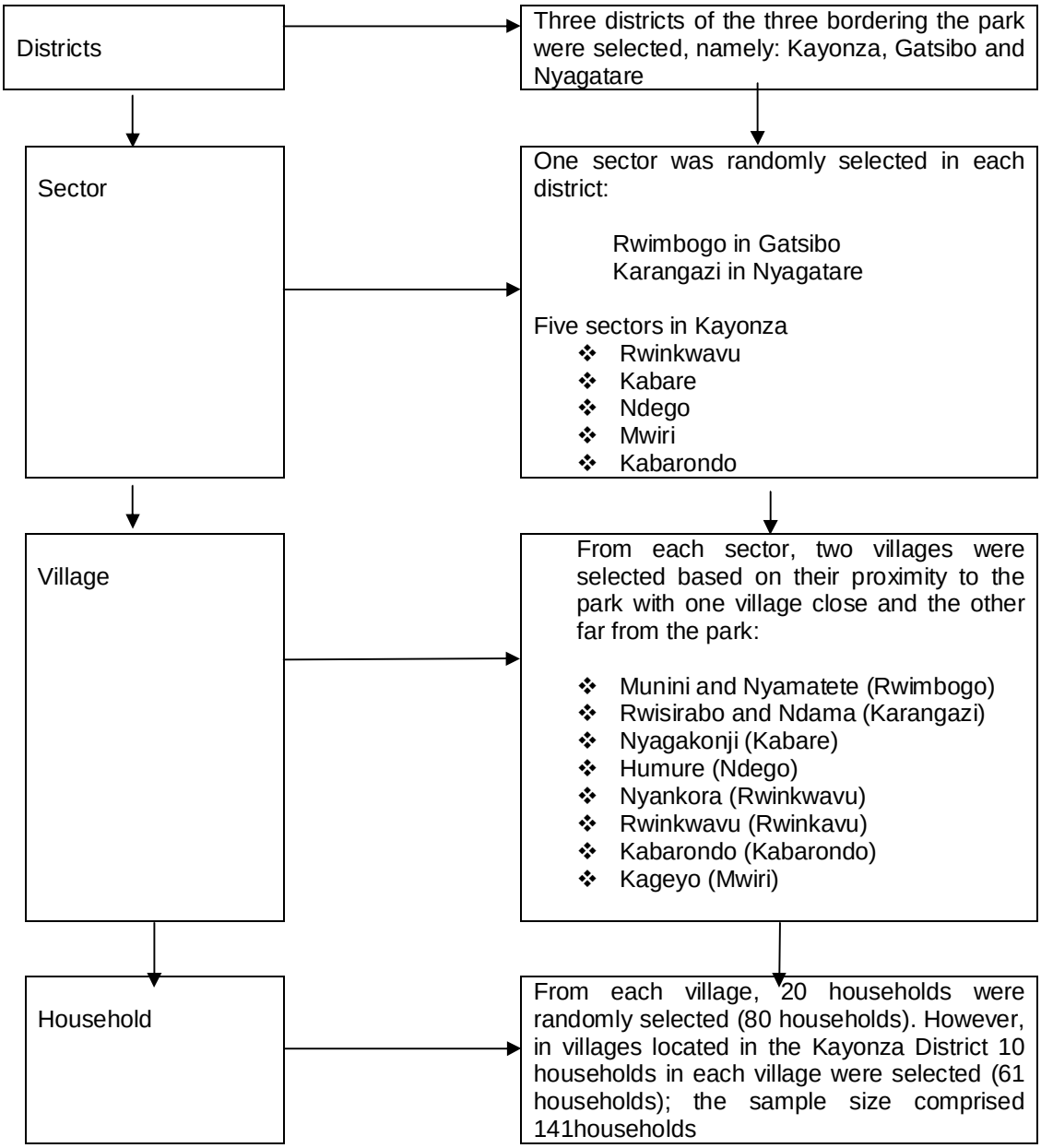


Figure 3.1: Methodology used for site and respondents selection

The study was conducted in ten villages namely, Kabarondo, Nyankora, Rwinkwavu, Nyagakonji, Ndego, Kageyo, Munini, Nyamatete, Ndama and Rwisirabo. Selection of the sample was done as shown in Figure 3.1. The districts bordering the park were selected and within each district, one sector was randomly selected and within each sector, two villages were randomly selected based on their distance from the park with one village being close to the park and the other far from the park. Finally, in each village 10 households were randomly selected for interviews. However, more villages of the Kayonza District were selected to participate in the study. This is because, on the one hand, this district has numerous sectors, which border the park (Appendix D) and, on the other hand, it is through this district that most tourists visit the ANP. Participants were chosen on the basis of the order in which they were met as the researcher walked through the villages.

3.6 Methods of data collection

3.6.1 Research instruments

A research instrument is anything that one uses to obtain the data that should be analysed (Hofstee, 2006:115). Data was collected using a structured questionnaire with close-ended questions. The questionnaire was developed by the researcher using available literature regarding community attitudes towards conservation in protected areas (Newmark *et al.*, 1993:177-178; Shrestha, Janakari & Alavalapati, 2006:73-74; Arjunan *et al.*, 2006:192). The questionnaire comprised three sections (See Appendix B).

The first section contained information that pertain to socio-demographic characteristics such as gender, age, educational level, occupation size of the family, distance of household to the park, district and village in which the household is situated and ownership of livestock.

The second section dealt with twelve questions relating to attitudes of local communities towards conservation of ANP, protected area employees and poaching activities; their past interactions with people who poach, as well as park staff; resources use patterns

and problems associated with living adjacent to the ANP. In this section, respondents were provided with multiple-choice questions.

The third section dealt with five statements formulated to portray different conservation values of the national park. The statements focused on the importance of the park for the survival of critical plant and animal species, the danger of illegal exploitation of the park to its inhabitants, the importance of the park for improvement of the local environment, preservation of resources for future generation and, lastly, the importance of the park in attracting tourists that generate sources of income to the national economy. Respondents were asked to rate their levels of agreement and disagreement with the given statement on a five-point Likert scale (5=strongly agree; 4=agree; 3=undecided; 2=disagree; 1=strongly disagree). Strong agreement with these statements would imply a higher level of conservation attitudes, while strong disagreement with the statements would imply negative attitudes of local communities towards conservation.

3.6.2 Reliability and validity of the instruments

The quality of data reflects reliability of the measurement used. Daniel, Stephen and Frederick (1998:104) have argued that if one cannot trust the measures, one cannot trust an analysis that uses those measures. According to Welman and Kruger (2001:139) reliability refers to the extent to which the obtained scores may be generalised to different measuring occasions. Validity determines the extent to which an instrument measures what is supposed to be measured (Sirard & Russel, 2000:440). The social science notion of validity relates more rigorously to procedures to obtain information so that appropriate inferences and interpretation may be made (Daniel, Stephen & Frederick, 1998:135). Therefore, in order to ensure validity and reliability of the instruments used in this study, the questionnaire was adapted and modified from the one that was utilised in previous studies on local people's attitudes towards conservation in protected areas (Newmark & *et al.*, 1993:177-178). The modification was based on another questionnaire, which was developed and validated in the literature relevant to this study (Shrestha & Alavalapati, 2006: 73-74). The modification of the adapted questionnaire was done in consultation with the current study. In addition, verification of the translated questionnaire was done to ensure validity of the instrument.

3.6.3 Language used in data collection

Prior to the survey, since a majority of the participants could not understand English, a translator was used to translate the questionnaires from English into the local language, which is Kinyarwanda (Appendix A). The translation was done in order to give the respondents an opportunity to answer in a language, which was convenient to them.

3.6.4 Procedure

The procedure of data collection began with lodging an application letter to seek permission to conduct research from ORTPN, the authority in charge of the management of the Akagera National Park. Once the authority granted permission (Appendix C), the researcher began to collect data from participants. A brief description of the researcher was provided to respondents to ensure that they understand the purpose of the study, in order to seek their consent to participate in the survey. Questionnaires were administered orally by the researcher within a period of a month and a half. However, in certain instances, respondents completed the questionnaires themselves in the presence of the researcher and returned them with immediate effect.

After dealing with local communities, structured and open-ended interviews were conducted with local officials to collect qualitative data that helped to verify and enrich data obtained from the survey. The main questions concerned the nature of conflicts between the local communities and wild animals and how they collaborate with the protected areas management to resolve those conflicts. An unstructured and open-ended interview was also held with the official in charge of community conservation in the ANP before and after the survey.

3.7 Data analysis

Data from completed questionnaires were computerised and analysed with the aid of the Statistical Package for the Social Sciences (SPSS) version 16.0. Descriptive statistics such as frequency distributions were generated to summarise the property of the dataset. Descriptive statistics are utilised with a purpose to describe rather than judge or interpret (Landman, 1988:59). According to Salkind (2000:149), using descriptive statistics, one can describe characteristics of distribution of the collected scores such as

the average score on one variable or the degree that one score varies from another. Salkind (2000:150) emphasises that the first step in the analysis of data is to describe them. Describing them usually means computing a set of descriptive analysis statistics, which allow the researcher to acquire an accurate first impression of what the data looks like (Salkind, 2000:150).

In conjunction with the frequency distributions presented in the form of charts and tables, bivariate tests were utilised to determine if respondents' age and/ or gender, occupation, family size, occupation, village distance, length of residence in the area, recognition of development projects in the area, and size of owned land, are associated with an individual's attitudes towards conservation. Bivariate tests were presented in cross-tabulations with Pearson chi-square values (X2) to determine the significance of all binomial variables. Statistics were tested at the 0.05 level of significance. In general, the chi-square test of independence is used to determine whether or not two or more categorical variables are related. In the case of two categorical variables, evidence that they are related consists of evidence that they are not independent (Dana, 1996:318). Therefore, explanation of the concept of independence implies the type of relation among variables that this test is meant to detect.

All interview results from key informants were treated individually and were not coded for computerised analysis. However, these results were used to verify the truthfulness of data obtained from local communities.

3.8 Limitations of the study

Although the researcher believes that the methods used in this study are reliable and appropriate to investigate people's attitudes towards wildlife conservation, some limitations were encountered.

The use of self-administered questionnaires might have lead to a certain level of information bias. Respondents might have viewed the interviewer as being affiliated with the wildlife and national park department and, thus, might not have freely expressed their opinions. The researcher personally experienced this simply by comparing what people say during an interview and the contradicting way in which they act according to

data obtained from key informants. However, in an attempt to reduce bias response, respondents were provided with identification of the researcher, as well as the purpose of the study. In addition, anonymity was maintained as respondents were not required to identify themselves.

The research topic was undertaken with a quantitative, rather than qualitative approach. Limitations of the study, therefore, concern the empirical data. In-depth interviews, with open-ended questionnaire, as well as discussion groups, would be suitable to obtain thorough insights about factors that influence local people in their conservation attitudes. In addition, qualitative data would have helped to understand what local communities expect from the protected area for improvement of their livelihood. However, qualitative data from key informants assisted to verify and substantiate quantitative data from the survey. In addition, some respondents' comments expressing their grievances, helped to assess their attitudes towards wildlife conservation.

A lack of statistical data regarding the population size made it difficult for the researcher to assert that the samples were representative of the communities under the study. However, the researcher believes that the samples provided reasonable information that allows finding parallels in the patterns of the relationships between people and wildlife.

3.9 Summary

This chapter has detailed the methodological approach, which investigated conservation attitudes of Rwandan community that live adjacent to the ANP. The approach involved a combination of documentary and empirical research.

The documentary research, on the one hand, was conducted by reviewing the literature on previous studies, books and reports concerning the attitudes of people towards wildlife conservation. Conversely, the empirical survey was executed through use of a self-administered questionnaire to collect quantitative data from the local community. Qualitative data was gathered to support quantitative data obtained from the survey. Qualitative data was obtained from key informants including local authorities and protected area employees through unstructured interviews.

This chapter also provided the theoretical aspect of research methodology, described the research settings, study population and sampling techniques. In addition, the chapter described means by which collected data was presented and analysed. Furthermore, it highlighted limitations encountered throughout the research process. The following chapter presents and discusses the findings of this study.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.1. Introduction

This chapter presents and discusses the findings of the study, which are summarised and presented in two different analytical instruments, namely frequency distribution tables charts as well as Chi-square (X2) test of independence tables. On the one hand, frequency distribution tables and charts present a description of the quantitative data of demographic characteristics of the study population, the conservation attitudes of local communities; resources use patterns and problems and, finally past interactions with protected areas and protected areas employees. The survey analysis results are presented and interpreted per dataset of each statement or question, which is contained in the questionnaire according to its relationship to the study. Conversely, the chi-square tests of independence tables present relationships between certain variables in order to demonstrate the factors that affect conservation attitudes of the local communities.

4.2 Demographic characteristics of the study population

In total, one hundred and forty one respondents received questionnaires and returned them, which provided a response rate of 100%. A reason for the high response rate was effectiveness of data collection method, whereby questionnaires were completed and returned to the researcher immediately upon completion. The questionnaires covered demographic data of respondents comprising age, gender, level of education, occupation, district and village of domicile, size of their family, as well as the distance between their residences and the protected area

4.2.1 Gender

Figure 4.1 shows the gender of participants in this study. Of the 141 respondents, 80 (56.7%) are males while 61 (43.3%) are females.

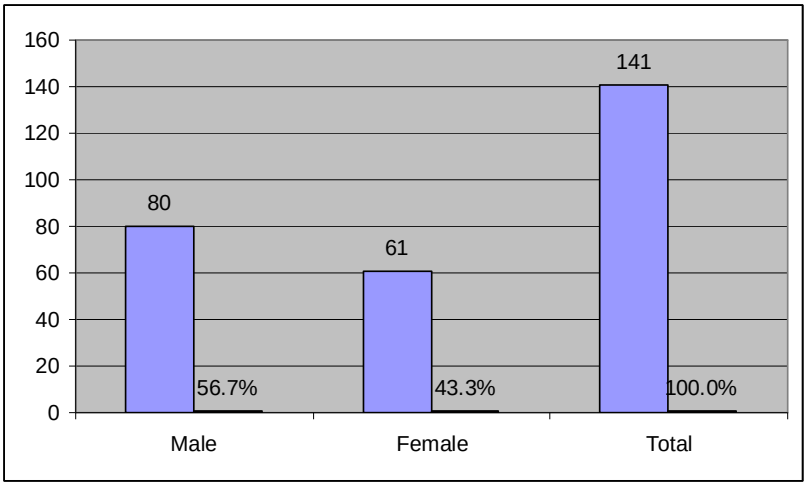


Figure 4.1: Gender of respondents (n=141)

This study suggests that male respondents may express more positive conservation attitudes than their female partners. According to Xu *et al.* (2006:370), being housewives, females pay more attention to living conditions than male. Women may perceive the prohibited utilisation of wildlife resources as a constraint to their better livelihood. Alternatively, males are availed more opportunities to be employed in conservation areas. However, if local communities do not benefit from the existence of the park, then both males and females would hold negative conservation attitudes.

4.2.2 Age

Figure 4.2 illustrates the age group of local communities. The highest number of respondents was in the age group of 35 to 44 years (41.8%), followed by the age group of 25 to 34 years (34.0%), and the age group of 45 to 54 years (12.1%). The lowest number of respondents was in elderly age group of 55 years and above, which represents 5.7% and the youth group of between 18 to 24 years, which is 6.4% of the total number of respondents.

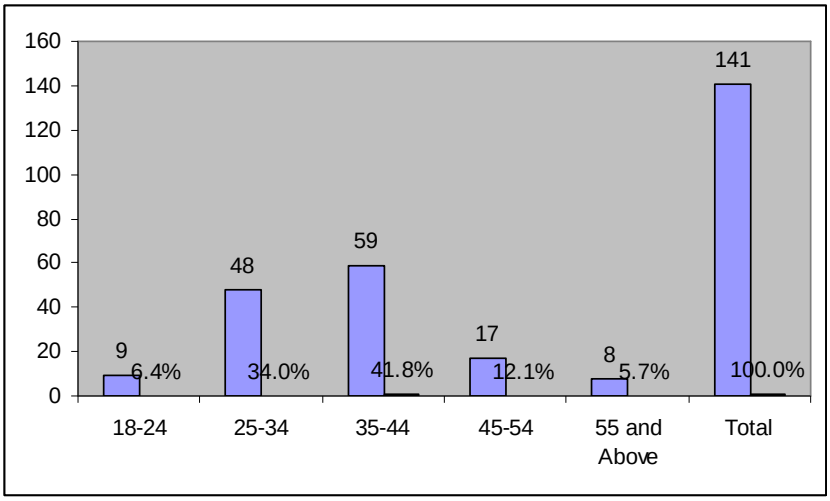


Figure 4.2: Age brackets of respondents (n=141)

The study was approached with a suggestion that age may be an important factor to determine conservation attitudes of the local communities. On the one hand, if the elderly perceive the ANP as a barrier to maximisation of their household utility, then aged people are likely to have negative attitudes towards wildlife conservation (Shrestha & Alavalapati, 2006:76). Conversely, elderly people may desire to conserve natural resources for future generations (Shrestha & Alavalapati, 2006:76). In this case, elderly people may have positive attitudes towards conservation.

4.2.3 Level of education

As indicated in Figure 4.3, a majority of respondents, namely 57.4%, have only received primary education, followed by those who received secondary education, namely 24.1%, though a number of them did not complete this education level. In addition, 14.9% have not received any formal education, while 3.5% have a university level of education. These figures indicate that a majority of local communities in Rwanda receive basic formal education.

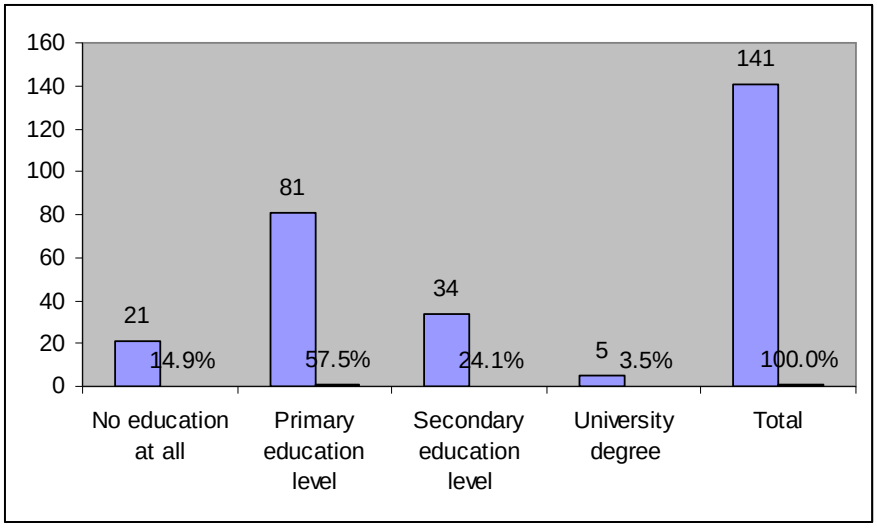


Figure 4.3: Educational level of respondents (N=141)

This study expected educated people to favour the conservation of the ANP. A main reason might be that they had better environmental awareness, and short-term, as well as long-term benefits associated with conservation. In addition, education is often regarded to be an initial step in improving people's attitudes towards conservation (Xu *et al.*, 2006:370). Furthermore, those who receive higher education may have more advantages of obtaining opportunities of employment in the ANP.

4.2.4 Occupation of respondents

Figure 4.4 indicates the occupations of respondents, a majority of whom, namely 45.8%, are agriculturalists, followed by those who own livestock, but whose primary occupation is agriculture, which represent 34.8%, while 14.2% are pastoralists. The remaining small figures represent those undertaking activities other than agriculture and livestock grazing as their primary occupation.

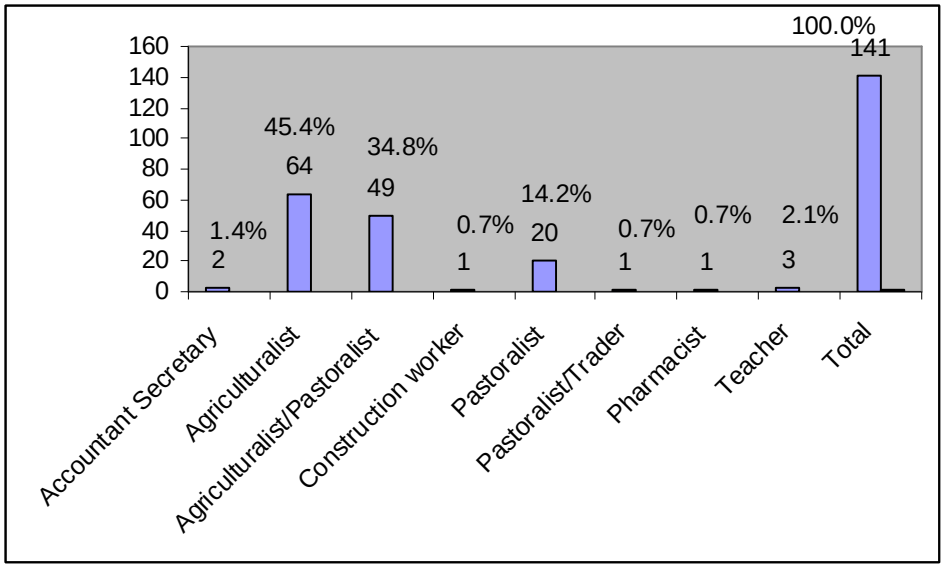


Figure 4.4: Occupation of respondents (n=141)

The primary occupation of communities that live adjacent to the ANP is an important variable in influencing their attitudes towards wildlife conservation. The study suggests that people whose primary occupation is anything other than agriculture and livestock grazing are likely to hold more positive attitudes towards conservation. The reason is that problems caused by wildlife may be more detrimental to the livelihood of farmers than of other job occupants, since the latter can improve their livelihood through income earned from their jobs. However, in this study, the number of respondents who held occupation other than agriculture or grazing was small; hence their results are insignificant and cannot be based on drawing any conclusions.

The researcher suggests that people whose primary occupation is grazing livestock are likely to have more negative attitudes towards conservation than those who combine agriculture and livestock grazing. Based on their tradition of nomadic grazing, livestock is a valuable asset and, therefore, their right of free movement cannot be infringed upon. Thus, on the one hand they may not welcome any restrictions to the access of the wilderness area; while, conversely they may not tolerate any competition of pasture brought about by wildlife to their livestock. Although illegal exploitation of the ANP by local communities constitutes a punishable offence, pastoralists do not halt their practice of grazing in the ANP (Table 2.2). There is a penalty inflicted on them when they are caught (Karegire, 2008), which may spark antagonism between wildlife and community

and, subsequently, may jeopardise the future of wildlife. In addition, conflicts between communities and wildlife arise from raids of wildlife on crops and livestock on which local communities depend for their survival (Metha *et al.* 1998:320; Sekhar, 2003:340). If wildlife did not damage their crops, it is worth suggesting that agriculturalists would not conflict with wildlife even if their agricultural harvests were not sufficient for their welfare.

4.2.5 Distance from the park

Figure 4.5 indicates the distance between the residences of respondents and the ANP. Of the 141 respondents, 61 (43.3%) reside within one kilometre of the park, 20 (14.2%) respondents reside within two kilometres of the park while a total of 60 (42.6%) respondents reside within 10 and more kilometres of the ANP.

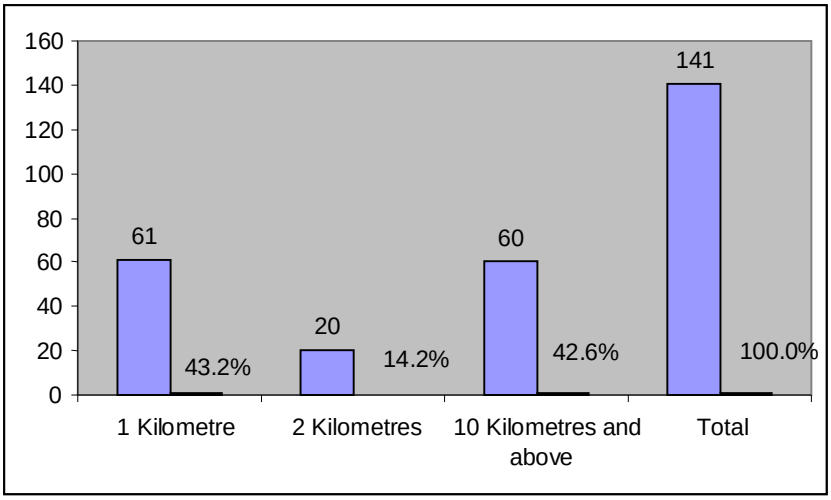


Figure 4.5: Distance of households from the park (n=141)

It was suggested that the distance between wilderness area boundaries influence the community's dependency on the reserve, as well as their awareness of conservation programs (Shrestha & Alavalapati, 2006:75). On the one hand, a household that live closer to the reserve, may be more dependent on the reserve as a source of livelihood. Conversely, a household closer to the reserve may suffer enormous losses owing to raids of wild animals on their crops and livestock. Households closer to the park are also more aware of the conservation programs owing to their frequent interactions with park officials. While this study suggests that more awareness of conservation programs may

result in more positive attitudes towards conservation, higher dependency and loss of crops and livestock pertaining to wild animals may lead to negative attitudes towards conservation. In addition, although households that live further from the park are likely to have less awareness and fewer benefits of the conservation programs, they are less likely to encounter problems with wild animals, and therefore, they are likely to have more positive attitudes towards conservation. Hence, it is difficult to predict the influence of distance on the conservation attitudes of communities.

4.2.6. Household size

Figure 4.6 illustrates the size of households that participated in this study.

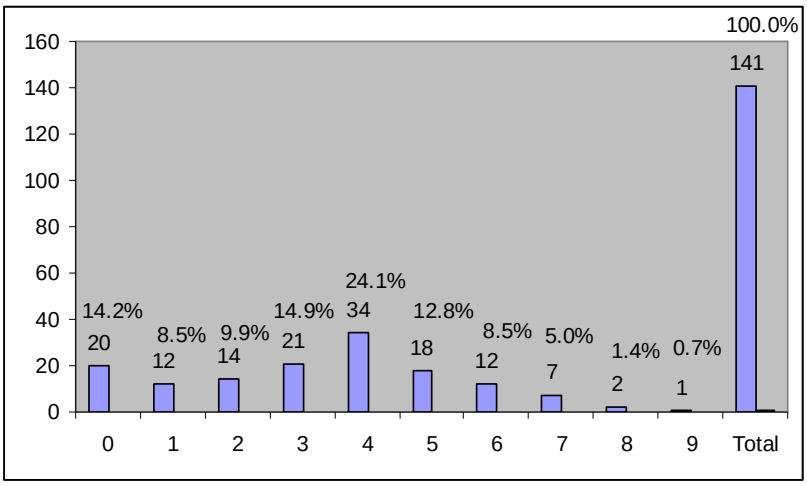


Figure 4.6: Households size (n=141)

The figure above shows that a majority of households, namely 51.8%,comprise between 3 to 5 children, while 32.6% are small sized households with less than 3 children, whereas the remaining percentage of 15.6% are considered as large family with between 6 to 9 children. In general, large families require more resources to meet their subsistence needs; therefore, they may have a higher propensity to extract resources from the conservation areas (Masozera, 2002:40; Shrestha & Alavalapati, 2006:76). Hence, it is expected that large households are likely to have negative attitudes towards conservation. However, large households could have a positive impact on conservation attitudes if economic opportunities increase in terms of family size. This is because the

income earned from these economic opportunities may reduce the household's dependency on the conservation areas.

4.3 Utilisation of resources

This study suggests that the utilisation of resources may play a key role in influencing the local community's attitudes towards conservation. The researcher argues that people who are more dependent on the reserve resources are unlikely to favour any conservation program if a ban is imposed on exploitation of the protected area. The following variables will help to determine resource utilisation patterns among communities that live adjacent to the ANP.

4.3.1 Land holding

Figure 4.7 shows the size of land held by households, which range from landless to 25 ha of land holding. The figure below indicates that 41.8% households own land of up to 3 ha, while 33.3% own land of 3 to 7 ha, whereas 7.1% own land of 7 ha to 10 ha, and lastly 17.7% of households have land of 25 ha

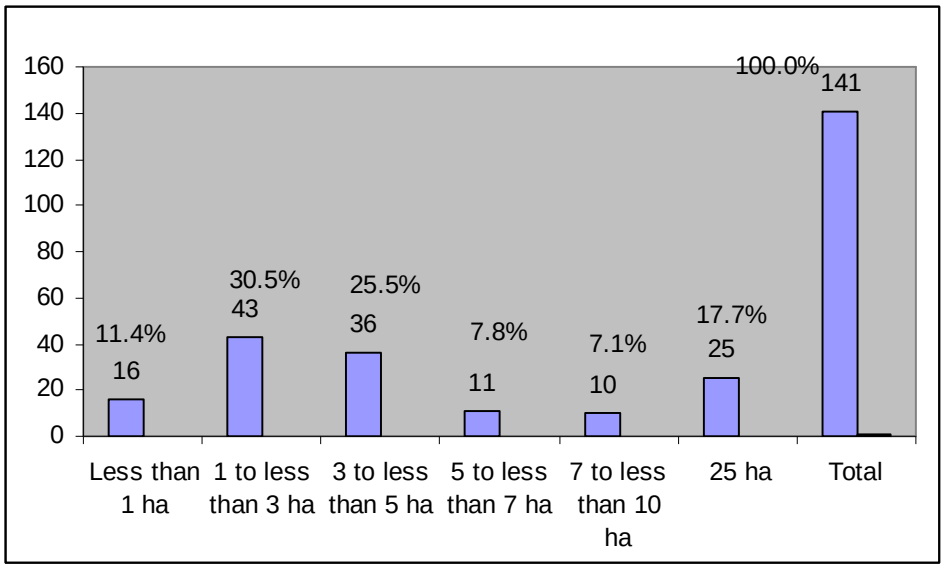


Figure 4.7: Size of land owned (n=141)

It was realised that most respondents who reported to have less than 10 ha were those who practice agriculture as their primary occupation, while respondents who own 25 ha, are pastoralists.

According to Shrestha and Alavalapati (2006:76) households with larger land are likely to generate more income from their own land and their dependency on the ANP resources should supposedly be small. Thus, land size is expected to have a positive influence towards conservation attitudes. However, this may not be true in the case of communities that live adjacent to the ANP owing to reduced rainfall and depletion of their land, which makes it impossible to utilise their land effectively and efficiently. They may, therefore, resort to utilising the reserve resources in order to meet their basic needs. Alternatively, pastoralists who own 25 ha of land believe that they hold small land, hence their practise of grazing around and inside the ANP, which threatens the life of wildlife (Table 2.2). Thus, it is difficult to suggest that land size influence positively on conservation attitudes of local communities that live adjacent to the ANP.

4.3.2 Length of residency

Figure 4.8 shows how long communities have lived in the area.

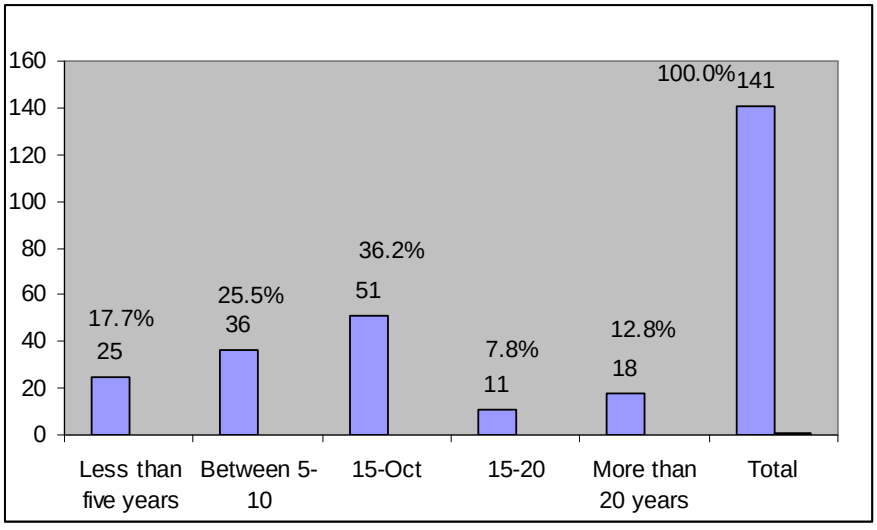


Figure 4.8: Length of residency (n=141)

Figure 4.8 indicates that a majority of people (79.4%) that live in villages adjacent to the ANP were settled there after the war and genocide of 1994. These were former refugees that were repatriated and settled in the area, which used to be the Mukura hunting reserve adjacent the ANP and a great territory of the ANP. The remaining total of 20.6% is the population that has lived in the region for more than 20 years, most of whom were people from other provinces that migrated to seek land.

This study suggests that length of residency may play a key role in peoples' attitudes towards conservation. Arjunan *et al.* (2006:196) argued that younger people and those with a shorter period of residency do not share the perception of older people regarding traditional rights regarding the forest. People with longer periods of residency may remember the period when they could hunt, graze their cattle and collect products from the reserve freely and any restrictions on such activities might have created resentment from these people (Arjunan *et al.*, 2006:196. This scenario is likely to have occurred in the ANP and its surroundings, which saw the adjacent Mukura Hunting zone suppressed and a total ban on accessing the reserve by local communities. However, the length of residency around the ANP may play an insignificant role in influencing communities' attitudes towards conservation since a majority of residents have inhabited the areas after restrictions on protected area utilisation were imposed. Therefore, this study suggests that communities are likely to hold positive attitudes towards conservation.

4.3.3 Consumption of game meat

Figure 4.9 indicates resources utilisation patterns with regard to the consumption of game meat. A majority of respondents, which account for 82.3%, reported that they obtain meat from butchery, followed by those who reported that they obtain meat from their own livestock, namely 34%, while 2.8% lack means to buy meat, and finally, none of the respondents reported to have consumed game meat.

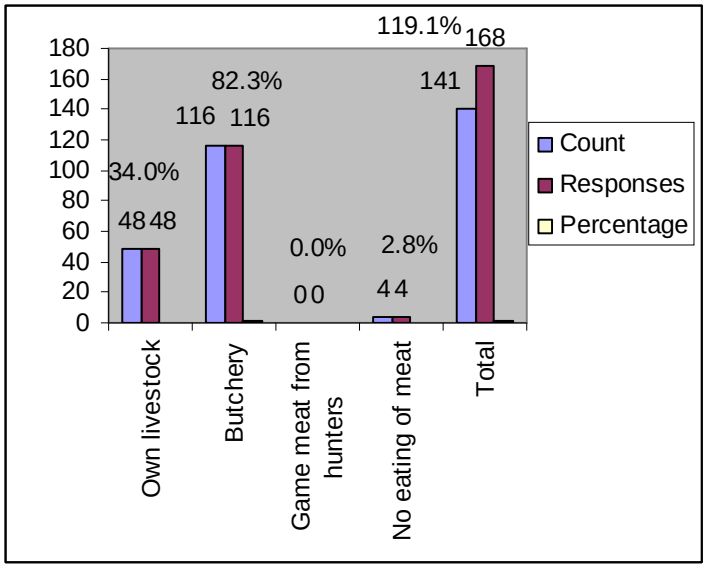


Figure 4.9: Source of meat (n=141)

These results indicate that local communities do not engage in poaching to improve their livelihood. Although these results suggest communities' positive attitudes towards wildlife conservation, they do not reflect the true facts of the ANP's illegal exploitation, as reported by park officials. In other words, local people appear to be aware and understand that game meat hunting is illegal, while their actions compromise conservation (Table 2.2). Table 2.2 shows the extent to which the ANP is heavily exploited by communities through poaching and snaring. It portrays the numbers of poachers who were arrested in the park, snares that were found, as well as wild animals that were found caught in those snares. People might have refrained from reporting game meat consumption for fear of being reported or prosecuted. However, these results appear to show that local communities are aware and understand that game meat consumption is illegal. This may, therefore, be translated into positive attitudes towards conservation if the communities are provided with better economic conditions.

4.4 Benefits created by the protected areas

Benefits derived from conservation such as employment, participation in tourism related opportunities that provide incentives to local people, as well as tourism revenue sharing schemes tend to result in favourable community attitudes towards conservation. The

results of this study shows that local people do not benefit from the existence of the ANP (Figure 4.10; Figure 4.11 and Figure 4.12).

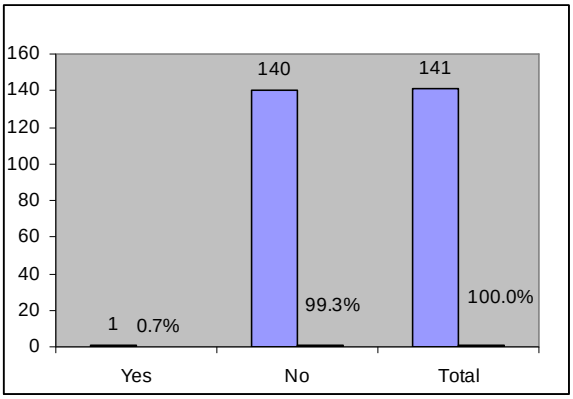


Figure 4.10: Employment created by the ANP (n=141)

Of the 141 people who were investigated, one person (0.7%) reported to have a member of the family working for the ANP. This has created a state of discontentment amongst local communities that believe that employment opportunities are provided to people from other provinces, which is to their detriment. One would understand why they are likely to hold negative attitudes towards park officials, which may have a great impact on their conservation attitudes. In addition to the limited employment opportunities in the ANP, the absence of development projects within the communities makes it difficult for local people to improve their livelihood and, thus, reduces their dependency on protected area resources.

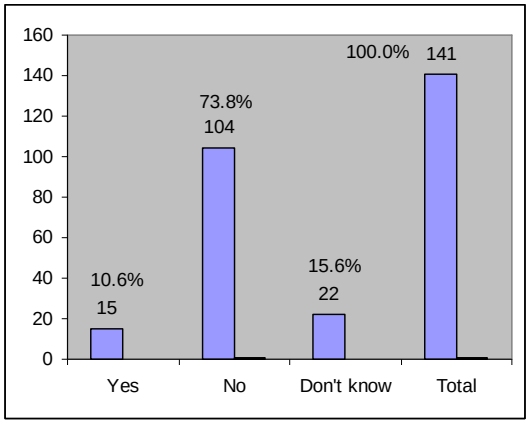


Figure 4.11: Development projects in the area (n=141)

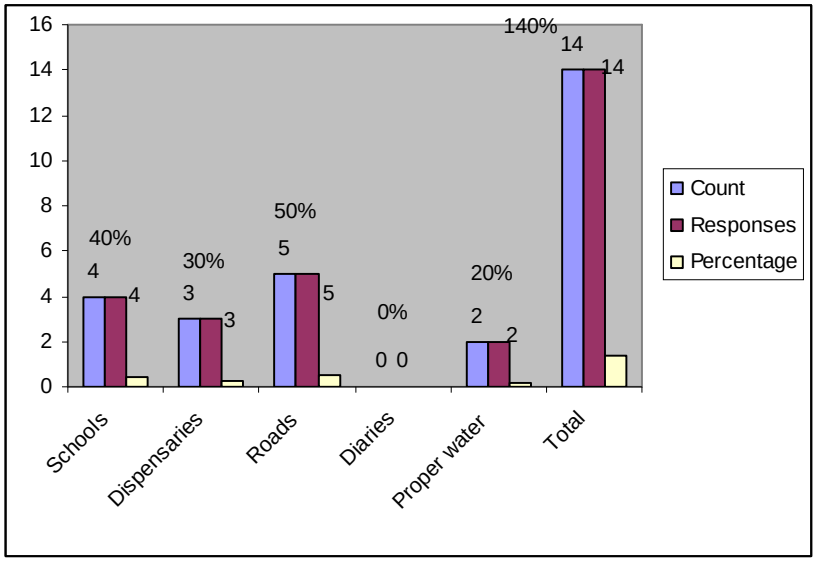


Figure 4.12: Types of development projects in the area (n=141)

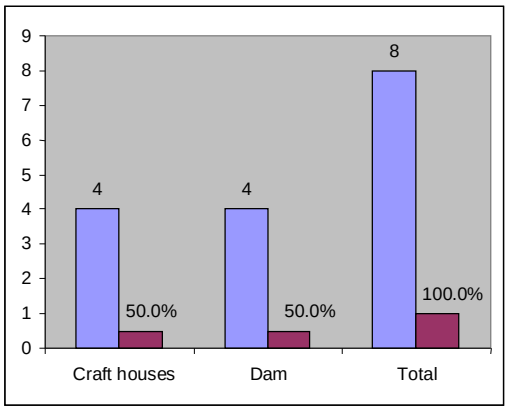


Figure 4.13: Other development projects (n=141)

Figure 4.11 illustrates findings of the existence of development projects in areas in which the study was conducted. The findings indicate that 10.6% have seen development projects in the area, whereas 15.6 % do not know whether there is or there are no development projects, while 73.8% of respondents did not report any development projects in respect of their knowledge. Development projects that were reported to have taken place in villages adjacent the ANP included roads, schools, dispensaries and proper water (Figure 4.12), most of which are still under construction. Other development projects cited were craft houses and dams (Figure 4.13). The findings of this study indicate that community tourism is not developed in villages

adjacent to the ANP although there is a program by ORTPN to progress towards community tourism development (Karegire, 2006). Craft houses that were reported (Figure 4.13) have yet to open and mark the beginning of these development programs.

In fact, neither respondents who do not know nor those who know that there are development projects are likely to not have received any benefits from those projects. Development projects such as roads, schools, dispensaries and proper water, were seen by several as not being beneficial from the ANP, but as a prerogative of the government to provide basic infrastructures to its people. However, these projects are sponsored by ORTPN through the revenue sharing scheme (Karegire, 2008). Annual meetings are held by ORTPN officials with Mayors and executives from districts that surround the ANP to discuss and decide on which projects to sponsor (Karegire, 2008).

4.5 Communities' attitudes towards park officials

Past interactions of park officials with the local communities might have played a significant influence on their attitudes towards conservation. This study suggests that a good relationship between park officials and communities may be translated into positive attitudes towards conservation. Figure 4.14 indicates frequencies of visits by park officials:

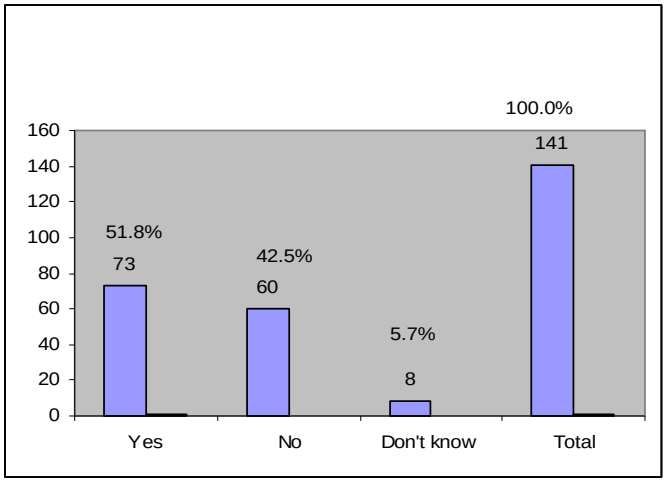


Figure 4.14: Visits of ANP employees to the village (n=141)

Figure 4.14 shows that 51.4% of respondents have seen the presence of ANP employees in the village, while 42.9% have not seen any park employee in the village and, finally, 5.7% were not aware whether park officials came to the village or not. These results assert that the park officials' presence amongst communities is not enough to make positive impacts on people's conservation attitudes. The study suggests that the presence of park officials within the community cannot be a determinant factor for conservation attitudes but their reasons for visits can explain the likelihood of relationships between park officials and the community.

Figure 4.15 shows reasons for visits to communities by park officials.

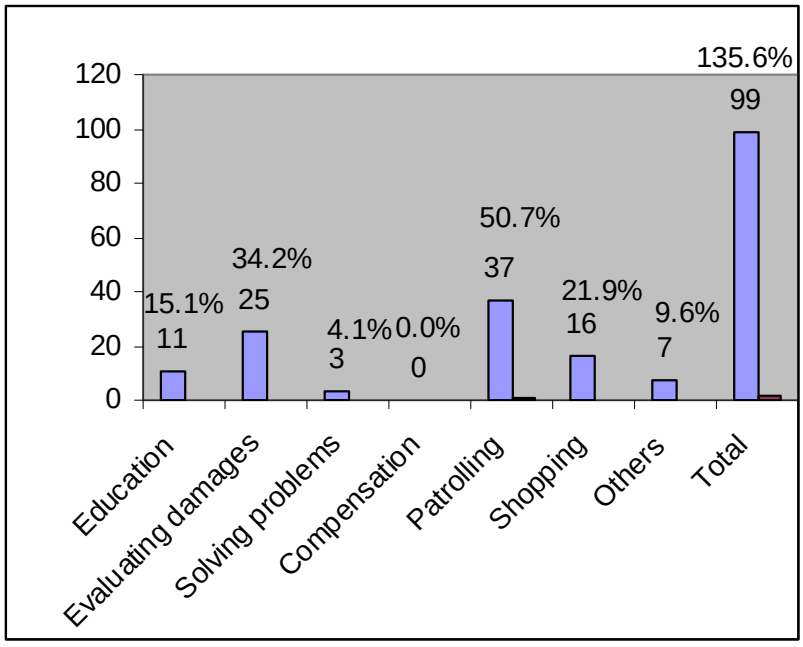


Figure 4.15: Reasons for visits by ANP employees (n=141)

Figure 4.15 indicates reasons why ANP officials visit local people. It was found that the main reasons why park officials visit villages is to patrol and seek poachers, namely 50.7%, followed by evaluating damages caused by wild animals, which account for 34.2%, followed by shopping with 21.9%, while education regarding conservation scored 15.1%, whereas patrolling and seeking poachers accounted for 11.3%. Other reasons include picking up people to extinguish fires and driving through the villages. These

results indicate that park employees travel in villages for the purposes of wildlife safety and security and not for interests of the communities.

These results also show that local communities do interact with ANP officials mainly when they have suffered damages caused by wild animals' raids on their crops, as well as livestock depredation, which constitute people's subsistence resources. Although damages caused by wildlife are frequently evaluated, compensations are never provided. Karegire (2008) pointed out that the law governing management of national parks in Rwanda does not make any provisions for compensating farmers for crops and livestock depredation by wild animals. Therefore, if local communities bear the costs of crops and livestock depredation without any compensation, it should be understood why their relationship with wildlife is antagonised.

Although shopping and education were among the main reported reasons for park officials to visit local communities, they seem to be meaningless for people who struggle to meet their subsistence needs.

Other reasons for visits that were provided include patrols in search of poachers, driving around the villages, which are apparently overlooked by communities who have feelings of helplessness. It can, therefore, be asserted that local communities displayed negative attitudes towards ANP employees, which may be present profound repercussions to their attitudes towards wildlife conservation. Figure 4.16 provides more details regarding communities' attitudes towards ANP officials.

When asked about positive things that people from the ANP do, 87.2% of those surveyed reported protection of natural resources. Keeping wildlife away revealed a 28.4% response, while 24.1% of responses showed that ANP officials generate revenue and foreign exchange, whereas environmental education amounted to 19.9% of responses. Provision of transportation and water recorded 5.7% and 4.3%, respectively. A total of 27.7% of responses showed that local communities expressed a concern that they do not obtain any assistance from officials.

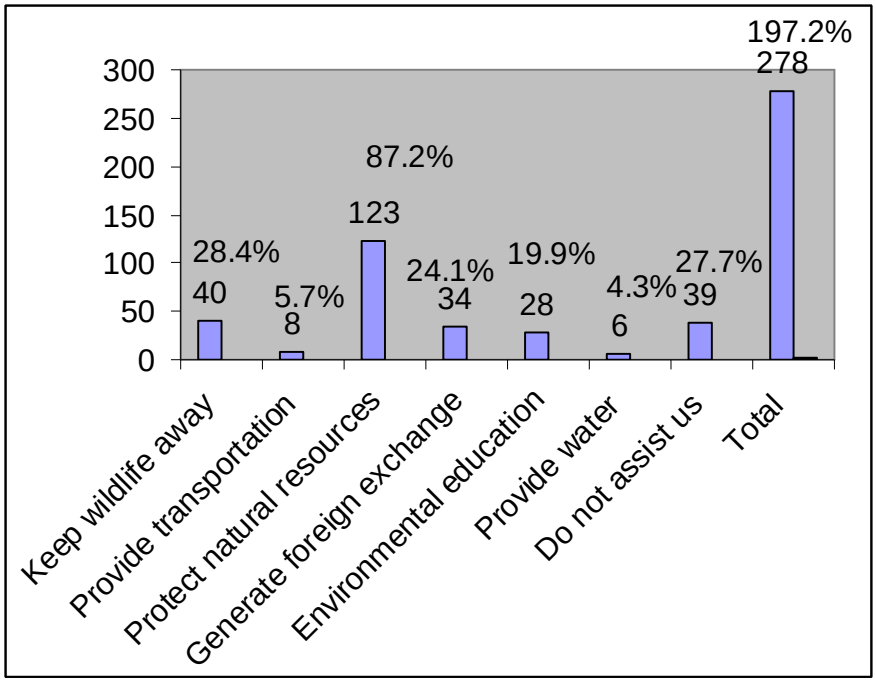


Figure 4.16: Services provided by ANP officials (n=141)

Those who live closer and those who live far from the park shared the view that park officials protect natural resources, which implies that their main task is to ensure that natural resources are highly protected with or without the cooperation of local communities. Only people whose households are far from the park reported that park officials keep wildlife away from them, whereas households that live closer to the park feel that park officials are ineffective in preventing wild animals from raiding their crops and livestock . In other words, communities regard park officials as lenient towards wildlife and do not consider people's needs.

In addition, although local communities acknowledge to a certain extent, that park officials do generate revenue and foreign exchange from tourism, they pointed out that they do not benefit from these tourism revenues in order to improve their livelihoods. The insufficiency of basic needs such as proper water and transportation explain the extent to which benefits from tourism revenue are felt by local communities.

These findings indicate that local communities have less positive attitudes towards protected area employees than the protected area itself.

4.6 Problems encountered while cohabitating with wildlife

Wildlife poses serious problems to people that live adjacent to the protected areas. These problems may be presented in different forms including, raiding crops and livestock, causing injuries and killing people, diseases, and others. People who live adjacent to the ANP reported to be victims of problems that are caused by wild animals as represented in Figure 4.17 below:

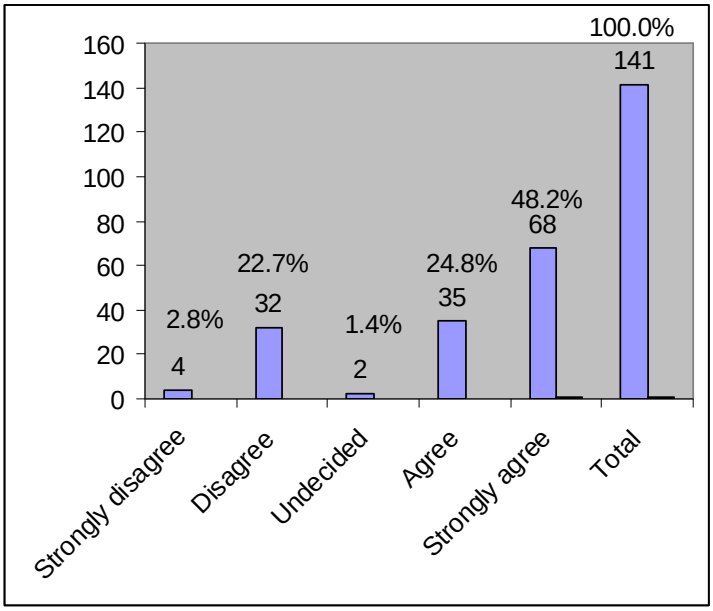


Figure 4.17: Recognition of problems caused by wildlife (n=141)

Respondents were asked to agree or disagree with the statement that wild animals cause problems. Figure 4.17 indicates that of the 141 respondents, 68 (48.2%) agreed strongly with the statement, while 35 (24.8%) agreed with the statement, whereas 32 (22.7%) disagreed that wild animals cause problems. A total of 4 (2.8%) respondents strongly disagreed, while 2 (1.4%) were undecided. These results demonstrate a majority of respondents (73%) have encountered problems, which are caused by wild animals, whereas 27% did not meet any problem owing to wild animals. The study found that people who reported to not have suffered damages, which are caused by wild animals, live far from the protected area. However, in certain villages, there were no different attitudes amongst households that are closer and those that are further from the park. A reason for this was that certain wild animals are prevalent throughout the

villages. These animals include hippopotamus that left and travelled long distances from the park in search of water and now live permanently in public dams. Therefore, they do not only compete over the pasture land with domestic livestock, but also prey on agricultural crops. Problems caused by wild animals are presented in Figure 4.18 below.

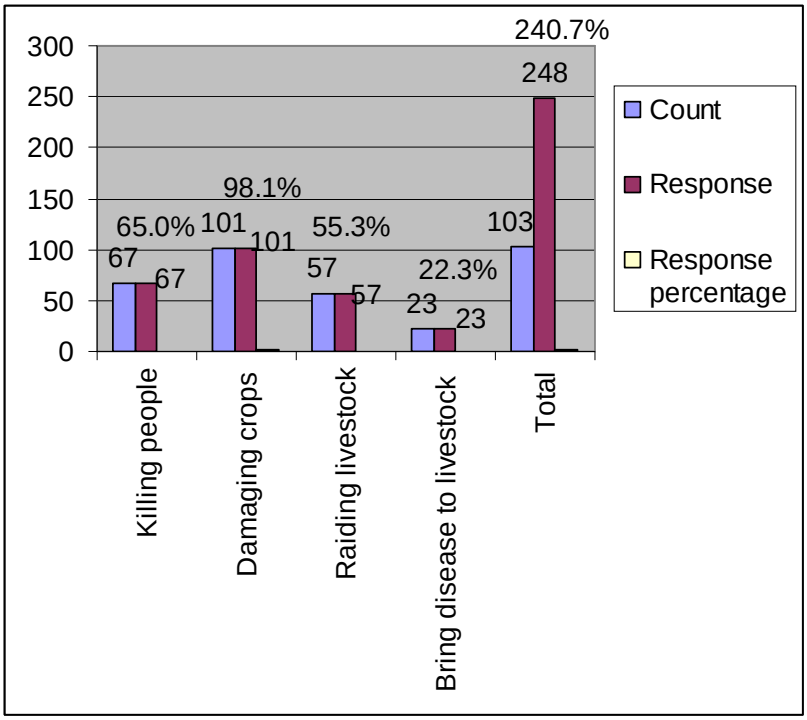


Figure 4.18: Types of problems created by wildlife (n=141)

Figure 4.18 illustrates problems that are caused by wild animals and that are experienced by those who live adjacent to the ANP. A majority of respondents, namely 98.1% reported that they suffer mostly because of a loss of crops caused by wild animals. A total of 67 (65%) respondents indicated that wild animals kill people, while 57(55.3%) respondents pointed out that wild animals prey on their livestock, whereas a total of 23 (22.3%) blamed wild animals for contaminating their livestock with diseases. Most people who live adjacent to the ANP are highly dependent on agriculture and livestock grazing. The findings of this study indicate that local people bear the costs of cohabitating with the ANP by losing their livelihood resources to wild animals. Wildlife does not only destroy their resources, but also cause losses to human life and brings diseases to the neighbourhood. Resulting effects are that communities resort to

defending themselves by killing wild animals. For example, the near extinction of lions in the ANP was because lions were killed through poisoning or any other means when they preyed on livestock. However, in an attempt to defend themselves against wild animals, people lose their lives. Animals that were reported to cause damages to crops include elephants, buffalo, rhinoceros, as well as hippopotamus. Tigers and lions were reported to raid livestock, while buffalo were the main culprits in bringing about disease, causing injuries, as well as killing livestock and people.

In order to investigate communities' attitudes towards wild animals, they were asked to enumerate problems that they encountered with farming activities (Figures 4.19 and Figure 4.20).

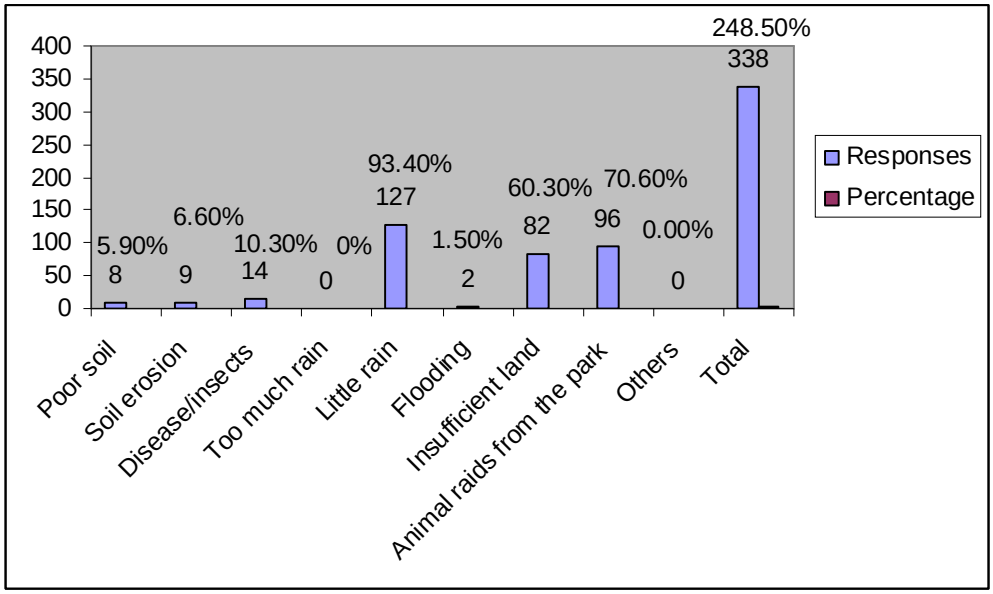


Figure 4.19: Problems associated with crops (n=141)

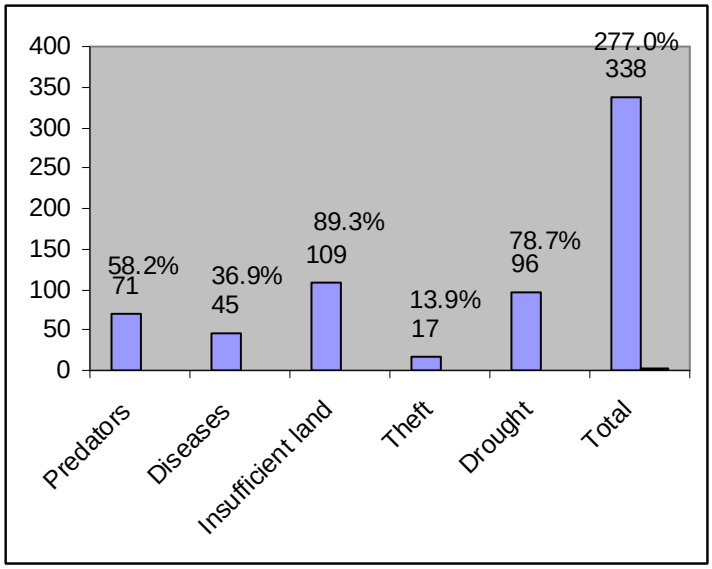


Figure 4.20: Problems associated with livestock (n=141)

Figure 4.19 illustrates problems that local people face regarding their crops, while Figure 4.20 shows their problems with livestock. The main problems that affected agriculture were reported to be little rain (93.4%), a loss of crops to wildlife (70.6%) and insufficient land (60.3%). A combination of these problems makes it difficult for people to have positive attitudes towards conservation. In other words, while local communities may expect reduced harvests owing to insufficient land and less precipitation, wild animal raids on crops add insult to their injuries, and cause extreme loss and subsequent hunger.

Communities also reported problems that they face with regard to their livestock grazing. These problems comprised insufficient land for grazing with 89.3% of responses, drought owing to insufficient rain (78.7%), predators (58.2%) and diseases (36.9%). A total of 13% reported theft that affected their livestock. These findings indicate that both agriculturalists and pastoralists face similar problems regarding insufficient land and little rain although resulting effects may differ. This is because while agriculturalists can tolerate a loss of crops owing to less land and less rain, pastoralists are less tolerant and resort to invading the ANP for pasture land during the dry season (Table 2.2), knowing that they would be inflicted with heavy penalties if they are caught.

However, while agriculturalists bear the loss of crops to wildlife, pastoralists lose livestock to predators and disease. In addition, diseases that are brought about by wildlife, do not only kill livestock, but they also increase costs of livestock's medical treatment. Diseases that were enumerated were foot and mouth disease, as well as livestock illness caused by insects (Tsetse fly, for example) that accompany wild animals. Buffalos were cited as main culprits in spreading diseases.

Insufficient land and unfavourable weather are common problems throughout the Republic of Rwanda. Therefore, local people are in constant danger of insufficient harvest to satisfy their subsistence needs. Furthermore, wild animals cause major losses on people's insufficient subsistence resources, which often result in hunger. A combination of problems that people face creates conflicts between them and wildlife, thus jeopardising the future of natural resources and its conservation.

4.7 Conservation values

A primary objective of this study was to discover conservation attitudes of communities that live adjacent to the ANP. In this regard, people were asked to agree or disagree with statements that relate to conservation values. More frequent agreements with these statements would imply a high level of positive conservation attitudes.

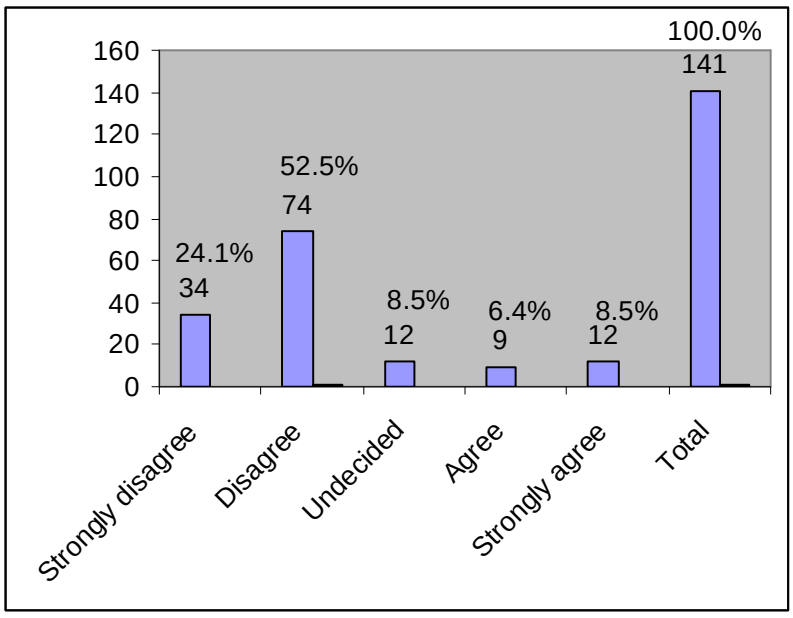


Figure 4.21: Endorsement of removal of the ANP (n=141)

Figure 4.21, Figure 4.22 and Table 4.1 illustrate the view of communities towards different conservation attributes.

Figure 4.21 illustrates views of communities with regard to the removal of the ANP. The table shows that a majority of respondents opposed the removal of the ANP. In other words, 52.5% disagreed, while 24.1% strongly disagreed with the suggested removal of the ANP. Few people supported the suggested removal of the ANP (23.4%). Respondents who showed a neutral stance on the suggested abolishment of the ANP appear to be ignorant about the importance of biodiversity conservation. Therefore, they tend to agree with the suggested removal of the ANP. In other words, people's indecision regarding the idea of removing the ANP implied that they supported it since they do not understand reasons to maintain the park.

The study found that high opposition to the suggested removal of the protected area was based on the need and importance that local people attached to the park. The most frequent justification for opposing removal of the ANP was that it generates revenue and foreign exchange via tourism. Another reason was attached to the importance of natural resources in providing a clean environment. People believe that the removal of the ANP would lead to desertification that may cause severe climate change and subsequent environmental degradation.

Wildlife depredation to crops and livestock, combined with a fear of being attacked by wildlife, was the main reason for supporting the removal of the ANP. This implies that effective protection of people's resources from wild animals would improve their attitudes towards conservation.

Extents to which people conduct themselves explain how they are committed to the cause of keeping wildlife intact. They were asked to agree or disagree on whether poaching activities are against the law (Figure 4.22).

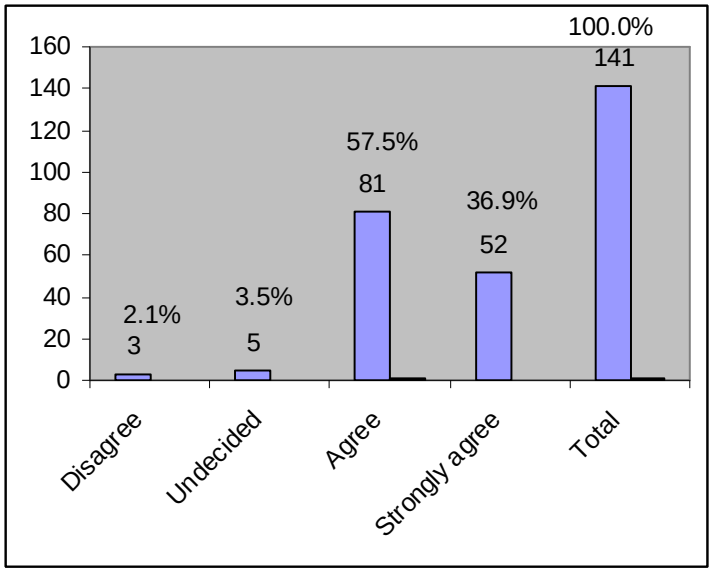


Figure 4.22: Acknowledgement of illegality of poaching in the ANP (n=141)

A majority of respondents (94.3%) acknowledge that poaching activities are illegal, while 3.5% were ignorant about the illegality of poaching and, therefore, they are more likely to support poaching, whereas 2.1% of respondents believe that it is their right to hunt within the park. These results indicate that local communities oppose poaching activities that occur in the ANP. However, Table 2.1 illustrates the opposite. Communities engage in poaching and snaring, whilst endangering wildlife (Table 2.1) in spite of their awareness concerning the illegality of utilizing ANP natural resources. It was found that poaching is not exercised by only Rwandan communities but also by the Banyambo community from neighbouring country, Tanzania. These results are similar to those of Kanyamibwa (1998:1401).

By approving that poaching activities are illegal, local communities were also reluctant to admit that they have seen poachers in the village. Therefore, it is clear that communities are not yet ready to report any wrongdoings committed to wildlife. They have, instead, reported that hunting in the park was stopped owing to heavy punishments inflicted on them once they are caught. However, their report does not reflect the facts as shown in Table 2.1.

In an attempt to reduce the level of poaching in the ANP, ORTPN has been assisting former poachers to form associations that engage with other projects that are related to

agriculture and livestock grazing (Karegire, 2006). However, it is unrealistic to suggest that these associations would stop poaching as wildlife is increasingly in danger of such illegal activities. Another problem that remains is how to curb the poaching from Banyambo community from Tanzania who continually affect the future of wildlife in the ANP.

In order to discover conservation attitudes of communities that live adjacent to the ANP, respondents were asked to agree or disagree with statements that relate to conservation values. Respondents' agreement with a given statement implies certain conservation attitudes.

Table 4.1 below illustrates a summary of frequency tables of responses to conservation value statements.

Table 4.1: Responses to conservation value statements

Statements	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
1. ANP is important for the survival of critical plant and animal species.	0%	0%	5%	64.5%	30.5%	100.0%
2. Livestock grazing and firewood, fodder, and raw materials collection in the ANP are harmful to wildlife.	0%	12.1%	7.1%	45.4%	35.5%	100.0%
3. The ANP is a community resource and its conservation is essential for a healthy environment.	4.3%	23.4%	16.3%	39.7%	16.3%	100.0%
4. Protection of the ANP is important for the benefits of future generation	0%	2.1%	11.3%	58.9%	27.7%	100.0%
5. Protection of the ANP attracts tourists that provide additional income for local people	1.4%	4.3%	10.6%	45.4%	38.3%	100.0%
Total	5.7%	41.9%	50.3%	253.9 %	148.3%	

A majority of respondents (95%) agreed with the statement, which describes the ANP's importance for the survival of critical plant and animals, while 86.6% of respondents acknowledge the importance of the ANP for the benefits of future generations. However,

several respondents supported the protection of the ANP for future generations, not because of its contribution to a healthy environment, but because it will serve as an area of settlement for future generations as the population growth rate is high. When it comes to the importance of the ANP attracting tourists that provide additional income to local people, 83.7% agreed with the statement, although they raised concerns that tourism revenue does end up in government coffers, which are ultimately utilised in public and social services. A total of 80.9% of respondents reported their agreement that livestock grazing, firewood, fodder and raw material collections will harm wildlife habitat. However, local people admitted that they refrained from exploiting resources from the ANP in order to avoid heavy penalties on the one hand and also to avoid contracting diseases on the other hand. When asked to agree with the statement that describes the ANP as a community resource where conservation is essential for a healthy environment, their agreement merely reached 56%. They asserted that the ANP is a government resource and does not benefit local people directly who suffer the pain of cohabitating with wildlife.

Overall, by agreeing with the conservation statements, local communities showed a high level of positive attitudes towards wildlife conservation. However, their agreements do not necessarily translate into good practices in protection of the ANP. In fact, people might be hypocritical in showing that they aspire to the Government's pledge to conserve, but conduct themselves differently with regard to illegal practices in the ANP (Table 2.2). In other words, people appear to have good will in terms of wildlife conservation, but their actions are contrary.

4.8. Factors influencing communities' attitudes towards wildlife conservation

The main objectives of this study were to investigate conservation attitudes of Rwandan communities that live adjacent to the ANP and factors that influence them in such attitudes. In this regard, bivariate tests were utilised to determine if socio-demographic characteristics such as age, gender, occupation, household size, village distance, length of residence within the village, land ownership and problems that are caused by wild animals influence their attitudes towards wildlife conservation.

When asked if the ANP would be removed, 8.5% of respondents were undecided, while 14.9% strongly agreed or merely agreed with its removal. These figures imply a certain level of negative attitudes towards conservation. In order to find why certain individuals agree with the removal of the ANP, statistical tests were undertaken and summarized in Table 4.2

Table 4.2: Influencing factors in support of the ANP removal

	Pearson Chi-square	Degree of freedom (df)	P-value (P)	
Gender	4.458	4	.348	P>0.05
Age	42.744	16	.000	P<0.05
Education	51.185	12	.000	P<0.05
Household size	33.556	36	.585	P>0.05
Distance from the park	26.740	8	.001	P<0.05
Occupation	38.827	32	.189	P>0.05
Size of land owned	37.071	20	.011	P<0.05
Length of residence	22.961	16	.115	P>0.05
Problems with wild animals	28.609	16	.027	P<0.05
Past interactions with park officials	10.150	8	.255	P>0.05
Development projects	19.545	8	.012	P<0.05

Table 4.2 shows that variables such as gender, household size, occupation, and past interactions with park officials are statistically insignificant (P>0.05). It implies that those variables do not relate to the agreement of respondents regarding removal of the ANP.

Table 4.2 indicates a statistical significance between age variables of respondents and their attitudes towards conservation (Chi-square 42.744, P=0.000, df 16). The study revealed that young people appeared to have more positive attitudes towards conservation than older people. These findings are consistent with previous study results (Arjunan *et al.* 2006:193; Tomicevic, 2006:491). These positive attitudes might have resulted from better environmental awareness, which is provided to young people, in terms of short term, as well as long term benefits that are associated with the conservation of natural reserves. However, illiterate young people appeared to be

ignorant concerning the role played by natural forestry within the environment, which negatively affects their attitudes towards conservation.

Education variables were statistically significant (Chi-square 51.185, P=0.000, df 12), which suggest that educated people hold positive conservation attitudes, which is consistent with previous study findings (Shrestha, Alavalapati, 2006:79; Xu *et al.*, 2006:69). In fact, educated people show better environmental awareness in term of short term, as well as long term benefits that are associated with the protection of natural reserves and they have a better chance of being employed within the protected area. One participant asserted:

"I know pretty much the importance of the forest in cleaning the environment and attracting rainfall. How could I wish for the removal of the ANP with the level of education I have acquired?"

The study revealed that although educated people hold more positive conservation attitudes than illiterate people, they complained about a lack of employment opportunities in the ANP as one respondent complained:

"I have completed my secondary studies and I am now jobless, at the same time we, unfortunately, always see new recruits in the ANP without having been given any employment offer, which is totally unfair on the local community".

Thus, although educated people hold more positive conservation attitudes, they may develop a sentiment of unhappiness owing to a lack of employment opportunities, which are availed by the protected area and which may turn against conservation efforts.

The proximity of households to the ANP were statistically significant (Chi-square 26.740, P= 0.001, df 8), as it indicates that people who live closer to the ANP were more likely to agree with the removal of the ANP than those who live further. These results indicated that people who live closer to the park reported more problems than those who live further from it (Chi-square 28.609, P= 0.027, df 6).

Informal discussions with key informants including park officials and local authorities confirmed complaints made by communities that wildlife depredation of crops and

livestock is a major issue between the ANP and local communities. Local communities are neither allowed to kill depredating wild animals nor receive any compensation for wildlife damages. Therefore, if local people bear the real costs of conservation without receiving any benefits to offset those costs, one should understand why negative attitudes towards wildlife conservation have emerged amongst local communities in Sub-Saharan Africa, as well as in other places (Johannesen & Skonhoft, 2005:221).

In spite of the problems caused by wild animals amongst local communities, overall results of this study indicated that people disagree with the removal of the ANP. A majority of participants asserted:

" *We strongly support the existence of the ANP, but park officials should protect us from their animals' depredation"* and *"if they cannot keep wildlife inside the park, then they should compensate us for the losses brought about by wildlife".*

Others complained:

"We are growing crops to improve the health of wild animals while we are starving."

The size of land owned by households were statistically significant (Chi-square 37.071, P= 0.011, df 20) and suggest that people with small land are likely to be less positive regarding conservation. Most people who approved the removal of the ANP argued that it would pave the way for increased arable and pasture land.

Although not statistically significant (Chi-square 38.827, P= 0.189, df 32), pastoralists are more concerned with the size of land for grazing with a belief that wild animals occupy a large land area compared to their herds. They, therefore, believe that they should share the pasture land with wild animals in the park, particularly during the dry season.

Development projects in the village were statistically significant (Chi-square 19.545, P=0.012, df 8) to influence people in their conservation attitudes. Even though there are few development projects in area that adjacent to the ANP (Figure 4.10), participants who recognise the existence of development projects such as schools, roads and hospitals, are likely to have had benefits provided. Informal discussions with key

informants revealed that community conservation is a new initiative that was recently adopted by the unit in charge of conservation in the ANP and its role is to develop community projects that would benefit to local people via tourism activities. Even though community development projects are not prevalent to enhance communities' conservation attitudes, the findings of this study suggest that its benefits can be incentives, which would allow people to perceive conservation positively.

The study sought to examine factors that created discrepancies in response to conservation attitudes. In other words, the study analysed relationships that exist between variables and conservation value statements in order to find what motivates people to conduct themselves differently towards conservation of the ANP (Table 4.3).

Table 4.3: Influencing factors regarding the agreements with five conservation value statements

Independent variable	Dependent variable	Pearson X2	Df	P-value	
Gender	Statement 1	.269	2	.874	P>0.05
	Statement 2	3.414	3	.332	P>0.05
	Statement 3	1.800	4	.773	P>0.05
	Statement 4	4.193	3	.241	P>0.05
	Statement 5	14.518	4	.006	P<0.05
Age	Statement 1	11.265	8	.187	P>0.05
	Statement 2	19.783	12	.071	P>0.05
	Statement 3	27.585	16	.035	P>0.05
	Statement 4	24.036	12	.020	P<0.05
	Statement 5	21.588	16	.157	P>0.05
Education	Statement 1	13.339	6	.038	P>0.05
	Statement 2	8.007	9	.533	P>0.05
	Statement 3	9.550	12	.655	P>0.05
	Statement 4	25.638	9	.002	P<0.05
	Statement 5	19.542	12	0.76	P>0.05
Distance from the park	Statement 1	9.395	4	.052	P>0.05
	Statement 2	18.929	6	.004	P<0.05
	Statement 3	21.698	8	.006	P<0.05
	Statement 4	14.012	6	.030	P<0.05
	Statement 5	19.571	8	.012	P<0.05
Occupation	Statement 1	13.881	16	.608	P>0.05
	Statement 2	36.623	24	.048	P<0.05
	Statement 3	30.539	32	.540	P>0.05

	Statement 4	17.909	24	.807	P>0.05
	Statement 5	13.892	32	.998	P>0.05
Size of land owned	Statement 1	5.247	10	.874	P<0.05
	Statement 2	19.055	15	.211	P>0.05
	Statement 3	29.968	20	.070	P>0.05
	Statement 4	17.879	15	.269	P>0.05
	Statement 5	30.249	20	.066	P>0.05
Length of residence	Statement 1	16.055	8	.042	P<0.05
	Statement 2	26.402	12	.009	P<0.05
	Statement 3	19.521	16	.243	P>0.05
	Statement 4	30.102	12	.003	P<0.05
	Statement 5	45.728	16	.000	P<0.05
Household size	Statement 1	14.398	18	.703	P>0.05
	Statement 2	26.748	27	.477	P>0.05
	Statement 3	36.585	36	.442	P>0.05
	Statement 4	43.329	27	.024	P<0.05
	Statement 5	36.651	36	.439	P>0.05
Past interactions with park officials	Statement 1	13.199	4	.010	P<0.05
	Statement 2	3.048	6	.803	P>0.05
	Statement 3	31.030	8	.000	P<0.05
	Statement 4	15.805	6	.015	P<0.05
	Statement 5	9.974	8	.267	P>0.05
Problems with wildlife	Statement 1	13.143	8	.107	P>0.05
	Statement 2	32.988	12	.001	P<0.05
	Statement 3	27.329	16	.038	P<0.05
	Statement 4	19.5.5	12	.077	P>0.05
	Statement 5	34.192	16	.005	P<0.05
Development projects	Statement 1	4.811	4	.307	P>0.05
	Statement 2	8.694	6	.192	P>0.05
	Statement 3	17.245	8	.028	P<0.05
	Statement 4	3.297	6	.771	P>0.05
	Statement 5	11.724	8	.164	P>0.05

According to Table 4.3, there is no relationship between the gender of respondents and four of the conservation value statements, which are illustrated in Table 4.1, except for the statement that protection of the ANP attracts tourists that provide additional income to households (Chi-square 14.518, P=0.006, df 4). Discrepancies between males and females stem from the fact that being housewives, females pay more attention to living

conditions than their male counterparts. As community tourism is not developed around the ANP to benefit local people and tourism revenues are not currently shared amongst local people, and while living conditions are poor, females remain pessimistic concerning the future benefits from tourism activities in the ANP.

There is a relationship between the ages of people and their agreement that the ANP is a community resource and that its conservation is essential for a healthy environment (Chi-square 27.585, P= 0.035, df 16), while protection of the ANP is important for the benefit of future generations (Chi-square 21.588, P= 0.020, df 12). These results suggest that young people might have received better environmental awareness through education and, therefore, they may be optimistic about their future relationship with the ANP. In this regard, they are likely to participate in any initiative, which is designed to enhance the wildlife conservation in the hope of reaping future benefits.

Although not statistically significant on three of five conservation value statements, the education level of communities is a key factor in their conservation attitudes. There was a statistical significance between education variables and the statement describing the importance of ANP for biodiversity conservation (Chi-square 13.339, P= 0.038, df 6), as well as the statement describing the importance of the ANP for benefits of future generations (Chi-square 25.638, P=0.002, df 9). This implies that as the level of education improves, people understand current needs, as well as the benefits of maintaining the park for future utilisation. More importantly, educated people may have obtained better environmental awareness, which would translate into greater utilisation of natural resources to preserve the interests of future generations.

The distance between households and the conservation area is an important factor in peoples' conservation attitudes, as found from responses to all conservations value statements ($P<0.05$). Households that are closer to the protected area are in constant danger of wildlife raids on their crops, livestock, as well as their lives without receiving any compensation. In addition, a lack of benefits such as employment opportunities and revenue sharing from tourism, which offset costs that are associated with cohabitating with wildlife, render households that are closer to the park, vulnerable to extreme misery.

Occupation of communities did not show any discrepancy of responses on four of the five conservation value statement (P>0.05). However, when asked to agree that illegal utilisation of park natural resources are harmful to wildlife, respondents' discrepancies were noticed between agriculturalists and pastoralists (Chi-square 36.623, P=0.048, df 24). People whose pastoral activities are their primary occupation provide more value to their livestock and tend to ignore the right to life of wild animals even if they are aware of the importance of natural resources. In fact, communities might recognise the need and importance of protected areas on the one hand, but conversely act in a different manner (Table 2.2).

Although not statistically significant (P>0.05), the size of the land appears to affect pastoralists' conservation attitudes more than it affects agriculturalists although both of them claim to have insufficient land. Stated differently, pastoralists are likely to seek pasture land from the protected area in order to save their cattle from starvation, which arises from insufficient grazing land and drought. The results confirmed the assertion by Byers (1996:8) that when the choice is between conservation and starvation, people will behave the same even if they know that their behaviour will harm the resource base and make life harder for themselves in the long term.

Length of residency affects people's conservation attitudes (P<0.05). The study had predicted that people with longer residency are likely to have less conservation attitudes after the Mukura hunting zone was suppressed, which deprived people of their right to hunt and graze. However, results of this study showed the contrary. In other words, communities with shorter periods of stay expressed their anger against the ANP, as one asserted:

"We were pleased to be repatriated home but why do we have to live with animals?"

While another respondent complained:

"*I wish I would have stayed and faced difficulties in exile rather than come here to die from starvation owing to wild animals."*

In fact, people with shorter periods of stay may not be accustomed to confronting wild animals, while they become less tolerant if their subsistence resources are preyed upon by wild animals.

Past interactions between local communities and park officials portrayed a statistical significance regarding the statement, which describes the ANP as important for wildlife conservation (Chi-square 13.199, P=0.010, df 4), its importance for a healthy environment (Chi-square 31.030, P=0.000, df 8) and its benefits for future generations (Chi-square 15.805, P=0.015, df 6). Visit by park officials to the local communities may create a certain level of public environmental awareness and knowledge concerning the role of natural resources regarding the sustainable healthy environment. Environmental awareness, therefore, enhances local peoples' understanding of the importance of natural resources and may lead to their protection. However, park officials visit community neighbourhoods mostly to patrol and maintain the security and safety of wildlife (Figure 4.15), which creates a belief that the ANP is a government resource rather than a community resource. Nevertheless, local communities reckon that the ANP should be preserved for a better environment and for the Government to generate revenue via tourism.

Problems created by wildlife constitute an important factor, which influences conservation attitudes of local communities. Table 4.3 indicates statistical significance between problems that are caused by wild animals and three of the five conservation value statements (P<0.05). Whereas local communities bear the costs of wildlife depredations without receiving any compensation or any other kind of benefits that are generated by the protected area to offset costs, their support for conservation may decline to the detriment of the future of wildlife, as well as future generations (Shrestha & Alavalapati, 2006:70). Indeed, conflicts between wildlife and local communities are sparked by crops and livestock loss, which are caused to wildlife raids. This implies that people would hold positive attitudes towards conservation if they were not victims of wildlife depredation. Several of the respondents asserted:

"The ANP would be important for the country's tourism, were it not for wild animals that raid our subsistence resources".

According to Karegire (2008) and local authorities who were interviewed, ineffective resolutions of problems that are caused by wild animals make it difficult to for sensitisation regarding wildlife conservation. In order words, problems that are caused by wildlife are not addressed properly and the result is that local communities may be reluctant to support wildlife conservation education and, therefore, sensitisation efforts are deemed to fail. For example, one respondent pointed out:

"Environmental sensitisation units in the village were unable to solve problems caused by wild animals and decided to hand in their resignation from teaching about wildlife conservation and its benefits."

Another respondent said:

"They *must firstly pay for our losses to wildlife before they come to show us wildlife's portraits during sensitisation because we cannot eat those portraits."*

Although there was a small percentage of recognition of development projects in the villages surrounding the ANP (Figure 4.11), those who recognised the existence of development projects have probably received benefits that are provided by those projects and may, therefore, see the ANP as a community resource, which should be preserved for a healthy environment (Chi-square 17.245, P= 0.028, df 8). These results suggest that local communities would support wildlife conservation efforts if they benefit from the protected areas. Similar results were also witnessed in the study of local peoples' attitudes towards conservation and wildlife tourism around Sariska Tiger Reserve, India (Sekhar, 2003:345).

4.9. Summary

This chapter has assessed the overall conservation attitudes of communities that live adjacent to the ANP, as well as factors that influence them. The study found that education and awareness of the importance of natural resources regarding the livelihoods of people do not necessarily translate into positive conservation attitudes among local communities. In fact, in spite of the fact that local communities know that the ANP is important for a healthy environment and important for the national economy,

they engage in illegal activities that endanger natural resources within their habitat. In other words, illegal activities undertaken by local communities in the ANP are far from being reflective of what they admit that the ANP should be preserved for the benefits of the country, as well as future generations.

Results of this study indicate that local communities do not benefit from the existence of the ANP; instead they lose their subsistence resources to wild animals' raids without receiving any compensation or any other source of revenue generated by the ANP to offset the damages suffered.

Adjacent to the ANP, there is a high population density, combined with a lack of alternative economic opportunities to compensate for inadequate agricultural products upon which local people depend. Therefore, local communities resort to illegal activities in the ANP in order to meet their subsistence needs. Illegal activities include poaching and snaring for game meat, as well as livestock grazing in the protected area.

The future of the ANP will be jeopardised if problems that are caused by wildlife are not solved properly and local communities are not provided with alternative economic opportunities to support the already fragile agricultural sector on which they highly depend. The following chapter draws conclusions and recommendations, which are based on the results that are presented and discussed.

CHAPTER FIVE

RECOMMENDATIONS AND CONCLUDING REMARKS

5.1 Introduction

This chapter provides a summary of the study. As local communities constitute an important element within nature conservation, one should be aware of their actual attitudes towards conservation. In this regard, the study was aimed at investigating conservation attitudes of Rwandan communities that live adjacent to the Akagera National Park and factors that influence such attitudes. In this chapter, the findings of the study are summarised and recommendations are made, which are based on the results of the study. Finally, concluding remarks are drawn up.

5.2 Summary of the study

This study has investigated and examined conservation attitudes of Rwandan communities that live adjacent to the ANP and factors that influence such attitudes. The aim of the study was to find whether or not improved or positive relationships between the park and people can be translated into sustainable conservation of wildlife in the ANP.

Chapter One outlined problems that wildlife face as a result of human being illegal activities. Illegal activities, which are undertaken by local communities, include poaching, fishing, snaring for game meat, livestock grazing, as well as fuel-wood collection. The high population growth combined with extreme level of poverty and wildlife depredation, have been highlighted as background to the problems that the ANP currently faces.

The chapter set out objectives pertaining to the study and key research questions were posed in order to obtain answers that would assist to attain the set objectives. This chapter also provided a brief overview of the methodological approach of the study, which was explained in detail in Chapter Three.

Chapter Two discusses the issue of wildlife conservation and its impact on local communities. It highlighted the convention on biological diversity on which each United

Nations member country must adhere to in an effort to preserve and maintain sustainable use of natural resources. It also provided a description of the study area and the needs for wildlife conservation. The tourism industry in Rwanda is one of the top income earners of the country and it is built on wildlife, which is concentrated in protected areas. Thus, effective wildlife conservation brings about economic opportunities for the country via tourism activities. Wildlife does not only play a role in economic opportunities for a developing country such as Rwanda, but also as part of nature, it plays a crucial role within the ecosystem. In addition, wildlife, as part of biological diversity, enriches people's lives by making the world a beautiful and interesting place in which to live and when animals and plants are abolished, the earth loses something irreplaceable.

Chapter Two also highlighted both positive and negative impacts of wildlife conservation on the local communities. Positive impacts, on the one hand, range from the use of wildlife resources, as well as the distribution of tourism-related benefits among local communities. Conversely, negative impacts include wildlife depredation, insecurity, disease transmission and wildlife competition for resources such as pasture land and water. The chapter also discussed implications for reducing conflicts between protected areas and local communities. These include, amongst others, active participation of local communities in wildlife conservation and benefits that may be accessed via tourism activities.

Chapter Three provided details for the research methodology with which the study was conducted. It first provided theoretical aspects of research methodology prior to describing the actual research methodology, which was employed in the present study. It detailed methodological approaches, especially a combination of qualitative and quantitative methods that were applied in the study. It also describes instrumentation, data collection method and analysis techniques, which were employed in the process. Finally, the chapter presented limitations that were encountered in the process.

Chapter Four presented and discussed findings of the study. Data from completed questionnaires were computerized and analyzed with the aid of the Statistical Package for the Social Sciences (SPSS) version 16.0. Descriptive statistics such as frequency distributions were generated to summarise the property of the dataset. In addition,

bivariate tests were utilised to determine if respondents' age and/ or gender, occupation, family size, occupation, village distance, length of residency in the area, recognition of development projects in the area, and size of owned land, are associated with an individual's attitudes towards conservation. Bivariate tests were presented in cross-tabulations with Pearson chi-square values (X2) as means to determine the significance of all binomial variables. The study found that:

- Local communities undertake illegal activities in the ANP, harming wildlife in spite of their awareness of short-term, as well as long-term benefits that are associated with wildlife conservation.
- Education and awareness campaigns concerning the value and importance of forest reserves do not necessarily translate into positive conservation attitudes if local communities do not obtain tangible benefits from the existence of the protected area.
- Local communities are in constant conflict with wildlife, which may be sparked by either side. On the one hand, wildlife depredations cause greater loss to people's subsistence resources such as crops and livestock. Conversely, illegal activities such as poaching and livestock grazing undertaken by local people, infringe on the rights of wildlife.
- Local communities suffer from cohabitating with wildlife without obtaining adequate benefits in terms of either compensation, revenue-sharing via tourism or employment opportunities to offset damages caused by wildlife depredations.
- Although local communities view poaching and livestock grazing in protected area as illegal and endorse the existence of the ANP in spite of the problems that it creates, they generally held negative attitudes towards park officials.
- Conservation of the ANP has become increasingly complex as a result of Rwanda's overpopulation and poor socio-economic conditions, particularly its rural communities.

5.3 Recommendations

Based on the above results of the study, the following recommendations are provided for future actions:

5.3.1 Recommendations for ANP and ORTPN officials

5.3.1.1 Recommendation 1

Wildlife depredation in the ANP's surroundings is an issue that requires urgent action in attempt to obtain local support for long term conservation. Park officials should speed up implementation of electrical fencing construction, which would prevent wild animals from crossing their habitat and prevent local people from illegal activities in the protected areas. In addition, wild animals that live outside on private lands should be returned to the park in an effort to reduce their conflicts with local communities.

5.3.1.2 Recommendation 2

In order to reduce potential conflicts between the ANP and local communities, it is urgent to give priorities to local communities over employment opportunities that are created by the ANP. Moreover, community-based conservation projects should be developed to increase employment opportunities and to reduce forest dependency, while enhancing biodiversity conservation.

5.3.1.3 Recommendation 3

Wildlife inflicts heavy loss to local communities living adjacent to the ANP through crop raiding and livestock depredation, which deprive them of the satisfaction of their subsistence needs. The study suggests that local communities should be compensated for losses that they incur, following wildlife depredation on their subsistence resources.

5.3.1.4 Recommendation 4

More financial resources should be devoted to environmental education programs, which focus on educating and raising public awareness about the value of wildlife. However, as education does not only provide any guarantee of support for conservation amongst local communities, education programs should be combined with programs that provide tangible benefits for local people, thus enhancing their attitudes towards conservation.

5.3.1.5 Recommendation 5

Benefits created by conservation activities such as employment, as well as participation in community tourism activities tend to result in positive conservation attitudes. However, the results of this study indicate that community tourism is not developed in areas surrounding the ANP and as a result local communities benefit little if nothing to enhance their motivation for conservation. The study recommends that the ANP management should emphasise their effort on community tourism development.

5.3.1.6 Recommendation 6

Revenue-sharing has been viewed as a means of distribution of revenue from tourism to local communities in order to improve their welfare and enhance their support for conservation (Archibald & Naughton-Treves, 2001:143). However, there is no clear tourism revenue-sharing scheme put in place to benefit local communities living adjacent to the ANP. The study suggests the establishment of tourism revenue-sharing scheme to improve the livelihood of local communities and foster their support for conservation.

5.3.1.7 Recommendation 7

The results of this study indicate that local communities living adjacent to the ANP are discontent with the ANP management owing to the lack of employment opportunities provided to them. While people from other regions get employed at the ANP at the detriment of local communities, one would understand why they hold negative attitudes towards the ANP employees, which may impact negatively on their conservation attitudes. Therefore, the study recommends that local communities should be given employment priorities when job opportunities emerge. When local communities' members work in ANP, not only communities' welfare is improved through revenue generation, but also a sense of the protected area ownership is improved, which create incentives for conservation.

5.3.2 Recommendations for further research

A situational analysis of conservation attitudes of communities that live adjacent to the ANP, and factors that influence such attitudes, provide a framework within which

strategies to build strong relationships between people and the park, can be devised. However, the researcher recommends further research using a combination of methods of data collection to obtain more insights from local communities about their concerns associated with cohabitating with wildlife. The recommended data collection methods focus group discussions and direct interviews with local communities.

Whereas local communities cause loss to wildlife and vice versa, this study found that the conflicts between communities and wildlife is partly sparked by the climate change. Little information is available to what extent climate change plays a role in habitat change around the ANP. The findings of the study indicated that insufficient land coupled with little rain is the main factors that force pastoralists to invade ANP for pasture land. Therefore, further research should study the effects that climate change brings about to people and wildlife. In addition, reactions of both people and wildlife to each other, as a result of climate change, would be assessed in further study.

5.4 Concluding remarks

Local communities' support is an important factor within wildlife conservation. However, although communities that live adjacent to the ANP have endorsed its protection, positive attitudes were seldom reflected in their daily interaction with the ANP. What people said during interviews and the way in which they act are contradictory. They engage in illegal activities that jeopardise current, as well as future wildlife. Additionally, illegal activities take place in spite of clear knowledge and awareness regarding the short and long-term importance of forest reserves amongst local people.

Negative conservation attitudes are influenced by socio-economic conditions of households that are unable to fulfil their subsistence needs. As Byers (1996:8) pointed out, when the choice is between conservation and starvation, people will behave the same even if they know that their behaviour will harm the resources base and make life harder for themselves in the long term.

In addition to poor socio-economic livelihood conditions, the ANP is more of a burden than a benefit to people. In fact, local communities that live closer to the park lose their insufficient subsistence resources to wildlife depredation without obtaining any benefits

from the ANP to offset costs suffered. Therefore, unless people obtain some kind of compensatory benefits from the protected areas, their attitudes will continue to be hostile and their attempts to gain access to resources, will undermine the viability of park systems.

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APPENDICES

APPENDIX A: QUESTIONNAIRE IN KINYARWANDA (RWANDA'S LANGUAGE)

Waterside Residence
P.O. Box 2315
Cape Town 8000
Mutarama 2008

Bwana/Madamu

IBIBAZO BIJYANYE NO KUGENZURA RY'IMYIFATIRE Y'ABATURAGE MU KUBUNGABUNGA UBUZIMA GATOZI BWA PARIKI Y'IGIHUGU Y'AKAGERA.

Ubufatanye bwanyu burakenewe muri iri barura rijyanye no kugenzura imyifatire y'abaturarage mu kubungabunga ubuzima gatozi bwa pariki y'igihugu y' Akagera. Ubufatanye bwanyu mu gusubiza ibi bibazo murabushimirwa cyane kuko amakuru azavamo azafasha umushakashatsi kurangiza amasomo y' ubukerarugendo n'amahoteri mu Ishuri Rikuru ry'Ikoranabuhanga ry'Umujyi wa Cape (CPUT).

Ibibazo byatanzwe ku buryo bitwara igihe gito cyane kuzuza. Ushyire ikimenyetso cya X mu kazu katanzwe ku gisubizo wifuza gutanga.

Ibisubizo bizava muri iri barura bizagirirwa ibanga kubabitanze.

Abifuza gusobanuza ibijyanye n'ibibazo cyangwa se iri barura byabazwa umushakashatsi kuri aderese ikurikira.

Gaetan NGABONZIZA
Umushakashatsi
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Tel. 03101625

A. IBIRANGA URUGO

1. **Igitsina**

	(X)
Gabo	
Gore	

2. **Imyaka**

	(X)
18-24	
25-34	
35-44	
45-54	
55 no hejuru	

3. **Amashuri**

	(X)
Kutagera mu ishuli	
Amashuli abanza	
Amashuli yisumbuye	
Kaminuza	

4. Icyo ukora……..

5. Umubare w'abana: …….

6. Intera uvuye kuri parike

	(X)
Munsi ya Kilometero 1	
1-2 Kilometero	
3-5 Kilometero	
6-7 Kilometero	
8-10 Kilometero	
Kurenga ibirometero 10	

7. Akarere …….

8. Umurenge…….....

9. Mworoye amatungo? ..... (X)

Yego	
Oya	

B. IMYITWARIRE IJYANYE NO KUBUNGABUNGA UBUSUGIRE BWA PARIKE

Imyitwarire kuri parike, abakozi ba parike, n'abahigi.

1. Ese mwemera ko Pariki y'igihugu y' Akagera yakurwaho?

Simbyemera na gato	Simbyemera	Nta gisubizo mfite	Ndabyemera	Ndabyemera cyane

2. Ni ibihe bintu byiza abakozi ba parike bakora?

	(X)
Kuturinda inyamaswa	
Kuduha imiti	
Kudutwara mu modoka zabo tugize aho tujya	
Kurinda umutungo kamere wa parike	
Kuduha inkwi zo gucana	
Kuzana amadovize aturutse muri ba mukerarugendo	
Kwigisha ibijyanye n'ibidukikije	
Gutanga amazi	
Ntibadufasha	
Ibindi	

3. Mwemera ko ubuhigi bunyuranije n'amategeko ?

Simbyemera na gato	Simbyemera	Nta gisubizo mfite	Ndabyemera	Ndabyemera cyane

4. Hari umuntu wo mu muryango wawe ukora muri pariki?

	(X)
Yego	
Oya	

Gukoresha umutungo wa pariki n'ibibazo.

5. Mutuye hano igihe kingana iki?

Munsi y'imyaka 5	Hagati ya 5 - 10	10-15	15-20	Hejuru y'imyaka 20

6. Ubutaka bwawe bungana iki ?

Munsi ya ha 1	Hagati ya ha 1 na ha 3	Hagati ya ha 3 na ha 5	Hagati ya ha 5 na ha7	Hagati ha 7 na ha10	Hejuru ya ha 10

7. Inyama murya muzikura he?

Ku matungo yacu	Aho bacuruza inyama	Inyama z'umuhigo	Ahandi

8. Mugira ibihe bibazo ku bihingwa byanyu?

	(X)
Ubutaka bubi	
Isuri	
Ibyorezo/indiririzi	
Imvura nyinshi	
Imvura nke	
umwuzure	
Ubutaka buke	
Konerwa n'inyamaswa zo muri pariki	

9. Mugira ibihe bibazo ku matungo yanyu?

Inyamaswa zo muri pariki	
Ibyorezo/udukoko	
Ubutaka buke bwo kororeramo	
Ubujura	
Umwuma utewe n'imvura nke	

Ubufatanye n'abakozi barinda pariki

10a. Hari umukozi wa pariki wari waza ku murenge wanyu?

Yego	Oya	Simbizi

10b. Niba ari yego, Aba aje gukora iki?

(X)

Kwigisha ibijyanye n'ibidukikije	
Kubarura ibyangijwe n'inyamaswa	
Gukemura ibibazo biterwa n'inyamaswa	
Kwishyura ibyangijwe	
Gufata abahigi	
Guhaha	
Ibindi	

11a. Inyamaswa z'ishyamba zibateza ibibazo.

Simbyemera na gato	Simbyemera	Nta gisubizo mfite	Ndabyemera	Ndabyemera cyane

11b. Ni ibihe bibazo inyamaswa z'ishyamba zibateza?

Kwica abantu	
Kwona imyaka	
Kwica amatungo	
Kuzana ibyorezo mu matungo	
Ibindi	

12a. Hari imishinga y'amajyambere mufite muri uyu murenge?

Yego	Oya	Simbizi

12b. Ni iyihe mishinga y'amajyambere iri muri uyu murenge ?

Ishuri	
Ivuriro	
Umuhanda	
Ikaragiro ry'amata	
Amazi meza	
Ibindi	

C. IBIBAZO BIJYANYE NO KWITA KU BUSUGIRE BWA PARIKI

Erekana igisubizo cyawe ku bibazo bijyanye no kubungabunga ubusugire bwa pariki y'akagera.

1 SIMBEMERA NA GATO	2 SIMBYEMERA	3 NTA GISUBIZO	4 NDABYEMERA	5 NDABYEMERA CYANE

	Urwego rwo kemeranya n'ikibazo				
	1	2	3	4	5
1. Pariki y'Akagera ifite akamaro ku kubaho kw'ibimera n'inyamaswa zihatuye.					
2. Gukomeza kuragira, gutashya inkwi, n'imiti muri pariki byangiza ubuzima bw'inyamaswa ziyituye.					
3. Gukomeza kuragira, gutashya inkwi, n'imiti muri pariki byangiza ubuzima bw'inyamaswa ziyituye.					
4. Ukurinda kwa pariki bifitiye akamaro kanini abanyarwanda bazabaho u buzima bwinshi.					
5. Ukurinda kwa pariki y'akagera bikurura ba mukerarugendo binjiza amadovize mu baturage.					

Mwakoze cyane kuruhare mwagize muri ubu bushakashatsi.

APPENDIX B: QUESTIONNAIRE IN ENGLISH

Waterside Residence
P.O. Box 2315
Cape Town 8000
January 2008

Sir/Madam

QUESTIONNAIRE ON INVESTIGATION OF CONSERVATION ATTITUDES OF LOCAL COMMUNITIES LIVING ADJACENT TO AKAGERA NATIONAL PARK IN RWANDA.

Your kind co-operation as part of a sample survey is sought for the completion of the questionnaire which is part of a survey to investigate the conservation attitudes of local communities living adjacent to Akagera National Park. Your willingness to complete the questionnaire will be much appreciated as the information obtained will assist the researcher to complete his Master's in Tourism and Hospitality Management at Cape Peninsula University of Technology.

The questionnaire has been designed in such a way that it will require the minimum of time to complete. Please place an "X" in the block that you wish to select your response to that question unless a more detailed answer is provided.

All information will be treated as strictly confidential

Enquiries about the questionnaire or the research project may be directed to the researcher.

Gaetan NGABONZIZA
Researcher
Email: ngagaet@yahoo.fr or 204222877@cput.ac.za
Tel. 03101625

A. HOUSEHOLD CHARACTERISTICS

10. Gender

	(X)
Male	
Female	

11. Age

	(X)
18-24	
25-34	
35-44	
45-54	
55 and above	

12. Educational level

	(X)
No education at all	
Primary educational level	
Secondary educational level	
College Diploma	
University Degree/	
Other	

13. Occupation ……..

14. Number of Children: ……..

15. Distance from the park

	(X)
Less than1 Kilometre	
1-2 Kilometres	
3-5 Kilometres	
6-7 Kilometres	
8-10 Kilometres	
More than 10 Kilometres	

16. District……..

17. Village…….....

18. Do you own livestock? .....

	(X)
Yes	
No	

B. CONSERVATION ATTITUDES

Attitudes towards protected areas, protected areas employees and poaching

1. How strongly do you agree or disagree with the removal of Akagera National Park (ANP)?

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

2. How do officials from ANP assist you?

	(X)
Keep wildlife away	
Provide medical assistance	
Provide transportation	
Protect natural resources	
Provide firewood	
Generate revenue and foreign exchange	
Environmental education	
Provide water	
Others	
Do not assist us	

3. Poaching activities are against the law.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

4a. Does any member of your family work in Akagera National Park?

	(X)
Yes	
No	

4b. If yes, what position?

……

Resource use patterns and problems

5. How long have you lived in this village?

Less than 5 years	Between 5 -10	10-15	15-20	More than 20 years

6. What size is your parcel of land?

Less than 1 ha	1 to less than 3 ha	3 to less than 5 ha	5 to less than 7 ha	7 to less than 10 ha	More than 10 ha

7. Where do you obtain meat from?

My livestock	From butchery	Game meat from hunters	Other sources

8. What types of problems do you have with your crops?

	(X)
poor soil	
soil erosion	
disease/insects	
Too much rain	
little rain	
flooding	
insufficient land	
Animal raids from the park	
Other	

9. What types of problems do you have with your livestock? (X)

Predators	
disease/parasites	
insufficient land for grazing	
Theft	
Drought due to insufficient rain	

Past interactions with protected area and protected areas employees

10a. Has anyone from Akagera National Park ever come to your village?

Yes	No	Don't know

10b. If yes, what was their reason?

(X)

Education	
Evaluating damages caused by wild animals	
Solving problems caused by wild animals	
Compensation	
Arrest poachers	
Buying food and beverage	
Others, please specify	

11a. Wild animals cause a lot of problems to local people living adjacent to the park

Strongly disagree	Disagree	Undecided	Agree	Strongly agree

11b. What types of problems do wild animals cause you?

Killings of people	
Damage crops	
Raiding livestock	
Bring disease to livestock	
Others, please specify	

12a. Do you have any development projects in your village?

Yes	No	Don't know

12b. If yes, what kind of development project do you have?

School	
Dispensary	
Roads	
Dairy	
Proper water	
Others, please specify	

C. CONSERVATION VALUES STATEMENTS

To what extent would you agree to the following statements?

Please read the following statements and indicate your preference according to the legend below

1 **STRONGLY DISAGREE**	2 **DISAGREE**	3 **UNDECIDED**	4 **AGREE**	5 **STRONGLY AGREE**

STATEMENTS	DEGREE OF PREFERENCE				
	1	2	3	4	5
1. The Akagera National Park (ANP) is important for the survival of critical plant and animal species					
2. Livestock grazing and firewood, fodder, and raw materials collection in ANP are harmful to wildlife.					
3. ANP is a community resource and its conservation is essential for a healthy environment.					
4. Protection of ANP is important for the benefit of future generation					
5. Protection of ANP attracts tourists that provide additional income to the local people					

Thank you very much for participating in this survey.

APPENDIX C: AUTHORISATION LETTER TO CONDUCT RESEARCH

PROTOCOLE D'ACCORD DE RECHERCHE

0014 - 02 - 12 - 07

Le présent accord est conclu entre l'Office Rwandais du Tourisme et des Parc Nationaux (ORTPN), **BP 905 Kigali** , ci-après désigné Autorité Compétente d'une part et *NGABONZIZA Gaetan* ayant l'adresse suivante *Cape Peninsula University of Technology(S Africa) TEL :03101625* , ci-après désigné chercheur.

Ayant entendu que le chercheur désire mener une recherche dans l'aire protégée appelée *Parc National de* l'Akagera se trouvant sous la responsabilité de l'Autorité Compétente,

Considérant également que l'Autorité Compétente accepte que le chercheur susmentionné conduit la recherche dans l'aire protégée susdite sous les conditions et termes stipulés ci-dessous :

Il est maintenant convenu ce qui suit :

1. **L'Autorité Compétente** autorise et accepte que le chercheur mène la recherche décrite au point suivant dans l'aire protégée ici dénommée *Parc National de l`AKAGERA*

2. La recherche sera conduite telle qu'elle est décrite dans le formulaire de demande d'autorisation sur le sujet intitulé *«Conservation attitudes of Rwanda Communities living adjacent to Akagera National Park»*

3. La présente recherche commencera *1* jour(s) après la signature de ce protocole d'accord et sera menée dans une période de *15* jour(s)/ mois/année après laquelle le présent protocole d'accord ne sera plus valide.

4. Le chercheur payera les frais de recherche de demande non remboursable en FRW/US$ de *5.000 Frw* lesquelles donnent la permission d'effectuer la recherche décrite ci haut.

5. Le chercheur soumettra à l'autorité compétente les rapports de progression des activités. Ces rapports seront complétés par un rapport final qui inclut l'analyse des données recueillies, les conclusions et les recommandations.

6. En terme de garantie aux conditions de l'article 5 susmentionné, le chercheur payera à l'autorité compétente, service de comptabilité une consignation des rapports équivalente à ..... FRW/US$ et cette consignation sera remboursée au chercheur signataire de ce protocole après réception par l'autorité compétente du rapport final de recherche.

7. Le chercheur fera dans le cas nécessaire une autre demande de permission de collecte des échantillons et laquelle demande précise les besoins quantifiés des spécimens à collecter, leur catégorie, leur utilisation et l'endroit de destination des spécimens collectés. Cette demande est adressée au Directeur Général de l'autorité compétente.

8. Le chercheur est tenu de respecter les règlements régissant les parcs nationaux et les réserves naturelles et ne devraient collecter, prendre ni utiliser aucun autre spécimen non spécifié dans cet accord sans un accord écrit et délivré par l'Autorité compétente. Chaque accord additionnel à la présente portera un cachet de l'autorité compétente.

9. L'autorité compétente se réserve le droit en cas de juste cause d'arrêter ou de suspendre les travaux de recherche en cas de non-respect des clauses du présent protocole

10. Le présent protocole n'exclut pas le respect d'autres cadres législatifs nationaux et internationaux en vigueur sur la collecte, le transport, la manipulation et l'exportation du matériel biologique. Le chercheur est appelé à en tenir compte.

Dans l'esprit de franche collaboration et de partenariat, les deux parties ont signé ce protocole d'accord de recherche à Kigali le jour, le mois et l'année mentionnés ci-dessous.

Pour l'ORTPN

Rosette Chantal RUGAMBA
La Directrice Générale

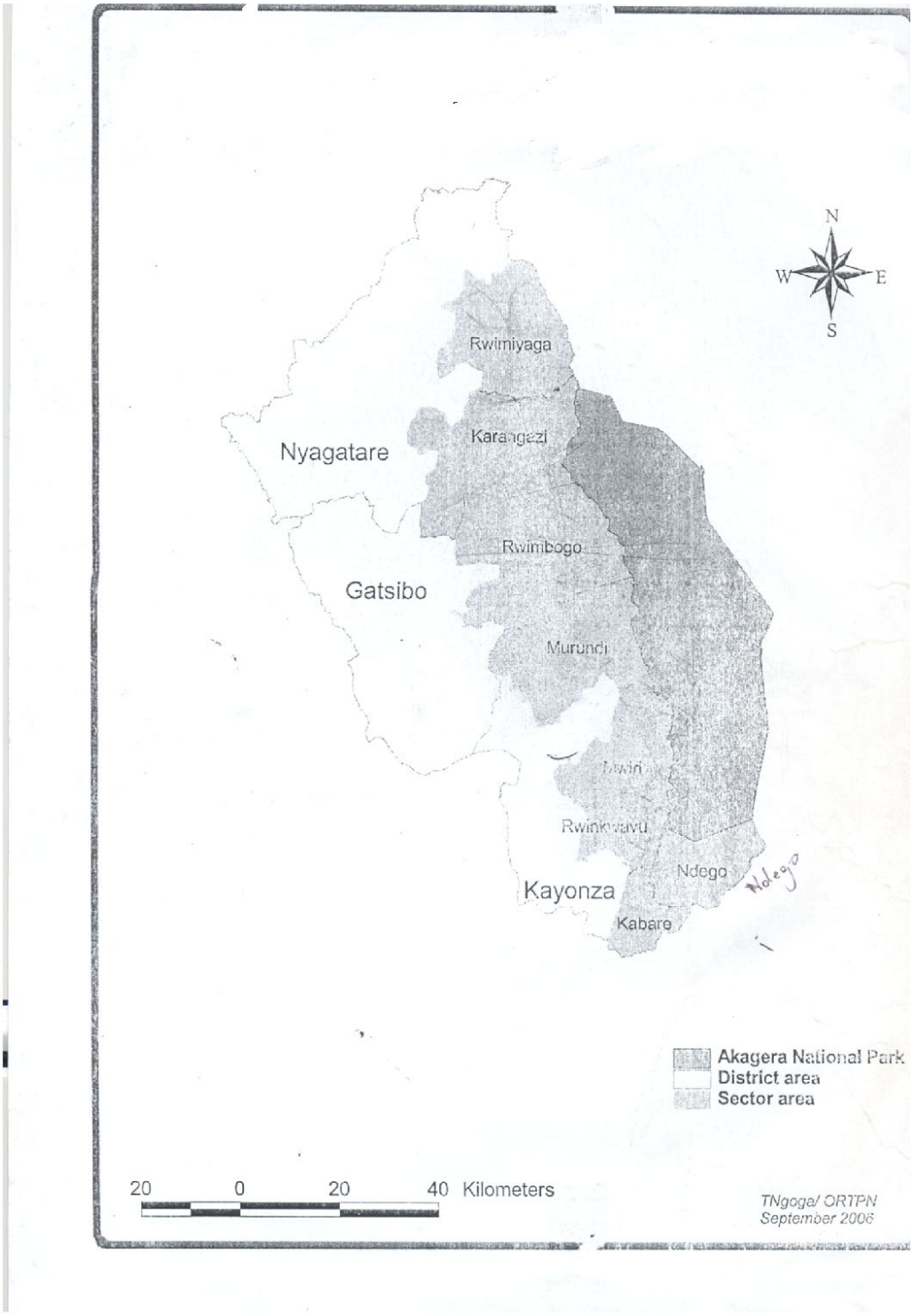
Signature .....
Date 20/12/07

Pour le chercheur

Nom & Prénom... NGABONZIZA Gaëtan
.....

Signature.....
Date 18/12/2007

APPENDIX D: AKAGERA NATIONAL PARK/RWANDA SURROUNDING ADMINISTRATIVE AREA



APPENDIX E: TESTIMONIAL OF STATISTICIAN

To whom it may concern:

Gaetan Ngabonziza (Student Number 204222877) – MTech dissertation

The statistical analysis of the data in this research project have been approved by me.

Corrie Uys, M.Sc (Statistics)

APPENDIX F: TESTIMONIAL OF EDITOR

3 August 2009

Dear Sir/Madam

This serves to confirm that I have proofread and edited the thesis entitled *"A critical investigation of conservation attitudes of local communities that live adjacent to the Akagera National Park, Rwanda"*, and that the candidate has been advised to make the necessary changes.

Thank you.

Yours faithfully

Shamila Sulayman

(Ms) Shamila Sulayman
Communication Lecturer
Department of Management and Project Management
Faculty of Business
Cape Peninsula University of Technology

APPENDIX G: TABLES OF RESULTS

Table 1: Gender of respondents (n=141)

	Count	Percentage
Male	80	56.7%
Female	61	43.3%
Total	141	100.0%

Table 2: Age brackets of respondents (n=141)

Age

		Count	Percentage
Age	18-24	9	6.4%
	25-34	48	34.0%
	35-44	59	41.8%
	45-54	17	12.1%
	55 and Above	8	5.7%
	Total	141	100.0%

Table 3: Educational level of respondents (n=141)

Education

		Count	Percentage
Education	No education at all	21	14.9%
	Primary education level	81	57.5%
	Secondary education level	34	24.1%
	University degree	5	3.5%
	Total	141	100.0%

Table 4: Occupation of respondents (n=141)

Occupation

		Count	Percentage
Occupation	Accountant Secretary	2	1.4%
	Agriculturalist	64	45.4%
	Agriculturalist/Pastoralist	49	34.8%
	Construction worker	1	.7%
	Pastoralist	20	14.2%
	Pastoralist/Trader	1	.7%
	Pharmacist	1	.7%
	Teacher	3	2.1%
	Total	141	100.0%

Table 5: Distance of households from the park (n=141)

Distance from the park

	Count	Percentage
1 Kilometre	61	43.3%
2 Kilometres	20	14.2%
10 Kilometre and above	60	42.6%
Total	141	100.0%

Table 6: Households size (n=141)

Size of the family

		Count	Percentage
Children	0	20	14.2%
	1	12	8.5%
	2	14	9.9%
	3	21	14.9%
	4	34	24.1%
	5	18	12.8%
	6	12	8.5%
	7	7	5.0%
	8	2	1.4%
	9	1	.7%
	Total	141	100.0%

Table 7: Size of land owned (n=141)

Size of land

		Count	Percentage
Valid	Less than 1 ha	16	11.4%
	1 to less than 3 ha	43	30.5%
	3 to less than 5 ha	36	25.5%
	5 to less than 7 ha	11	7.8%
	7 to less than 10 ha	10	7.1%
	25 ha	25	17.7%
	Total	141	100.0%

Table 8: Length of residency (n=141)

How long have you lived in this village?

		Count	Percentage
Valid	Less than five years	25	17.7%
	Between 5-10	36	25.5%
	10-15	51	36.2%
	15-20	11	7.8%
	More than 20 years	18	12.8%
	Total	141	100.0%

Table 9: Source of meat (n=141)

Source of meat

		Count	Responses	Column N %
Where do you obtain meat from?	Own livestock	48	48	34.0%
	Butchery	116	116	82.3%
	Game meat from hunters	0	0	.0%
	No eating of meat	4	4	2.8%
	Total	141	168	100.0%

Table 10: Employment created by the ANP

Does any member of your family work in ANP?

		Count	Percentage
Valid	Yes	1	.7%
	No	140	99.3%
	Total	141	100.0%

Table 11: Development projects in the area (n=141)

		Count	Percentage
Valid	Yes	15	10.6%
	No	104	73.8%
	Don't know	22	15.6%
	Total	141	100.0%

Table 12: Types of development projects in the area (n=141)

		Count	Responses	Column Responses %
What kind of development projects do you have?	School	4	4	28.6%
	Dispensary	3	3	21.4%
	Roads	5	5	35.7%
	Dairy	0	0	.0%
	Proper water	2	2	14.3%
	Total	10	14	100.0%

Table 13: Other development projects

	Count	Percentage
Missing	133	94.3%
Craft house	4	2.8%
Dam	4	2.8%
Total	141	100.0%

Table 14: Visits of ANP employees to the village

		Count	Percentage
Valid	Yes	72	51.8%
	No	60	42.5%
	Don't know	8	5.7%
	Total	141	100.0%

Table 15: Reasons for visits by ANP employees

		Count	Responses	Column Response % (Base: Count)
What are the reasons of officials of ANP to visit you?	Education	11	11	15.1%
	Evaluating damages caused by wild animals	25	25	34.2%
	Solving problems caused by wild animals	3	3	4.1%
	Compensation	0	0	.0%
	Arrest poachers (Patrol)	37	37	50.7%
	Buying food and beverage	16	16	21.9%
	Others	7	7	9.6%
	Total	73	99	135.6%

Table 16: Service provided by ANP officials

		Count	Responses	Column Response % (Base: Count)
How do officials from ANP assist you?	Keep wildlife away	40	40	28.4%
	Provide medical assistance	0	0	.0%
	Provide transport	8	8	5.7%
	Protect natural resources	123	123	87.2%
	Provide firewood	0	0	.0%
	Generate revenue and foreign exchange	34	34	24.1%
	Environmental education	28	28	19.9%
	Provide water	6	6	4.3%
	Do not assist	39	39	27.7%
	Total	141	278	197.2%

Table 17: Recognition of problems caused by wildlife

Wild animals cause problems

		Count	Percentage
Valid	Strongly disagree	4	2.8%
	Disagree	32	22.7%
	Undecided	2	1.4%
	Agree	35	24.8%
	Strongly agree	68	48.2%
	Total	141	100.0%

Table 18: Types of problems caused by wildlife

		Count	Responses	Column Response % (Base: Count)
What types of problems do wildlife cause you?	Killings of people	67	67	65.0%
	Damage crops	101	101	98.1%
	Raiding livestock	57	57	55.3%
	Bring diseases to livestock	23	23	22.3%
	Others	0	0	.0%
	Total	103	248	240.7%

Table 19: Problems associated with crops

		Count	Responses	Column Response % (Base: Count)
What types of problems do you have with your crops?	Poor soil	8	8	5.9%
	Soil erosion	9	9	6.6%
	disease/insects	14	14	10.3%
	Too much rain	0	0	.0%
	Little rain	127	127	93.4%
	Flooding	2	2	1.5%
	Insufficient land	82	82	60.3%
	Animal raids from the park	96	96	70.6%
	Others	0	0	.0%
	Total	136	338	248.5%

Table 20: Problems associated with livestock

		Count	Responses	Column Response % (Base: Count)
What problem do you have with your livestock?	Predators	71	71	58.2%
	Diseases	45	45	36.9%
	Insufficient land for grazing	109	109	89.3%
	Theft	17	17	13.9%
	Drought due to insufficient rain	96	96	78.7%
	Total	122	338	277.0%

Table 21: Endorsement of removal of ANP

Akagera National Park should be removed

		Count	Percentage
Valid	Strongly disagree	34	24.1%
	Disagree	74	52.5%
	Undecided	12	8.5%
	Agree	9	6.4%
	Strongly agree	12	8.5%
	Total	141	100.0%

Table 22: Acknowledgement of illegality of poaching in the ANP

Poaching activities are against the law

		Count	Percentage
Valid	Disagree	3	2.1%
	Undecided	5	3.5%
	Agree	81	57.4%
	Strongly agree	52	36.9%
	Total	141	100.0%

Table 23: Responses to conservation value statements

23.1.`The Akagera National Park (ANP) is important for the survival of critical plant and animal species

		Count	Percentage
Valid	Undecided	7	5.0%
	Agree	91	64.5%
	Strongly agree	43	30.5%
	Total	141	100.0%

23.2. Livestock grazing and firewood, fodder, and raw materials collection in the ANP are harmful to wildlife

		Count	Percentage
Valid	Strongly disagree	0	0%%
	Disagree	17	12.1%
	Undecided	10	7.1%
	Agree	64	45.4%
	Strongly agree	50	35.5%
	Total	141	100.0%

23.3. ANP is a community resource and its conservation is essential for a healthy environment

		Count	Percentage
Valid	Strongly disagree	6	4.3%
	Disagreed	33	23.4%
	Undecided	23	16.3%
	Agree	56	39.7%
	Strongly agree	23	16.3%
	Total	141	100.0%

23.4. Protection of ANP is important for the benefits of future generation

		Count	Percentage
Valid	Disagree	3	2.1%
	Undecided	16	11.3%
	Agree	83	58.9%
	Strongly agree	39	27.7%
	Total	141	100.0%

23.5. Protection of ANP may attract tourists that provide additional income to the local people

		Count	Percentage
Valid	Strongly disagree	2	1.4%
	Disagree	6	4.3%
	Undecided	15	10.6%
	Agree	64	45.4%
	Strongly agree	54	38.3%
	Total	141	100.0%

APPENDIX H: THE RWANDAN GOVERNMENT POLICY ON CONCERVATION

REPUBLIC OF RWANDA

MINISTRY OF LANDS
RESETTLEMENT AND
ENVIRONMENT

NATIONAL STRATEGY AND ACTION PLAN FOR THE CONSERVATION OF BIODIVERSITY IN RWANDA

APRIL 2003

1. GENERAL INTRODUCTION

1.1 Convention on biological diversity

To day, all mankind agrees that biological resources are vital for the economic and social development of present and future generations. These resources constitute an invaluable wealth. However, they are seriously threatened by man's activities, resulting in an alarming extinction of species and a regression and/or destruction of ecosystems.

Faced with this worrying observation, the United Nations Environment Programme (UNEP) launched initiatives, particularly the meeting of the Special Group of Experts on Biodiversity held in November 1988 to consider ways and means of preserving threatened biological resources.

In May 1989, UNEP established the working group of legal and technical experts responsible for studying the biological diversity in order to prepare an international legal instrument for the conservation and sustainable use of biological diversity.

In February 1991, the ad hoc group was transformed into an Intergovernmental Negotiating Committee.

On 22 May 1992, UNEP organized the Nairobi United Nations Conference, which adopted the agreed text of the Convention on Biological Diversity with three fundamental objectives, namely:

a) conservation of biological diversity
b) sustainable use of its components
c) fair and equitable sharing of the benefits arising from the utilisation of genetic resources

After its adoption, the "Convention on Biological Diversity" (**CBD**) was open for signature on 5 June 1992 at the United Nations Conference on Environment and Development (Earth Summit). It remained open until 4 June 1993 by which time it had received 168 signatures. The Convention entered into force on 29 December 1993.

Rwanda signed the International Convention on Biological Diversity in Rio on 10 June 1992 and ratified it on 18 March 1995. This act offered a formal framework that enabled the Government of Rwanda to confirm its concerns for the conservation of its biological diversity since the 1920s with the creation of national parks (Akagera National Park 1934, the Volcanoes National Park 1925) and forest reserves (the Nyungwe Forest Reserve 1933).

After the ratification, Rwanda, like other signatories of this Convention, undertook to implement the provisions of the Convention on Biological Diversity, including Articles 6 and 7 relating to the general measures for conservation and sustainable use and to identification and monitoring.

Article 6, which stipulates that "Each Contracting Party shall, in accordance with its particular conditions and capabilities":

a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, *inter alia*, the measures set out in this Convention relevant to the Contracting Party concerned;

b) Integrate as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programmes and policies.

Article 7, which stipulates that "Each Contracting Party shall, as far as possible and as appropriate, in particular for the purpose of Articles 8 to 10 (see Convention, Annex I):

a) Identify components of biological diversity important for its conservation and sustainable use, having regard to the indicative list of categories set down in Annex I of the Convention;

b) Monitor, through sampling and other techniques, the components of biological diversity identified pursuant to subparagraph (a) above, paying particular attention to those requiring urgent conservation measures and those which offer the greatest opportunities for sustainable use;

c) Identify processes and categories of activities which have or are likely to have significant negative impacts on the conservation and sustainable use of biological diversity and monitor their effects through sampling and other techniques; and

d) Maintain and organize, by any mechanism data, derived from identification and monitoring activities undertaken pursuant to subparagraphs (a), (b) and (c) above.

2.2.2.3 Wooded areas

Tree cultivation in Rwanda was confined to some plants around homes such as *Ficus thoningii, Euphorbia tirucalli, Erythrina abyssinica, Vermonia amygdlalena, Dracaena afromontana, etc.* But cultivation of woody perennials for timber, energy or service wood was not in the people's customs. As a result, there was massive exploitation which quickly proved its limitations. The first afforestation took place between 1920 and 1948 and consisted only of Eucalyptus. Later, other species were introduced. These included *Pinus spp, Callistris spp, Grevillea robusta, Cedrella spp, Cupressus.* The Arboreum of Ruhande (ISAR station) has 206 species, including 146 hardwood, 56 softwood and 1 bamboo species. These species have proved dangerous for biological heritage in that they exhausted and acidified areas that were already acidic, resulting in the reduction even the destruction of the undergrowth. In so doing, the installation of these species was conducive to soil erosion. In 1998, it was estimated that wooded areas covered 256,300 ha. Despite efforts for diversifying forest species, it is estimated that 99% of afforestation consists of Eucalyptus.

The conversion of these agro-forestal species-based afforestations such as *Grevillea, Cedrella, Maesopsis, Calliandra, Leucana…* proved to be essential. It is for this reason that agro-forestal practices have tended to become widespread even in agricultural areas.

2.2.3 Policies, laws and institutions related to the conservation of biodiversity

Major policy and strategic thrusts for the protection of biodiversity exist for certain fields of biodiversity such as forests, aquatic areas, agro-biodiversity (agriculture, animal breeding and fisheries) and protected areas.

Various State, parastatal and private institutions are involved in the conservation and use of biological resources on the basis of existing policy documents and legal texts which are in most cases scattered, incomplete and old.

2.2.3.1 Policy thrust

a. Forests

From 1920, Rwanda has been applying a reforestation policy necessitated by the continuous increase of the demand for wood products. The introduction of non native rapidly growing species such as the Eucalyptus, the Cypress was given special weight. Later in 1976, the tree day was institutionalized and afforestation became widespread in the whole country through community work (Umuganda) and several agricultural and forest development projects.

This policy continued until 1986 when the National Forestry Plan was prepared covering a period of 10 years, from 1986 to 1997. The main benefits of this policy were:

- Constitution and long term conservation of the forestry heritage which is environmentally balanced over the whole country.
- Increased forestry production.
- Improved use and appraisal of the decline of forests

Other undertakings included, among others, the promotion of sylvo-pastoralism and agro-forestry wherever possible, the finalisation of the action plan for the management and conservation of the savannas of the east, the preparation of plans for the development and management of forests, assisting Districts in implementing community forestry development plans and facilitating the emergence of wood processing units through private initiative. It was essentially planned to encourage Districts and individuals to undertake afforestation under the decentralization of forestry management services.

b. Aquatic areas

The 1987 – 1997 development plan prepared by the Ministry of Agriculture considers marshes from the point of view of their potentiality only for agricultural production. The Bill for the development of marshland prepared in 1987 requires consideration of safeguarding Environment through the development of marshes. It is envisaged to undertake a study on the impacts on the environment which will be done in accordance to the decision of the Ministry responsible for environment.

The National Environment Plan adopted in 1991 advocated for a compromise between the need to safeguard and the necessity to develop. It was necessary to harmonize the actions, establish a classification of marshes between areas requiring protection, areas requiring development and reserved areas, reduce to the minimum disruptive effects of developmental activities (by environmental impact assessment) and control the use of chemical inputs in the marshes and on slopes. These objectives remain valid as long as no new marshland development policy has been established yet. The instructions of the Ministry of Agriculture of 1997 aim at minimizing the procedures for the distribution of plots in the marshes, but an appropriate policy for the development of marshland is yet to come.

c. Crop areas and grazing land

The long advocated priority objectives of the former agricultural development policy (1991) focussed on the following lines:

- Intensive agriculture through increased use of agricultural inputs such as fertilizers, pesticides and selected seeds;
- Erosion control;
- Marshland development;
- Fisheries and fish farming development;
- Increased wood production.

The basic question is this: How do we guarantee increased agricultural, animal, fish and forestry production and preserve at the same time natural resources, the quality of human life, the sustainability and the diversity of the biological systems?"

In fact, cultivation of marshland results in the loss of part of their biological diversity if it is not well coordinated. There are many badly harnessed marshes which have not accomplished their mission. However, the policy envisages the protection of soil against erosion, increased production of wood through reforestation on soils that are unsuitable for agriculture and wherever appropriate, as well as the development of fisheries and fish farming which will contribute to the preservation of biological diversity and its enrichment.

The new agricultural development policy (1997) aims particularly at making the agricultural sector become professional. It aims also at the specialization and regionalization of crops so as to relieve the agricultural sector and promote increased production. Concerning animal breeding, the policy rests on the development of fodder farming and on nitrogen-fixing agro-forestry species being used as fodder. It recommends also the use of concentrates, the introduction of exotic breeds and artificial insemination. This will certainly have consequences on native plant and animal species.

d. Protected areas

In Rwanda, protected areas are the Volcanoes National Park classified as a reserve since 1925, the forest of Nyungwe since 1933, the Akagera National Park and the hunting fields since 1934. The Volcanoes National Park and the Akagera National Park are under ORTPN, while the rainforests of the Congo-Nile ridge are managed by MINAGRI. These natural reserves have been classified for their multiple roles, including their ecological, economic, cultural and social role. The major objective for their preservation is the conservation of species and various habitats of biodiversity for educational, tourism and research purposes.

These areas have been affected by various changes, including the reduction of space due to different causes such as the resettlement of the population in the special case of the Akagera National Park where 2/3 of the hunting fields have been given away for the resettlement of the people returning from exile.

2.2.3.2 Existing laws

There are legal instruments for the legislation of some fields of biodiversity such as forests, aquatic areas; agro-biodiversity referring to agriculture, animal husbandry and fisheries as well as protected areas. Some of the instruments are old, unknown to the public or totally ignored.

a. Forests

The existing legislative instruments in the field of forestry are as follows:

Decree of 18/12/1930 concerning the cutting and selling of wood. The main idea of the decree is that any cutting or sale of wood requires prior authorization. The decree provides for penalties to offenders and fixes taxes to be paid before the issue of the permit to cut or buy wood.

Law No. 47/1988 on the organization of forestry. This law was published in the Official Gazette No. 3 of 1989. It addresses a number of concerns, including the readjustment of the law to current and future contingencies; filling the gaps in the various modes of use and classification of forests; measures for the conservation of soil fertility and for avoiding erosion; new resources put at the disposal of the government for streamlining lumbering. The law provides for the establishment of a forestry unit, the creation of the State forestry estate as well as a management committee of a national forestry fund created by the Presidential Decree of 13/3/1992.

Rwanda's criminal code provides for soft penalties to any individual who, in fenced or unfenced areas, wickedly destroys or damages trees, crops, agricultural implements, knowing that they belong to the State.

b. Aquatic areas

With regard to aquatic areas, the following instruments are applicable:

- Order No. 221/116 of 20/5/1958 on bathing in lakes and rivers.

The first Article of this order recommends to provincial administrators to take measures for safeguarding the cleanliness, the tranquility or public order on

lakes and rivers.

Decree of 6/5/1952 on easements relating to underground water, water from the lakes and rivers as well as the use of such water.

This decree spells out the conditions, the scope, the modes of application and the extinguishment of natural and legal easements. Water being a primordial element in the material wellbeing and economic advancement of any society, measures for its safeguarding were applied as early as the colonial era.

Order of 1/7/1914 on pollution and contamination of water sources, lakes and rivers and parts of rivers.

Article 1 of this order instructs provincial administrators to determine protection areas for water sources, lakes, rivers or parts of rivers used or that may be used as water supply.

Article 2 stipulates that in such areas, it is prohibited to build houses, cabins, huts or straw huts; to establish factories, commercial houses, butcheries, kraals or cattle pens; to establish graves; to dig excavations; to create agricultural fields; to throw or bury rubble or refuse, debris, bodies or rubbish of any kind; to enter or walk or graze animals.

The same order prohibits to ret, soak or ferment any substance of whatever kind and to pour or throw grass, soil, stones, fallen branches, materials, rubble, refuse, bodies, debris or rubbish of whatever kind.

A bill on the drainage code was prepared by the Ministry of Public Works in February 1997. It provides for, among others, the general conditions for the disposal of used water; the collection and drainage of rain water; the collection, the disposal and treatment of solid waste; authorization of disposal; pollution and atmospheric nuisances and offences and their repression.

A bill on the use of marshland exists since 1988. Its objectives are to extend land for agricultural use in the country; to increase agricultural productivity through intensive agriculture on lands that are no longer suitable; to raise the standards of living of farmers and promote activities of farmers' associations and private initiatives and contribute to the general development of the country's economy.

The same bill subjects the launching of any major project for the development of marshland to prior studies of environmental impacts. Work cannot start before the publication of the findings of the study on the basis of which the Ministry responsible for environment may authorize or not the launching of planned works.

The classification of marshland according to their location, their size, their soil and hydraulic potentialities; in brief, their ecology constitutes another key element of this bill. It is from this classification that choice should be made as to which marshes should be developed and which should be preserved for their crucial role in the conservation of biodiversity, given that marshes constitute favourite habitats for species of mammals, birds and reptiles.

c. Protected areas

For the purpose of preserving natural wealth, which is mankind's heritage found on Rwandan soil, protected areas were established and consist of natural forests, national parks and hunting fields. These protected areas are governed by special legal instruments that determine their borders. These legal instruments are the following:

Decree of 26/11/1934 (Belgian Congo Institute of National Parks)- establishment of the Akagera National Park.

R.U.O. No. 52/48 of 23/4/1957 establishing the hunting fields of Mutara in the territory (province) of Byumba.

Articles 1, 2 and 3 refer to the establishment and borders of the hunting fields in the territory of Byumba directly adjacent to the Akagera National Park. Article 3 sets out the conditions for being allowed to carry out hunting. Articles 5 and 6 lists the competent authorities for authorizing hunting, the animals to be hunted and the appropriate periods for fishing, as well as taxes for the slaughter of certain animals.

The use of traps and piston guns is prohibited to hunters both native and non native, except with the special authorization of the General Deputy Governor.

R.U.O provides for penalties to offenders.

- Decree of 26/11/1934 (Belgian Congo National Park Institute) fixes the borders of former Albert National Park since 1925, of which Rwanda's side became known as the Volcanoes National Park whose borders were fixed by the decree establishing also the Akagera National Park in 1934.

R.U.O. No.83a/Agri of 12/12/1922 establishing two forest reserves in Rwanda.

This Order creates as a reserve the Natural Forest of Nyungwe situated in the mountainous massifs of the Congo-Nile ridge, the dividing line between Congo and Rwanda.

Decree-law of 26/04/1974 confirming and modifying the decree of 18/6/1973 establishing the Tourism and National Parks Authority (ORTPN).

ORTPN replaced the National Park Institute established by the decree of 26/11/1934 and the Tourism Authority established by the decree of 4/8/1959 and took over all its rights and obligations falling to Rwanda.

ORTPN's main objectives are to promote tourism and use all means likely to contribute to the development of tourism and to protect nature, more particularly the fauna and the flora, to enhance scientific research and tourism insofar as the latter two activities are compatible with the protection of nature.

ORTPN's heritage consists of the Akagera National Park and its annexes; the Umutara hunting fields and its annexes; the Volcanoes National Park and its annexes, and national parks and hunting fields established by decree and to be established later.

Under this decree, hunting, fishing, living and scientific research not authorized by the Managing Director or his deputy are prohibited in all the protected areas.

Order No. 52/175 of 23/05/1953 on bush fires. This order prohibits bush or undergrowth fires, mulch, wood, live plants or dead cover fires whose immediate aim is not development or crop management.

Decision No. 3 of the Cabinet sitting on 29/7/1997 on new borders of the Akagera National Park.

The new borders of the Akagera National Park have been reviewed following the resettlement and the need for land for agro-pastoral activities for the repatriated people.

Since their return in 1994, these people have occupied a big part of the park such that the Government had to step in to save 1/3 of the former land of the park.

A bill is being finalized on the new borders of the park in its present form.

d. Agro-biodiversity

Order No. 325/Agri of 16/10/1947 relating to the introduction of foreign fish species.

Under this order, it is prohibited to bring in fish species or species of fish eggs

that are foreign to Rwanda's waters.

R.U.O. No. 52/25 of 3 February 1955 on prohibition of fishing using fish-killing means.

This order prohibits fishing using narcotics in all the lakes and rivers in Rwanda.

R.U.O. No. 5520/97 of 02/06/1959 prohibiting seine fishing in inland lakes.

Seine fishing is prohibited in the lakes, except lake Kivu.

R.U.O. No. 52/160 of 16/11/1955 establishing regulations for fishing in the lakes.

It is prohibited in all the lakes in Rwanda to fish using nets whose meshes are less than 4 cm wide. In these same lakes, it is prohibited to used nets whose length is more than 1 km. It is prohibited to lay a fixed net at less than 50 m from the shore.

Order No. 51/162 of 4/5/1955 on the possession, cultivation, propagation, sale and transport of *Eicchornia crassipes* known as water hyacinth.

It is prohibited to import, possess, grow, propagate, sell and transport *Eicchornia crassipes* known as water hyacinth.

Circular No. 1900/07/24 of 11/12/1997 from the Ministry of Agriculture, Livestock, Environment and Rural Development concerning Fishing Regulations.

The circular repeats the main points of the Regulations on fishing with a view to updating the existing legal instruments.

2.2.3.3 Involved institutions

The major institutions involved in the conservation and sustainable use of biological resources include Ministries, public and private institutions, local and international non governmental organizations, international bodies and co-operating agencies as well as research and/or higher institutions of learning.

a. Ministries

Ministry of Lands, Resettlement and Environment (MINITERE)

In addition to planning and land resource management, the development and supervision of sustainable and viable national resettlement policies, MINITERE is responsible for formulating and monitoring the implementation of plans for the

preservation and protection of our natural resources such as the fauna and the flora, and ensure that developmental activities are carried out in such a manner as to protect environment.

It is also responsible for the development and application of environmental policies and programmes as well as environmental regulations and active co-operation with international bodies involved in the protection of environment.

Ministry of Commerce, Industry, Investment Promotion, Tourism and Cooperatives (MINICOM)

MINICOM is responsible for initiating, developing and administering programmes aimed at promoting a balanced and viable growth of national industries, including agro-industry, handicrafts, mines and tourism. It is also the duty of MINICOM to make follow up of the management of national tourist sites, including parks; promote internal and external trade growth; develop and manage systems for quality assurance of products and services. The promotion of ecotourism and sharing of benefits derived from tourist activities benefit the people living in the vicinity of protected areas and other natural tourist attraction reserves.

Ministry of Agriculture, Livestock and Forestry (MINAGRI)

MINAGRI's mission is to initiate, develop and administer programmes for the transformation and modernization of agriculture; develop and promote appropriate systems for the growth and improvement of agricultural marketing; develop and manage programmes for the promotion and improvement of stockbreeding, including fisheries; and develop and manage as soundly as possible national forestry resources without damaging the ecology and integrating them in other agricultural activities and in the national economy.

Falling under this Ministry are also soil conservation and improvement activities and the development of marshland, together with food security, without adversely affecting the sustainability of biological resources and environment.

Ministry of Infrastructure (MININFRA)

MININFRA is responsible for road and highways construction, public buildings, town planning, land, air, lake and river transport, as well as the coordination of meteorological services and networks. This is the Ministry that is the most appropriate for carrying out studies on interaction between climatic conditions and socio-economic activities, cross-border movement of living organisms and make available reliable climatological and agro-meteorological data which are indispensable for the promotion of a viable and sustainable agriculture. Once

available, these data could help to make a better follow up of climatic phenomena and their consequences on biological resources.

MININFRA is also responsible for formulating policies and strategies for appropriate management and use of national natural resources, including water, and initiating and promoting actions aimed at rational use of non conventional sources of energy such as solar, wind, biogas, peat energy, etc…

Prime Minister's Office

The Office of the Prime Minister is responsible for coordinating and making follow up of Government policies; activities of international organizations, NGOs and various socio-economic operators, both public and private. Programmes for the conservation of biodiversity and protection of environment are prepared by MINITERE but are endorsed and approved by the Office of the Prime Minister for inclusion in the overall Government policies.

b. Public institutions

Public institutions involved in the protection of biodiversity include the Tourism and National Parks Authority (ORTPN), the National University of Rwanda, the Institute for Agricultural Science (ISAR) and the Institute for Scientific and Technological Research (IRST).

Tourism and National Parks Authority

ORTPN was established in 1974 with the following objectives:

- To promote tourism and use all resources likely to contribute to the development of tourism
- To protect nature, more particularly the fauna and the flora, enhance scientific research and promote tourism provided that it is compatible with the protection of nature
- To propose to Government negotiation of agreements or conventions directly or indirectly related to the protection of nature and tourism
- To determine sites and propose the classification of buildings of a historic, scientific, anarcheological or tourism interest.

Institute for Agricultural Science (ISAR)

ISAR's mission is to promote the scientific and technological development of agriculture and stockbreeding; carry out research and experimental studies for the development of agriculture and stockbreeding; and publish and disseminate their findings.

ISAR has twelve research and experimental stations covering a total of 4,664 ha of experimental fields found in the whole country and according to specific crops grown in the region. It has already carried out experiments and disseminated 21 varieties of beans (more than 10 pre-dissemination varieties); 7 varieties of soya beans; 1 variety of garden peas; 3 varieties of groundnuts; 6 varieties of maize; 14 varieties of sorghum; 11 varieties of wheat; 9 varieties of sweet potatoes; 6 varieties of cassava; 9 varieties of Irish potatoes (more than 6 pre-dissemination varieties); 6 varieties of coffee trees; 4 varieties of pyrethrum and 8 varieties of avocado trees. ISAR has also disseminated various varieties of citrus fruits, papaya trees, pineapples, apple-trees, guava trees and orange trees, several exotic and native forestry and agro-forestry species for different ecological zones and several uses.

ISAR contributes also to the improvement of animal production through selection and adaptation of breeds to environmental conditions or through the introduction of exotic breeds. In the field of agrostology, ISAR has maintained a good collection of fodder plants in two stations: Karama (south-east) and Rubona (south). There are at least 14 species of plants. It is currently carrying out a study on species resistance *(Pennisetum, Tripsacu*m and *Desmodium distrortum)* to drought and on the possibility of conserving them by drying.

The Ruhande branch of ISAR deals especially with the promotion of forestry. It maintains an arboretum which is rich in native and non native species (ex-situ conservation).

In its near future research programmes, ISAR will introduce genetic material and concentrate on the transfer of appropriate technologies for root disease control (bean) and the production of voluble beans; technologies for the production and use of vitamin A and iron-rich foods; technologies for the production of high quality fodder and pastures (small ruminants); technologies for the rapid propagation of cassava, sweet potato and maize. ISAR contributes to the improvement and management of soil fertility through the transfer of technologies for the production of diversified species of agro-forestry trees to counter the shortage of mulching material and firewood, erosion and improve soil fertility.

Other future perspectives will consist of the improvement of crops and stockbreeding by reducing the principal constraints facing the agricultural sector (crop protection, soil conservation, soil fertility, cropping system), by strengthening the national research system, by controlling genetic manipulation, in vitro techniques and biotechnology. The acme for improvements is set to year 2010. To this end, ISAR will have of necessity to collaborate with international and UN NGOs, MINAGRI's agricultural projects and scientific, agricultural and

technological international research institutes.

National University of Rwanda (UNR)

Established in 1963, the National University of Rwanda has the mandate to train managerial staff the country needs in several fields. It also carries out basic and applied research in keeping with its training programmes. With regard to the conservation and rational use of biological diversity, UNR has the faculty of Agriculture, currently with researchers in the departments of biology, chemistry, geography and the Faculty of medicine, who are capable of providing the necessary knowledge to the students.

The role of UNR in the preservation of biological resources includes training senior staff in this field, but above all creating among the students awareness of issues related to rational management of biodiversity and getting them to participate more in finding solutions to such issues, as well as developing among them the sense of individual and collective responsibility towards resources and the strong will to become committed to the cause of sustainable development. UNR contributes also to the strengthening of the role of scientists and researchers in natural science, the improvement of knowledge and methods of conservation and use of biological diversity with a view of an environmentally viable development.

Institute for Scientific and Technological Research (ISRT)

The Institute for Scientific and Technological Research was established in 1989, replacing the National Institute for Scientific Research (INRS). Its mission is to carry out scientific and technological research related activities in direct relationship with the country's socio-economic development. It is involved in environmental preservation biased technology. In this regard, there is a Centre for Energy which is well versed in the economy of wood through the use of renewable sources of energy such as solar and biogas energy; the management of liquid waste or waste water. ISRT has also a Research Centre involved in the conservation of useful herbs in the Herbarium that can be consulted for the purpose of research or study (ex-situ conservation).

There is also a Pharmacopeae and Traditional Medicine University Centre (CURPHAMETRA) responsible for the development of medicinal plants. It manufactures curative plant-based modern drugs such as ointments, tablets, disinfectants, syrups from local plants that the population uses also in traditional medicine to treat many and varied diseases which are estimated to reach about one hundred (Rwangabo, 1993).

Kigali Institute for Science, Technology and Management (KIST)

The mission of the Kigali Institute for Science, Technology and Management is to train senior technicians in the field of science, technology and management. It has the faculty of technology with researchers in the field. It is involved in technology favourable to environment protection, particularly with its centre whose objective is to economize on wood through the utilisation of renewable sources of energy such as biogas and waste management.

Rwanda Standardisation Authority

The Rwanda Standardisation Authority was established in 2002 with the aim of promoting activities for the development of standards, quality management, metrology, and ensuring their implementation in the country. Compulsory standards must be applied in the fields of public interest, hygiene, human and animal health, food security and environment.

c. International Non-Governmental Organizations

International Non- Governmental Organizations in Rwanda play a part in several sectors of life. They are involved in the rehabilitation of basic infrastructure such as schools, health centres, water supply and construction of shelters for the returnees. However, in addition to these humanitarian activities, some NGOs carry out activities for the protection of environment and conservation of nature.

These NGOs are CARE International which has been operational since 1984, OXFAM-QUEBEC in the country since 1983, OXFAM-GB since 1977, Euro Action ACCORD since 1979, WORLD VISION since 1989, AFRICARE since 1984, TROCAIRE IRELAND since 1994, Catholic Relief Services, World Lutheran Federation, etc. The major activities carried out for the protection of environment and conservation of nature include, especially, integrated agriculture, reforestation, agro-forestry, apiculture, drainage, promotion of improved hearths for the economy of wood, erosion control and soil conservation, land use, tree plantation in resettlement areas for the returnees and in newly built villages, etc. Specific activities for the conservation of biological diversity are carried out particularly by the International Programme for the Conservation of the Gorillas (IPCG), the Project for the Conservation of the forest of Nyungwe (PCFN), the Karisoke Research Centre (KRC), the Dian Fossey Gorilla Fund (DFGF).

The IPCG is an international programme whose principal mandate is to ensure the long term survival and conservation of mountain gorillas and afro-mountain forests and medium altitude habitats in Rwanda, the Democratic Republic of Congo (former Zaire) and Uganda. It is a regional project. It has been operating in Rwanda since 1978, though its actual take off was in 1991 with the creation of

a national project. The activities of IPCG are carried out through the Tourism and National Parks Authority (ORTPN) and concentrate mainly on staff technical training, the provision of technical conservation equipment for ORTPN and the Volcanoes National Park; the reforestation of the borders of the Volcanoes National Park and creating environmental awareness of the population living in the vicinity of the park on the importance of the survival of this forest with its plants and animals, including the mountain gorilla which constitutes the international prestige of the Volcanoes National Park.

The Dian Fossey Gorilla Fund is also involved in the programme for the conservation of the mountain gorilla through support to research activities in the Volcanoes National Park. It finances the Karisoke Research Centre in its research on the fauna and the flora. Currently, the Dian Fossey Gorilla Fund (Europe) focuses its activities on community-based management of biodiversity, and this is done at the regional level. Awareness seminars are organized regionally. Among these are the one held in Kabale, Uganda, in November 1997 which brought together participants from Uganda, the Democratic Republic of Congo and Rwanda involved in the preservation of biological diversity and sustainable use of biological resources, with more involvement of the population.

The Project for the conservation of the forest of Nyungwe (PCFN) is a project that was initiated by Wildlife Conservation Society with the aim of collaborating with ORTPN and other Ministries involved in the conservation of the forest of Nyungwe. It started in 1988 and contributes to the conservation of this forest through tourism programmes, environmental research, education, environmental awareness and training of local staff in biological diversity conservation.

d. International Agencies

These are multilateral and/or bilateral institutions through which development aid is channeled to the people of Rwanda. Many of them are represented in Kigali. They include the United Nations Development Programme (UNDP), the United Nations Food and Agriculture Organization (FAO), the United Nations Education, Scientific and Cultural Organization (UNESCO), the German Development Agency (SAD/DED), the Netherlands Development Agency (SNV), the German Technical Cooperation (GTZ), the United Nations Children's Emergency Fund (UNICEF) and Cooperation Agencies such as the Canadian Cooperation Agency, the United States Agency for International Development (USAID), the Swedish International Development Agency (SIDA).

UNDP

UNDP has been mandated by the United Nations Environment Programme (UNEP) to assist countries to meet the challenge of rational management of

environment. The four pillars of UNDP mission are the fight against poverty, good governance, gender mainstreaming in development, improved environment and rational management of natural resources.

UNDP is by far the international organization most involved in programmes for the protection of environment, particularly within the framework of the Convention on Biological Diversity, the Convention on Climatic Changes, the Convention on Desertification Control and the establishment of environmental legislation. With the financial support of the World Environmental Fund (WEF) through UNDP, Rwanda has prepared a National Strategy for the Conservation of Biodiversity and its Action Plan, with the financial and technical assistance of UNEP, also through UNDP. The Government of Rwanda is in the process of developing a framework law on environment which will no doubt constitute the legal and institutional instrument for the management and protection of the country's biological resources.

Being a country in the process of reconstruction and with limited resources, Rwanda will have to continue receiving financial, material and technical support of the UNDP and the above mentioned financial and technical cooperation institutions, each in its own field.

FAO

FAO is mainly responsible for the promotion of agriculture and animal breeding with a view to guaranteeing food security without compromising sustainable development based on rational use of biological resources.

FAO is particularly involved in sustainable agriculture, desertification control and natural disasters such as famine, integrated land management as well as the development of marshes.

German Technical Cooperation

This is an implementing agency for integrated rural development programmes, management and protection of natural resources. It finances the project for the Protection of Natural Resources, the main component of which is devoted to the protection of the Akagera National Park in its new borders and the socio-economic development of outlying area.

UNESCO

UNESCO is involved in the conservation of biodiversity by providing support to education and training in the importance of environment and biodiversity, which should be incorporated in the schools curriculum and research programmes, as

well as in the programmes for the promotion of knowledge exchange among researchers, scientists and the general public.

UNESCO has initiated the Man and Biodiversity (MAB) programme which will contribute to a better protection of Rwanda's protected areas which are part of the world heritage such as the Volcanoes National Park.

World Bank

The World Bank is the institution responsible for financing investments focused on people's development all over the world. It will play a major role in the implementation of the National Strategy on Biodiversity and its Action Plan, as well as in environmental legislation by integrating the component of environment protection in the projects it finances in Rwanda. It is also involved in the promotion of the poverty reduction policy by facilitating to the poor access to sustainable and viable economic alternatives of existence.

USAID

USAID finances the development of agriculture and stockbreeding, of which environmental protection constitutes a priority and a prerequisite.

Integrating the environmental dimension in all the development programmes supported by the World Bank and USAID through the impact studies of these programmes on environment constitutes an important action for the conservation and safeguarding of environment.

Other partners such as the European Union, UNICEF, the German Development Agency, the Netherlands Development Agency do play also an important role in the protection of environment and conservation of biodiversity by supporting activities in the fields of tourism, forestry, natural resources protection, agro-forestry, hygiene and sanitation, fight against poverty, improved health, training and formal and informal education of the people.

e. Local Non-Governmental Organisations

Local NGOs have powers to mobilize financial, material, technical and human resources. Their intervention is direct and is not subject to cumbersome administrative bureaucracy. Major local NGOs that are involved in the conservation and rational use of biological resources include the following:

- *Land-use planning research and support Association (ARAMET)* whose principal mandate is the promotion of rural development with a view to optimal management of space in the face of problems related to the country's

limited resources. ARAMET is particularly involved in the adequate development and rational management of pastures and small marshes as well as reforestation, especially in semi-arid regions in the south east of the country.

- *Rwanda Association for integrated Development (ARDI)* whose objective is the promotion and consolidation of rural development groups, particularly by providing them with material, financial and organizational support. ARDI is particularly concerned with modern apiculture which is oriented towards the conservation of forestry ecosystems that accommodate biodiversity.

- *Association for the Conservation of Nature in Rwanda (ACNR)* whose major objective is to stimulate the interest and curiosity of the population, particularly the youth, to the importance of biodiversity in Rwanda and its conservation with a view to contributing to the promotion of research and knowledge of the fauna and the flora as well as the functioning of ecosystems in Rwanda.

- ACNR is particularly involved in creating awareness and environmental education in schools (primary, secondary and higher institutions) and at grassroots communities where it encourages and stimulates the establishment of nature clubs. It produces environmental education guides to students, pupils and the public so as to create in them awareness and positive attitudes towards environment and biodiversity protection. ACNR carries out research on birds with a view to protecting the most threatened of them.

- *Rwanda Association for Environment and Integrated Development (AREDI)* whose objectives are basic environmental education in schools and peasant communities, specialized training for trainers at the district level and other partners, and the promotion of environmental awareness. AREDI gives special weight to development projects that are appropriate and conducive to biodiversity conservation and enhances environmental assessments of all the projects with a view to safeguarding environmental quality and enhance biodiversity conservation. This integrated approach is the pillar of the Association.

- *Rwanda Association of Environmentalists (ARECO RWANDA NZIZA)* whose objective is to create awareness among the population in the conservation and protection of nature, develop tourism environment and promote a sound and pleasant environment for a sustainable, durable and harmonious socio-economic development.

  ARECO carries out awareness campaigns in primary and secondary schools

through drawing, poem and song competitions, environmental tours and production of environmental education posters.

- *Rwanda Rural Rehabilitation Initiative (RWARRI)* aims at promoting the socio-economic development of grassroots communities. It is involved in domestic energy saving technologies, agro-forestry, soil conservation, fruit tree and flower plantation in population clusters or villages or "Imidugudu".

- *Green Environment Conservation (GEC)* is primarily concerned with the reduction of energy (wood) deficits through the dissemination of improved hearths, the use of new and renewable energy, termites control and reforestation.

- *The Rwanda Environment Awareness Services Organization Network (REASON)* aims at environmental education of the public so as to ensure a sustainable future through training of grassroots leaders, organization of seminars for pupils and students, production of environment-related teaching materials and management of biological resources, awareness creation of the people living in the vicinity of the Volcanoes National Park and other activities related to awareness creation of majority groups such as the youth, the women, groupings, etc.

The activities carried out by these NGOs should be encouraged, particularly those that are related to education, training, sensitisation, people's involvement and rational management of resources.

Some of them deal with the youth or the women or with agro-stockbreeders in the rural areas, while others are involved with student communities and local authorities. All these initiatives strengthen the development and implementation of the biodiversity conservation strategy which aims at involving as many actors as possible, particularly the local communities.

4. NATIONAL STRATEGY AND ACTION PLAN FOR THE CONSERVATION OF BIODIVERSITY

Chapters 1 and 2 show that Rwanda has significant wealth in terms of biological resources and that this wealth was being depleted considerably as a result of natural factors, but particularly due to man's activities. This depletion became faster over the last years following the rapid growth of the population which depend essentially on natural resources of which biodiversity is an essential component. Aware of the need to conserve its biodiversity, Rwanda acceded to the International Convention on Biological Diversity. Among the obligations of the Parties to this Convention, Article 6, stipulates that "each Contracting Party shall, in accordance with its particular conditions and capabilities":

(a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, *inter alia*, the measures set out in this Convention relevant to the Contracting Party concerned;

(b) Integrate as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programmes and policies.

(c) It is in this context that the national strategy and action plan were developed.

4.1 National Strategy

The first step in the development of the national strategy was to define the aims and objectives. On this basis, the strategy was built around twelve objectives deduced from five major aims. These are:

1. Improved conservation of protected areas and wetlands
2. Sustainable use of the biodiversity of natural ecosystems and agro-ecosystems
3. Rational use of biotechnology
4. Development and strengthening of policy, institutional, legal and human resource frameworks
5. Equitable sharing of benefits derived from the use of biological resources.

4.1.1 Improved conservation of protected areas and wetlands

All protected areas and wetlands in Rwanda are today threatened by man's activities, and the consequences of these activities are the worrying degradation and space reduction, leading to a depletion of biodiversity. These activities are linked to the repatriation and resettlement of the population, population growth which does not match with the growth of resources, various pressures associated with poverty and lack of alternatives; lack of motivation/incentives for the population to preserve protected areas; inadequate institutional, legal and policy capacities for the protection and management of protected areas, and lack of human and material resources.

4.1.1.1 Objectives and strategies

In order to successfully and effectively preserve protected areas and wetlands, it will be necessary to realize the following two objectives:

a. Improved protection and management of protected areas and wetlands

Since their establishment, protected areas in Rwanda are supposedly shielded against any destructive action of man. However, they are regularly eroded gradually by clearings, both officially and clandestinely. In order to mitigate this situation, the Government has taken measures aimed at limiting the damages through the establishment of buffer forests around these protected areas and supplementing natural regeneration of thinnings. In spite of these efforts, threats still continue to be quite serious.

With regard to wetlands, they are subjected to agricultural, quarrying, fishing and other uncontrolled activities. The proliferation of these activities results in considerable loss of biological resources and the disturbance of the hydric regime of these areas.

Improved protection and management of protected areas and wetlands could be done through the following three strategies:

- Development and implementation of land use and management plans for each protected area;
- Involvement of the population living around in the conservation of protected areas;
- Development of a master plan for the use and management of wetlands.

b. Improved knowledge of the biodiversity of protected areas and wetlands

Studies and researches carried out in Rwanda on biodiversity are restricted and sometimes partial. In addition, due to the absence of a national biodiversity coordination framework, studies are scattered and several related documents are abroad without national cataloguing. This situation leads to lack of awareness of the components of the biodiversity of protected areas and wetlands.

In order to improve the knowledge of the biodiversity of protected areas and wetlands, two strategies are envisaged:

- Inventory and characterization of the components of the biodiversity of protected areas and wetlands;
- Regular monitoring of the state of the biodiversity of protected areas and wetlands.

4.1.2 Sustainable use of the biodiversity of natural ecosystems and agro-ecosystems

Apart from protected areas and wetlands, there are other natural ecosystems and agro-ecosystems (gallery forests, grazing land, cultivated areas, savannas) the management of which is not governed by any regulation. The consequence of this situation is that the biodiversity of these ecosystems is depleted significantly by man's various activities, particularly agriculture.

Rwanda's agro-ecosystem is seriously altered by climatic and edaphic conditions. The limited size of the fields and their depletion resulting from continued over-stripping have led to the reduction of production of seasoned varieties and breeds, a result of natural selection which generally fosters the most resistant and less productive genotypes.

Sustainable use of the biodiversity of natural ecosystems and agro-ecosystems must aim at the following four objectives:

1. Conservation of genetic biodiversity of native plant and animal species;
2. Sustainable use of biological resources of natural ecosystems;
3. Sustainable use of agro-biodiversity;
4. Development of an environmentally sustainable and economically viable tourism.

Each of these objectives will be realized through the following strategies:

Two strategies are envisaged for the first objective:

- inventory of native endemic and/or less known species of economic importance and characterization of their genetic diversity
- in-situ and ex-situ conservation of native genetic heritage

The second objective will be realized through two strategies

- development of alternatives to the use of biodiversity (e.g. alternative of energy, fishery aimed at poverty reduction)
- research and promotion of appropriate technologies for rational use of biological resources

For the third objective, the following four strategies will be applied:

- improved performance of native varieties and species
- promotion of sustainable traditional production systems
- prevention of introduction of intrusive species, control and eradication of non native species likely to threaten ecosystems and native species
- development of mechanisms for checking the importation and dissemination of genetic material capable of having harmful effects on biodiversity, particularly on agro-biodiversity.

The fourth objective is "the development of an environmentally sustainable and economically viable tourism". In fact, natural ecosystems and agro-systems accommodate an attractive biological diversity. Unfortunately, these environments are not known in the country. Similarly, the country does not have an adequate infrastructure to receive tourists who want to visit different areas of attraction. In order to realize this objective, two strategies will be utilized:

- development of ecotourism oriented infrastructure
- promotion of small and medium scale diversified and environmentally viable tourist activities

4.1.3 Rational use of biotechnology

Scientific progress enables the production of genetically modified organisms. Enormous quantities of varied products such as pharmaceutical, chemical, food, cosmetic and phytosanitary products have been imported and others produced in the country. The use of these products has some advantages but also some disadvantages both for man and for the biodiversity of different ecosystems of the country.

On the other hand, several technologies used in Rwanda are not controlled. Rational use of biotechnology must aim at the following two objectives:

1. improved access to and transfer of biotechnology
2. risk-free use of biotechnology

The first objective will enable the country to have access to modern biotechnologies and their operating procedures. In fact, up to now, a very big part of biotechnology products comes from developed countries. Consequently, there is need to transfer biotechnologies from developed countries to developing countries and related exchange of information. In order to attain this objective, the following strategy will be applied. Definition and implementation of mechanisms for the transfer and exchange of biotechnology.

The introduction of biotechnology products is recent in Rwanda, but their use in almost all production sectors in the country is a sign of a greater use in future. However, up until now, there are very few specialized centres in biotechnology and knowledge in this field is still limited. Impacts and risks caused by the use of biotechnology products have not been assessed.

With a view to risk-free use of biotechnology, the following two strategies will be applied:

- improved knowledge of advantages and risks of biotechnology
- development of national procedures and measures for the assessment and management of risks caused by genetically modified organisms

4.1.4 Development and strengthening of policy, institutional, legal and human resource frameworks

Improved conservation of protected areas and wetlands, sustainable use of the biodiversity of natural ecosystems and agro-systems and rational use of biotechnology can only be realized if policy, institutional, legal and human resource frameworks are developed and strengthened. This development and strengthening must aim at the following three objectives:

1. improvement of policy and legal frameworks for sustainable conservation of biodiversity
2. building of institutional and human resource capacities for sustainable conservation of biodiversity
3. strengthening regional and international cooperation for conservation and sustainable use of biodiversity.

In fact, until now, the legal instruments that govern the conservation and use of biological resources are incomplete and not always strictly applied. In order to attain sustainable use of biodiversity, the following two strategies are envisaged:

- development and updating of policies related to the conservation of biodiversity and the creation of an enabling environment for their implementation
- development of an integrated policy and legal framework for the conservation and sustainable use of biodiversity and equitable sharing of benefits derived from biological resources.

The building of institutional capacities and the strengthening of human resources for sustainable conservation of biodiversity will enhance the establishment of a well defined institutional framework for biodiversity. The success of this framework will become effective through the use of the following four strategies:

- establishment of an integrated system of information, formal and informal education and communication for the conservation and sustainable use of biodiversity;
- promotion of a conservation and biodiversity management-focused integrated research-development;
- establishment and strengthening of community management structures of biological resources;
- strengthening of partnership and formation of networks of actors for the promotion of the conservation of biodiversity and sustainable use of biological resources.

In addition to the national efforts by the population, grassroots authorities and various departments involved in the protection/conservation and management of biodiversity, it is necessary to envisage cooperation at the regional and international level so as to consolidate and carry out joint and convergent action in protected areas which, for the most part, have cross-border limits. This is the case with the Nyungwe National Park and the Akanyaru, Rusizi and Ruhwa marshes which are trans-border with Burundi; the Akagera National Park and the Akagera marsh with Tanzania; the Volcanoes National Park with the Democratic Republic of Congo and Uganda.

Regional and international cooperation for the conservation and sustainable use of biodiversity will be strengthened through the following strategies:

- strengthening of regional cooperation for the conservation of protected areas and wetlands
- strengthening of links among the parties, the states and their specialized institutions for the promotion of technical and scientific cooperation related to

biodiversity

- national capacity building for access, use and exchange of information through the clearing house mechanism
- establishment and strengthening of mechanisms at the national level for the mobilization of the necessary financial resources for the implementation of the Convention on Biodiversity.