# WILDLIFE MANAGEMENT AREA STRATEGY IN SUSTAINABLE CONSERVATION OF WILDLIFE RESOURCES, POVERTY REDUCTION AND IN THE MITIGATION OF HUMAN/WILDLIFE CONFLICTS: THE CASE OF MBOMIPA IN IRINGA, TANZANIA.

BY

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AUGUST, 2015

## DECLARATION PAGE

**Declaration by the Candidate**

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This thesis has been submitted for examination with our approval as University Supervisors


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# DEDICATION

To my father who has given me precious and unconditional physical, emotional, financial and spiritual support,

For my mother, her love and care enabled me to be who I am.

# ABSTRACT

This study was carried out in MBOMIPA WMA to establish the effectiveness of the operative Wildlife Management Area (WMA) strategy to wildlife conservation, rural poverty alleviation and promoting local level stewardship of natural resources. People living around PAs are "locked out" when policy makers declare protected areas for conservation and therefore causing resentment and denied livelihood to local communities. MBOMIPA WMA is a mega-biodiversity area as it is flanked by important protected areas of the southern highlands. The study assessed the status of current land uses, determined the main sources of conflicts, their impacts and methods of resolution. It also examined the range of benefits to local communities since its establishment. Purposive stratified random sampling technique was used to select 10 villages and random selection to select households for interviews. Field studies were conducted using household structured and unstructured interviews, focus group discussions and field observations and the primary data were analyzed. using SPSS, content analysis and Chi-square test. The results show that, WMA as strategy has contributed to wildlife conservation as the number of poachers has been reduced from 355 in 2000 to 105 in 2009 and the number of key wildlife species such as elephants have increased from 888 in 1995 to 2855 in 2002. Cultivated land have increased from 26,751 ha to 35,1453, forests from 7,090 ha to 35,219, bare soils from 590 ha to 52,852 ha in 1995 and 2010 respectively. On the other hand, the woodlands have decreased from 361,075 ha in 1995 to 91,217 ha in 2010. This indicates a high rate of woodland clearing for shifting cultivation which resulted into increased cultivated area with settlement and bare soils. The increased forests are from the protected areas i.e. the WMA, Game Reserves, Game Controlled Areas and National Park. Respondents acknowledged that there exists some socio-economic (59.7%) and ecological (76.3%) benefits derived from the Protected Areas and WMA initiatives. It was found that (60.6%) of the residents in the study area are still poor living below a dollar per day. (76.3%) of the respondents said that WMA has not sufficiently contributed to resolving the human – wildlife conflicts and that they continue to incur costs on crop damage and loss of human life (63.7%). WMA has also enhanced democratic decision making framework to the local village leaders and communities in general. However, there is still lack of transparency, accountability and skills among village leaders to manage the WMA. The information generated will be used to improve the WMA strategy so that it can provide more positive results. Furthermore, efforts are needed to raise awareness to local communities on WMA and benefits accrued from the wildlife resources. It is also necessary to enhance diversification of income generating wildlife based activities to increase the benefits from wildlife that can be shared equitably among the locals. Non wildlife activities such as beekeeping and fish ponds can help to boost the local people's income and therefore reduce poverty.

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# ACRONYMS

| AA | - | Authorized Association |
|---|---|---|
| AWF | - | African Wildlife foundation |
| CAMPFIRE | - | Communal Areas Management Programme |
| | | For Indigenous Resources |
| CBC | - | Community Based Conservation |
| CBO | - | Community Based Conservation |
| DC | - | District Commissioner |
| DED | - | District Development Direct |
| DFID | - | Department for International Development (U.K.) |
| DGO | - | District Game Officer |
| DLO | - | District Licensing Officer |
| DW | - | Director of Wildlife |
| FZS | - | Francfurt Zoological Society |
| GCA | - | Game Controlled Areas |
| GMP | - | General Management Plan |
| GTZ | | Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation) |
| HAT | - | Hunters Association of Tanzania |
| IGA | - | Income Generating Activities |
| LUP | - | Land use plan |
| LMGCA | - | Lunda Mkwambi Game Controlled Area |
| MBOMIPA | - | Matumizi Bora ya Maliasili Idodi na Pawaga (Sustainable Use of Wildlife Resources in Idodi and Pawaga) |

MCF - Malignant Catarah Fever

MNRT - Ministry of Natural Resources and Tourism

NCA - Ngorongoro Conservation Area

NCAA - Ngorongoro Conservation Area Authority

NGOs - Non-Governmental Organisations

OPs - Open Areas

PAs - Protected Areas

REWMP - Ruaha Ecosystem Wildlife Management Project

RUNAPA - Ruaha National Parks

RRLCP - Rungwa/Ruaha Landscape Conservation Programme

SRF - Systematic Reconnaissance Flights

TANAPA - Tanzania National Parks

TAS - Tanzania Shilling

TAWIRI - Tanzania Wildlife Research Institute

TWCM - Tanzania Wildlife Conservation Monitoring

ToR - Terms of Reference

URT - United Republic of Tanzania

VGS - Village Game Scout

VNRC - Village Natural Resources Committee

VPI - Villager's perception Index

WCA - Wildlife Conservation Act

WCS - Wildlife Conservation Society

WD - Wildlife Division

WPT - Wildlife Policy of Tanzania

WMAs - Wildlife Managemet Areas

# INTERPRETATION OF KEY CONCEPTS

1. **Authorized Association (AA):** means villages, individual groups and designated organizations given the authority to manage wildlife outside in WMA.

2. **Community:** means Local Communities as hereunder defined as An Assemblage of Tanzania citizens, ordinarily residing in a defined geographical area.

3. **Community-Based Organization:** means an organization whose primary objective is to conserve resources in a manner that facilitates the sustainable utilization of the resources by and for the benefits of local community members ordinarily resident in the resource area.

4. **Director of Wildlife:** (Refer to the WCA No. 5 of 2009) means the head of the wildlife (component, division and department) within the Ministry responsible for wildlife in the Government of the United Republic of Tanzania.

5. **Ecological Viability:** means the ability of a WMA to continue functioning as a sustainable ecological entity (or part of) with the envisaged uses.

6. **Economic Value:** means the monetary value of the resource based on allowed uses; consumptive and non-consumptive, as determined by cost/benefit analysis.

7. **Investment:** means the flow of capital to develop or improve infrastructure and services in a WMA.

8. **Joint Venture:** means an arrangement between an AA and other Parties to undertake specified business matters related to or incidental to the management and protection of wildlife in WMAs with the authorization of the relevant authorities.

9. **License:** means written permission to utilize resources issued by the relevant Government Authority as prescribed by law

10. **Biological Resources:** means living resources (plants, animals including insects and micro-organisms) that exist on planet earth.

11. **Non-biological Resources:** means all resources other than living resources of existing or potential economic value to the local communities, e.g. minerals, water, scenic sites, etc.

12. **Partnership:** means an agreement involving an AA and other Parties in accordance with the provisions of the Law of Contract Ordinance, the Companies Ordinance, CAPS 433 and 212, respectively, and any other relevant Law.

13. **Permits:** means a written authorization issued by an AA to allow third parties to undertaken certain activities in a WMA.

14. **Security of Tenure:** means the Authorized period, which, an area designated as a WMA, will remain as such.

15. **Significant Wildlife Resources:** means resources in a WMA with respect to abundance, diversity and uniqueness meeting a minimum cut off/threshold as defined by the Director of Wildlife.

16. **Tenure:** Means the use and occupation of land

17. **User Rights:** means the permission to use wildlife resources found within the WMA according to the existing laws and regulations.

18. **Wildlife:** means those species of wild and indigenous animals and plants, and their constituent habitats and ecosystems; to be found in Tanzania, as well those exotic species that have been introduced to Tanzania, and that are temporarily maintained in captivity or have become established in the wild.

19. **Wildlife Management Areas:** means an area declared by the Minister to be so and set aside by village government for the purpose of biological natural resource conservation.

20. **Village Game Scouts:** means villagers employed by the AA to protect wildlife resources on village land and outside WMA.

21. **Game Scouts**: Means employees of the GOT entrusted to protect wildlife resources in the United Republic of Tanzania.

22. **Traditional Communities:** means hunters, gatherers and nomadic pastoralists.

# ACKNOWLEDGEMENT

# CHAPTER ONE

# INTRODUCTION

## 1.1    Background

The World Conservation Strategy (1980) is focused on the need to maintain essential life support systems, preserve the genetic wealth contained in nature and ensure the sustainable use of species and ecosystems. One of the most important ways of protecting species and their habitats is through the establishment of legally protected areas (PAs) (**Figure 1.1).** PAs are clearly defined geographical locations, recognized, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature, so as to maintain the proper functioning of natural ecosystems services and cultural values (IUCN, 2011). Protected Areas act as refuges for species and to maintain ecological processes that cannot survive in intensely managed landscapes and seascapes. Protected areas act as benchmarks against which interactions between human and the natural world are understood and are often considered as the only hope of stopping many threatened or endangered species from becoming extinct.

There are several kinds of protected areas, which vary by level of protection depending on the enabling laws of each country or the regulations of the international organizations involved. Therefore, protected areas in different countries fall under categories of different nomenclature and covering a range of management objectives. Such objectives include but not limited to scientific research, wilderness protection, species/genetic diversity, environmental services, tourism and recreation, education and sustainable uses etc. (IUCN, 1994).
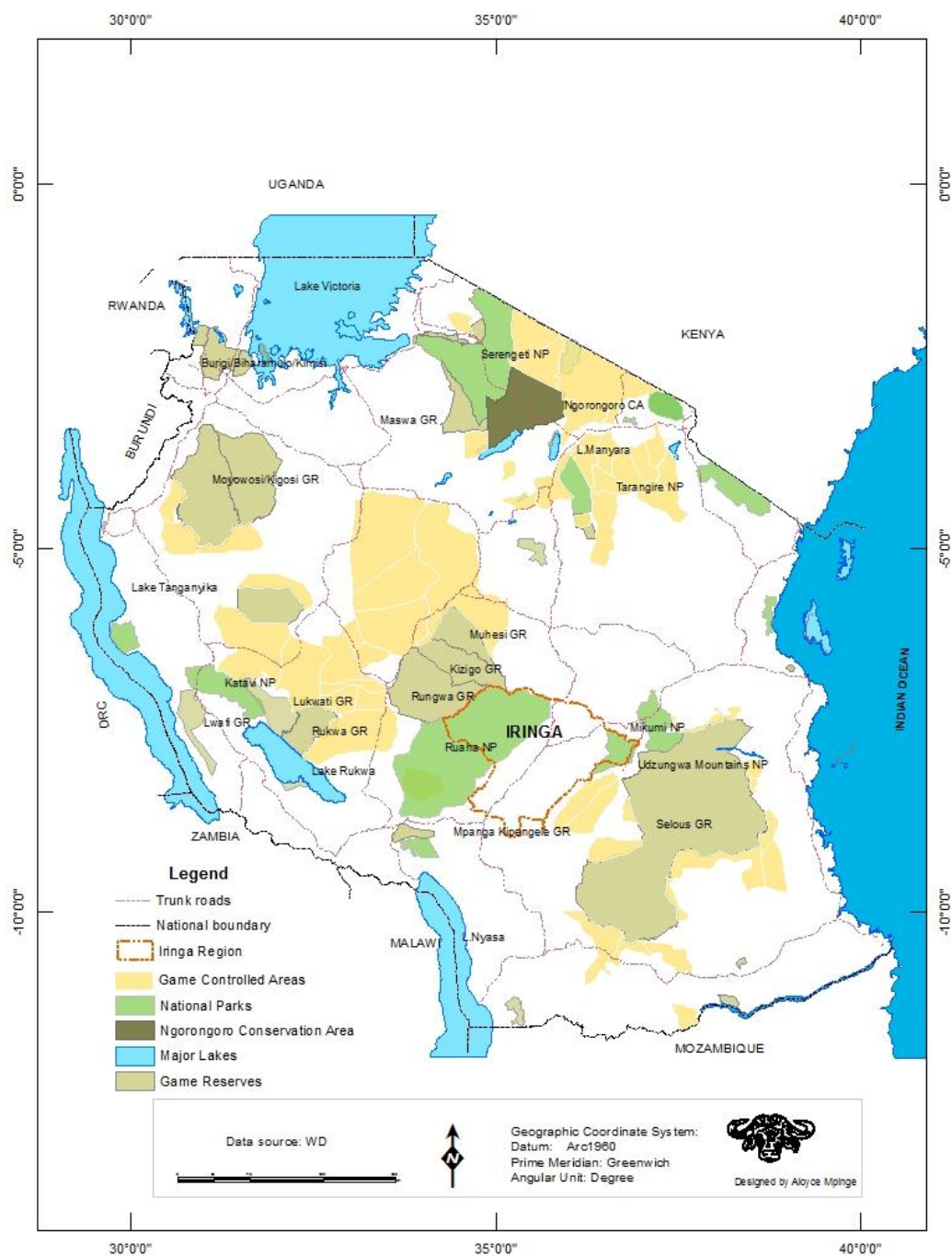
**Figure 1.1: Map showing protected areas in Tanzania**

**(Source: Wildlife Division, 2015)**

Traditionally and historically, societies have recognized the values of protecting some areas for intrinsic worth, so that they can better contribute to the sustainable use of resources they protect. For an example, in south Pacific societies have traditions of

Tapu'or "taboo'' by which some forests or reef areas are sacred, thus serving as sanctuaries for wild species and ecosystems (IUCN, 1991).

"*In situ*" conservation dates way back to 1872 when the Yellowstone National Park was established in the State of Wyoming, USA. Generally, Protected Areas (PAs) modeled after Yellowstone National Parks have been exclusively managed to principally protect and maintain biological diversity and their natural and cultural resources and to enhance revenue generation through activities like tourism, (photographic and spot hunting) (Ipara 2004; Msuha 2009).

Many countries are now recognizing and appreciating the value of establishing PAs. However, the challenge is on expansion of protected area network which blends with the national perspective, local and regional interests, political and administrative structures. Although PAs are important for *in situ* conservation, the approach has proved difficult to implement in many settings particularly in developing countries for several reasons (Gao & Chapel 1990),. Firstly, the establishment of PAs inherited from colonialist involved eviction of local communities in order to create areas for conservation, but as population increased conflicts between human and wildlife also increased leading to resentment and denied livelihood to local communities. Secondly, this so called "fortress conservation" (PAs) was a preservationist response to global conventions such as: Convention on Biological Diversity (CBD), Convention on International Trade on Endangered Species (CITES), World Heritage Convention, Ramsar convention, etc. Thirdly, the value of PAs as wildlife refuge and biodiversity hotspots varies from one stakeholder to another. To the wildlife enthusiast PAs represents jewels of biodiversity containing scarce or threatened species in their natural state (Ipara 2004). To a government, planners, landowners

(private investors) and tourist industry they are a great source of revenue. To local people PAs represent a common heritage upon which they depend for present and future generations' livelihoods, therefore high chances for conflicts. It should also be borne in mind that sites may be regarded as of considerable importance from a local perspective (cultural) even though they do not conform to the national and international criteria of site importance (Penning 1992).

Fourthly, many protected areas are too small to sustain viable wildlife populations particularly large carnivores and herbivores (Terborgh 1999; Chapel *et al* 2005), on the other hand large PAs are very expensive to maintain and often needs external funding (Leader & Alborn 1988). Fifthly, some species tend to disperse outside PAs. In East Africa it is estimated that more than 70% of the wildlife populations are dispersed in pastoral landscapes outside PAs (Homewood & Rodgers 1991, Western & Gichohi 1993). Lastly, the lack of local and national level appreciation and understanding of wildlife's contribution to formal and informal poverty reduction impedes "informed decision making" and creates political, cultural, social and economic pressures from local people and politicians for a change from wildlife land use practices to other land uses such as agriculture, livestock grazing and mining.

Other land use practices or activities which give communities livelihood, however, sometimes contribute to the degradation of the natural systems. Almost all forms of human production and consumption have the potential to deplete, convert, pollute or otherwise degrade natural systems. Activities such as overgrazing, over-fishing, conversion of forest and wetlands to agriculture and unsustainable wildlife utilization all degrade and deplete natural systems directly. Other activities such as the use of destructive fishing gear and timber harvesting techniques, such as slash and burn

agriculture, open pit mining and the disposal of untreated agricultural and domestic wastes degrade natural systems as secondary effects of the technologies and methods they employ (IUCN, 1994). As natural systems become degraded, livelihoods are progressively weakened and the economic welfare of communities suffers. With the "fence it, police it" approach - the Yellowstone model of conservation seemed to have many discrepancies. In an attempt to address the weakness of PAs, a joint management model - Community - Based Natural Resources Management (CBNRM) has been advocated for and put in place in many African countries Agrawal (2001).

In practice, CBNRM is mostly about ways in which the state can share rights and responsibilities regarding natural resources with local communities. Arguably CBNRM has the triple objective of poverty reduction, natural resource conservation and good governance DANIDA (2007). The opportunity and challenge is to pursue these objectives simultaneously, as they are not, by default, mutually supportive. This paradigm in Tanzania was explored through Community Based Wildlife Conservation (CBWC) strategies which started in the late 1980s as a pilot projects but officially they started in 2002.

## 1.2    Statement of the problem

Despite the efforts on changing conservation approaches and the good intentions that CBWC offers, still there is continued prevalence of human/wildlife conflicts, land degradation and high poverty levels in WMAs despite three decade of institutionalization of Community – Based wildlife conservation initiatives Kidegesho (2008). The conflicts manifest themselves through crop raiding by wild animals, human beings are killed by dangerous wild animals, livestock predation, poaching, human land conversions, encroachment in protected areas and corridor areas

Kidegesho (2008). Transformation of wetlands forest and rangeland for agriculture and livestock grazing, degradations of natural habitat and loss of biodiversity continues at a pace which is environmentally, socially and economically undesirable. The five-fold increase in Tanzania's population since 1960's (Wildlife Policy 2007) means land use conflicts between people and wildlife is also growing due to competition for resources. The conflicts are having devastating effects on natural resources carrying capacity. Poverty amongst rural communities in many parts of the country is rampant, Ministry of Planning, Economy and Empowerment (2005) and traditional conservation policies are slowly recognizing that without tangible incentives to local communities who have been living with the resources for years, there are little prospects for conservation. Major factors affecting the rate of biodiversity loss are population growth, economic growth, and the public good aspect of many biodiversity benefits (Swanson, 1995). Consequently solutions to curtail the problems must be sought so as to ensure that natural ecosystems are conserved and utilized sustainably.

The slogans like 'conservation through sustainable use', or "use or lose it" all have widely emphasized on the benefits of natural resources for rural development and advocates for stronger involvement of local communities in co-management (CBWC) instead of displacing and restricting their access (Kidegesho 2008). The co-management approach aims at harmonizing and reconciling the goals of conservation with those of socio-economic development, especially for poverty reduction (Kidegesho 2008).

In 1998, the government of Tanzania prepared the Wildlife Policy and community participation was regarded as an important strategy for wildlife conservation. In the

Policy there are several objectives that support community participation in the protection and utilisation of wildlife resources. These include promotion of conservation of wildlife and its habitats outside core protected areas by establishing Wildlife Management Areas (WMAs); transfer of management of natural resources from government to local communities thus ensuring that local communities obtain substantial and tangible benefits from wildlife conservation; ensure that wildlife is appropriately valued in order to reduce illegal off-take.

It is not well understood if WMA provides a more effective strategy whereby the state can engage communities in co-management of wildlife on village land to enhance environmental conservation without compromising the local community livelihoods neither is it clear how effective monitoring and protection of WMA does help to achieve the intended objectives. Sufficient data is lacking to help analyze the situation and provide significant interpretations for ensuring that a co-managed WMA is sustainable and beneficial. Also no conclusive studies have been carried out to establish the roots of CBWC/WMA ineffectiveness. Do we need for a paradigm shift? If yes, which way to go?

## 1.3    Rationale/significance of the study

Community Based Wildlife Conservation model (CBWC) MBOMIPA, was established in Idodi and Pawaga divisions, Iringa District as early as 1980s (Wildlife Division, 2002) so as to achieve the triple objectives i.e. Poverty reduction (people's livelihoods enhancement) in buffer zones through obtaining tangible benefits from wildlife conservation, sustainable natural resources conservation and good governance (empowering communities to conserve wildlife so as to reduce resource use conflicts).

Often, people living around PAs are "locked out" when policy makers declare protected areas for conservation. According to the WMA guidelines, the WMAs were supposed to be monitored and evaluated by the Wildlife Division, (2012) this has not been done. By the time I was writing the proposal, the studies done (Mungóngó (1996); Songorwa (2000); Mungóngó et al., (2003), Walsh (2003); Kidegesho (2004); Kidegesho (2008) have not comprehensively addressed all the issues.

There is a number of information gaps which this study has attempted to address. The information gaps include impacts of WMA land use on the physical environment as well as livelihood and welfare of the communities in Idodi/Pawaga areas; whether or not wildlife conservation through WMAs is integrated with rural development; changes in people's perception on wildlife (WD) conservation before and after WMA establishment; Comparisons on the significance of incentives to local communities living within and outside WMAs and their role in taking care of wildlife conservation in corridors, migratory routes and buffer zones. Further, it is worth knowing the magnitude of tensions of land use and resources access and effects of WMA on other land uses (e.g., pastoralists/Agricultural). This study also examines the composition of immigrants into Idodi - Pawaga area and has established the nature and magnitude of land use conflicts and their causes in the study area.

Further it reveals whether establishment of WMAs help to resolve human wildlife conflicts i.e., resolving conflicts between pastoralists and farmers in the face of lack or presence of tangible benefits from WMAs based on the developed and authorized General Management Plan (GMP) or Land Use Plan (LUP) as conservation tools. It provides information on the process of stakeholder's motivation and interests in the

area, governance, institutional and policy issues. The information obtained will help to find out the strengths and weaknesses of the WMA model in addressing the conflicts and the recommendation will help to enhance the strengths and find solution through planning, management and monitoring efforts. The results will reveal a joint/benefit-sharing arrangements that may be used to counter any of its shortcomings and improve the people/protected areas authorities relationship. These include, (i) overcome the social, cultural and economic forces which cause landholders to destroy wildlife and wildlife habitat and thus conflicts and competition over the resources such as water and grazing land arises; (ii) set in place optimum community economic incentives for wildlife conservation and (iii) Guaranteed regular monitoring or adjustment to associated policies, legislative framework and implementation strategies, failures may continue. The study results will be used to formulate a guide for future informed decision making on the management and policy strategies for community wildlife conservation through the WMA strategy.

## 1.4 Objectives

### 1.4.1 Overall objectives

The overall objective of the study was to assess the effectiveness of Tanzania's Community Based Wildlife Conservation (CBWM) through WMA initiatives in enhancing good governance in the sustainable conservation of wildlife resources, mitigating human wildlife conflicts and improving living conditions of communities living in Idodi and Pawaga divisions in Iringa Region – Tanzania.

1.4.2 **Specific objectives**

The specific objectives of the study were:

(i) To assess whether MBOMIPA WMA a co-management strategy has contributed towards wildlife conservation.

(ii) To determine the nature and extent of human wildlife conflict before and after WMA co-management strategy, has contributed towards mitigating the conflicts.

(iii) To establish the nature of socio-economic benefits accrued from wildlife utilization in protected areas and WMA.

(iv) To ascertain the contribution of WMA management on the local decision making framework in enhancing a local democratic culture in natural resource management on village land.

## 1.5 Research questions

1.5.1 **Broad questions**

(a) How was (is) the human-nature interface prior to, and subsequent upon the establishment of WMA in the study area?

(b) To what extent have WMA contributed towards the policy and substantive goals of the CBWC framework?

(c) What do the insights from MBOMIPA WMA portend for future sustainability of Tanzania's specific brand of CBWM and general discourse of human/ wildlife interface?

### 1.5.2   Specific questions

(a) What is the nature and extent of human wildlife conflicts?

(b) How has WMA helped to reduce the conflicts?

(c) To what extent has the WMA contributed to wildlife management/ environmental conservation?

(d) How has the WMA contributed to local household's wellbeing and poverty reduction?

(e) Has WMA framework enhanced local democratic culture in natural resource management?

## 1.6   Scope and limitations

This study sought to establish the effectiveness of WMA iniative in enhancing good governance, sustainable conservation of wildlife and in mitigating human – wildlife conflicts. Data on the nature and magnitude of land use conflicts in the study area, the causes for conflicts; stakeholder's motives and interests, governance, institutional and policy issues will be sought. The aim is to recommend solutions to enhance the WMA strengths through planning, management and monitoring efforts.

The limitations of the study include laxity of the respondents to reveal the truths, cross- examining some repondents were done and results were interpreted with some caution, because it must be borne in mind that, people will only report what they feel comfortable. Also testing questionnaires may result in the research assistants to begin the fieldwork with strong preconceived ideas about what they are going to find. This may lead to distortion of their findings in the field. One time surveys are not appropriate tools for measuring causality, because multiple variables can confound

Results, they do not give an opportunity for a respondent to explain his/her story, thus they do not provide in-depth explanations for responses Okech, (2004).

Lack of well established standard methods in perception studies, interview and questionnaire methods which are used in other disciplines such as geography, anthropology, architecture, and sociology were mainly used in this multi-displinary environmental study. This may create methodological problems as explained by Whyte (1977). Different methods were therefore used to cross check the respondent answers.

CHAPTER TWO

LITERATURE REVIEW

## 2.1 Introduction

This section will trace the emergence of Wildlife Conservation as a paradigm to address conflicts that arise between wildlife and humans, and wildlife and nature. It reviews past and present discourses regarding the subject, and popular initiatives adopted to harmonize human-wildlife, wildlife-nature relations - examples are provided from all over the world.

## 2.2 Evolution of wildlife conservation

The global landscape is increasingly human-dominated with reports that every ecosystem on the Earth's surface has now been influenced by human activities (Vitousek et al. 1997). Around 40-50% of the earth's surface is estimated to have been transformed by humans, often with marked ecological effects. About 10-15% of the global land surface is now covered by either row-crop agriculture or urban areas, while an additional 6-8% has undergone conversion to pasture (Olson et al. 1983). Much of this anthropogenic impact is due to the world's human population, which currently stands at 8.5 billion and which the UN predicts to reach 8.9 billion by 2025 (UN, 2012). With the changing land use pattern and the spread of settlement, natural habitats and hence much of the world's remaining biodiversity, have become increasingly restricted to small, fragmented patches. This intensifies the interactions and the potential conflicts between conservation and development.

These conflicts are particularly problematic as the human populations concerned comprise some of the world's poorest and most vulnerable people in terms of food

security, health, education, infrastructure and social institutions. Human-wildlife conflict clearly occurs in an extremely wide range of situations globally, involving a huge array of diverse situations. Here I will give a brief overview of the most common conflicts namely predation upon livestock, attacks on humans, crop raiding, disease transmission, incentive and, encroachment.

## 2.3    Human wildlife conflicts and their impacts

Dickman (2008), cited common problems that cause conflict between humans and wildlife. "The problems are extremely widespread globally, with lynx in France (Stahl et al. 2001b), brown bears in Norway (Sagor *et al*. 1997), pumas in Brazil (Mazzolli *et al*. 2002), golden jackals (*Canis aureus*) in Israel (Yom-Tov *et al*. 1995) and tigers in India (Sekhar 1998) being the common problem animals that causes conflicts. African wild dogs (*Lycaon pictus*) were found to cause only 1.8% of stock losses on cattle ranches in Zimbabwe, while diseases caused 23.5% (Rasmussen 1999.

Human attacks by wild animals are not as common as attacks upon livestock. In many countries it is difficult to obtain records of human attack by wild animals, but where such data exist, they suggest that deaths from animals are a tiny minority of mortalities, e.g., 0.06% in Norway and 0.07% in the US, including domestic animals (Loe, 2002). The Sundarbans region of eastern India has long been a 'hotspot' for man-eating tigers, with around 100 human deaths reported annually (Sanyal 1987), while 100 - 200 people are killed by Asian elephants every year in India (Thirgood *et al*. 2005; Veeramani *et al*. 1996). The case of the Tsavo man-eating lions, which killed 28 - 135 people in 1898-1899, is well-documented worldwide. (Patterson, 2014; Young, 2009; Kossoff, 2015).

Crop-raiding is a common flashpoint for human-wildlife conflict, with species such as bush pigs (Potamochoeros spp.) chimpanzees (*Pan Troglodytes*), cane rats (*Thryonomys swinderianus*) and even partridges (*Alectoris chukor*) imposing a significant impacts on people in terms of crop damage (Rao *et al*. 2002). In Wisconsin alone, white-tailed deer (*Odocoileus virginianus*) cause more than US$34 million worth of crop damage annually (Naughton-Treves 2005), while studies in Latin America have found that birds and monkeys alone can destroy up to 77% of a potential crop (Perez & Pacheco, 2006). In Cameroon, a single species of bird, the red-billed quelea (*Quelea quelea*) was recorded as stripping fields of up to 80% of their crops, and this same species causes significant problems to farmers elsewhere in Africa, including Tanzania (Ruelle & Bruggers 1982).

Risks of disease transmission has led to hostility towards various wildlife species worldwide. For instance, farmers in the UK are concerned about badgers (*Meles meles*), which have been implicated as vectors of tuberculosis to cattle (Hudson, 2002), while red foxes are a reservoir of *Echinococcus multiocularis*, a disease fatal to humans that is increasing in mainland Europe (Sillero-Zubiri & Laurenson 2001). There is also a zoonotic connection with humankind's most devastating current diseases:

Therefore it is that living alongside wildlife can incur a substantial economic price-tag: In the United States, agricultural producers spent US$2.5 billion to manage wildlife problems during the 1990s, while metropolitan households spent US$5.5 billion over the same period (Bruggers *et al*. 2002; Conover 1997, 1998). However, although costs can clearly be substantial wherever they occur, the economic impacts of human-wildlife conflict in particular are frequently borne by those very

communities least able to manage such costs. A review by Swanson and Andren (2005) showed that in 2000 alone, the Norwegian government paid out more than US$3 million in compensation for stock losses to carnivores. The indirect costs are often hard to quantify, but can be substantial. A study in southwestern Utah revealed that sheep depredation cost US$419,000 in direct economic losses, but at least US$1.2 million in associated indirect costs (Taylor *et al*. 1979). Such costs can take varying forms – for instance, electric fencing, commonly used to protect stock or game from predators on commercial farms in Namibia, costs a staggering US$781/km to install and a further US$952/km/yr to maintain, while even low-technology swing gates cost around US$43/km to install and US$470/km/yr to maintain (Schumann *et al*. 2006). Surveys revealed that livestock owners in Namibia spent approximately US$22 annually on ammunition to control predators, while farmers in Botswana employed an average of 3.5 herders at a cost of approximately US$30 each per month (Hermann *et al*. 2001).

At a broader scale, any associated protected areas impose opportunity costs on local people. Reduced or prohibited access to resources such as firewood, water, wild meat, medicinal plants and grazing areas within reserve boundaries can intensify local hostility towards protected areas, conservation authorities and also towards the species which are the target of protection (Emerton 1999). In Madagascar, people living adjacent to Mantadia National Park have been calculated to bear costs of US$419 per household annually (over half the annual per capita income), primarily due to restricted access to agricultural land. At a national scale, Norton-Griffiths and Southey suggested in 1995 that setting aside land for conservation in Kenya was effectively costing the country US$161 million per year, as the land could generate

$203 million annually if used for farming, compared to $42 million generated through tourism.

To summarize, living alongside wild animals can impose significant costs at a variety of scales, including both direct economic costs and indirect impacts. However, when people feel that the costs of wildlife presence are higher than the benefits, they usually take action, which can have important consequences for local wildlife population.

## 2.4 Wildlife management and conservation in tanzania

In Tanzania, Various policies and regulations related to the conservation of environment and natural resources are in place. Wildlife division, (2007); Tourism Division, (1999); Vice President's Office, (1997); Ministry of Lands and Urban Development, (1995); Ministry of Energy and Minerals, (2009); Forestry and Beekeeping Division, (1998); Ministry of Agriculture, Food Security and Coooperatives (2013).

### 2.4.1 National land policy (1995)

The National Land Policy states that, "the overall aim of a National Land Policy is to promote and ensure a secure land tenure system, to encourage the optimal use of land resources, and to facilitate broad - based social and economic development without upsetting or endangering the ecological balance of the environment". This statement is in favour of conservation of wildlife.

### 2.4.2 Agriculture and livestock policy (2013)

The Agriculture and Livestock Policy takes cognisance of the importance of conservation of natural resources and environment. This is clearly indicated in one of

its objectives which states, to balance the optimal use, and conservation of natural resources i.e. land, soils, water and vegetation so as to conserve the environment.

### 2.4.3    National tourism policy (1999)

The National Tourism Policy states that: "In response to objectives contained in the 1961 Arusha Manifesto, the Government vows to formulate, improve and implement wildlife conservation regulations, and to protect other tourist attractions for the benefits of present and future generations". Through the recognition of the importance of tourism industry as an economic activity and development in Tanzania, the National Tourism Policy stresses on wildlife conservation due to the fact that Tanzania tourism is largely wildlife based.

### 2.4.4    National environment policy (1997)

The Environmental Policy states that wildlife resources shall be protected and utilised in a sustainable manner on the basis of careful assessment of natural heritage in flora and fauna fragile ecosystems, sites under pressure and endangered species, with participation of, and benefit to, the local communities. Environmentally adverse impacts of development projects in wildlife conservation areas (e.g. tourist hotels, rail construction) will be minimised by EIA studies. Game ranching and captivity breeding of certain species will be encouraged.

Tourism development will be promoted based on careful assessment of the carrying capacity and prior EIA application. Environmentally friendly tourism (ecotourism) and diversification of tourism activities will be promoted, e.g. conservation and promotion of cultural heritage sites, in order to decrease pressures on heavily

impacted areas. Financial benefits from tourism activities shall accrue in part to the local community to motivate them in conservation of tourism resources.

### 2.4.5 Mining policy (2009)

The strategic plan of the Division of Minerals categorically prohibits mineral exploitation in PAs until such time when all mineral deposits in reserve areas outside PAs have been exhausted. This strategic plan is strongly in support of the Wildlife Policy which also prohibits any mining operations inside PAs, particularly National Parks, Ngorongoro Conservation Area and Game Reserves.

### 2.4.6 Forest and bee-keeping policy (1998)

The Bee-Keeping Policy directs appropriate beekeeping practices, maintenance of quality of bee products, protection of bee resources, bee fodder and consumers of bee products. There are areas that concentrate on to move the bee-keeping sector towards the goal of sustainable development of Tanzania and the conservation and management of her natural resources.

These policies require collaboration and co-ordination across various sectors related to land use in the implementation and administration of natural resources and environmental programs. The policies also acknowledge that creating a relatively autonomous realm of authority, responsibility and entitlement, with primary accountability to communities could be the best approach that may guarantee sustainable conservation of natural resources whilst ensuring benefits to local communities (Mung'ong'o *et. A.l,* 2003). These policies include Wildlife Policy of Tanzania (URT, 2007) which acknowledges that "the vision of the Wildlife Sector for

the next 20 years conforms to the development vision 2025 for Tanzania on environmental sustainability and socio-economic transformation." The National Forestry Policy of Tanzania (FPT), The National Bee-keeping Policy (Forestry and Beekeeping Division (1998) and The National Tourism Policy (Tourism Division (1999). Both policies mentioned above have clear management goals which are:- to enhance the contribution of forest sector to sustainable development of Tanzania and the conservation of and management of her natural resources for the benefit of present and future generations.

The policies also advocate the role of inter - sectoral co-operation and co-ordination, which will enhance the sustainable management of bee and bee-fodder resources around agricultural farms, forest and wildlife protected areas. The policies recognizes that conflicts and problems facing protected areas include among others poaching, human pressures due to uncontrolled population increase, wild fires, encroachment and deforestation, which may destroy catchment and suitable habitats for animals. Section 4.2.1 of National Land Policy states that "mechanisms for protecting sensitive areas will be created. (URT, 1995). One of the objectives of the National Environmental Policy is to raise awareness and understanding of the essential linkages between environment and development and promote individual and community participation in environmental action (URT, 1998).

Currently popular concepts such as sustainable development and sustainable conservation seek the integration of environment and development planning. Growing recognition of the importance of ecological sound sustainable development emphasizes the need to involve the local people who are the users and they also degrade the resource. Involving them in planning and decision making in conservation

of natural resources will create binding interests in the maintenance and protection of the resource base and therefore reducing conflicts (Walsh, 2000).

Land use planning in the past concentrated on issues of planning that will improve the economic growth of the country. Environmental issues and human well-being were forgotten or given very little consideration. McNeely (1994). Agenda 21 advocates natural resources management approach that ensures local community participation which means government decentralization and devolution to local communities of the responsibilities of natural resources management and utilization for current and future generation. Local communities must ensure that there is rational use of the resources through comprehensive strategic planning (Walsh, 2003). Nibuye (2010) Integrative ecosystem model (**Figure 2.1)** explains that there are exogenous and endogenous forces that affect the land use pattern. Exogenous forces include policies, economic pressure and capital and endogenous forces include land, natural resources and climate. Good policies will result into good land use plans and proper implementation. The economic development pressures should be balanced with environmental conservation.

There is a need to protect important habitat and species in it, if this is not adhered to natural disasters such as climate change, floods and drought will be inevitable. In order to be able to balance the two exogenous and endogenous factors, other forces such as demographic factors and institution setup have to be considered as they may have positive or negative outcome i.e. the economic production, allocation of resources, condition of resources and institution set-up Swanson et al., (1992). For example population increase has effects on land use pattern because the land resource is static while the population is increasing very fast. Institution setup also affects the

policy and regulatory mechanisms. Good institution setup helps to monitor implementation of the programs put in place such as conservation and law enforcement programs.

## 2.5 Evolution of the wildlife conservation efforts

Conservation is as old as humankind and this practice has developed progressively, generation by generation. It is important to discuss here how conservation changed overtime and the advantages and disadvantages of the different conservation strategies. There are four main evolutionary conservation strategies. These are traditional, protected area system, post-colonial system and community based conservation.
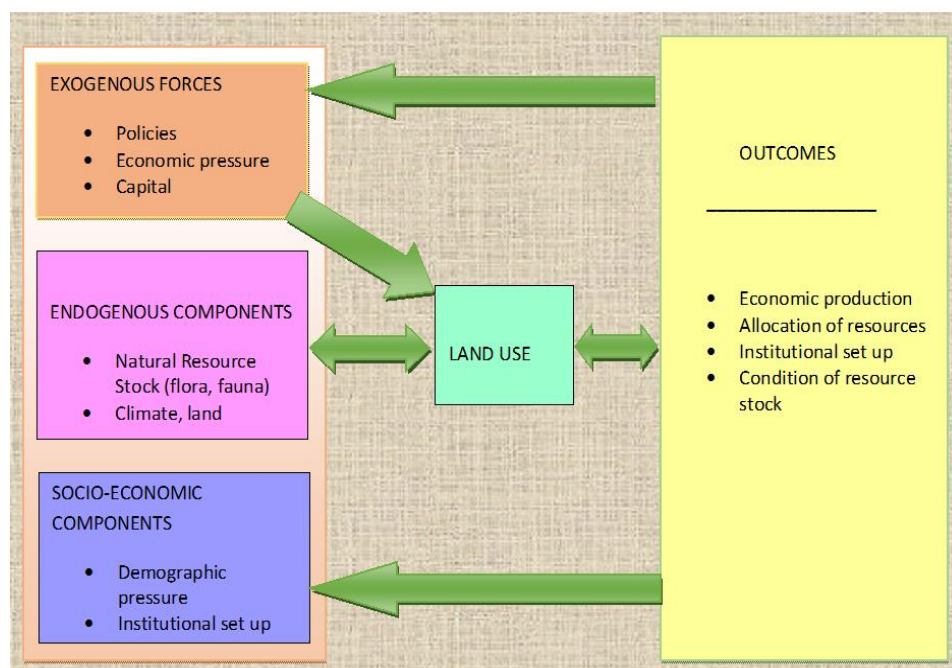
**Figure 2.1: Integrative ecosystem model. (Source: Nibuye, 2010)**

## 2.5.1 Traditional model of wildlife conservation

The history of people and nature protection in the form of traditional creeds and taboos has a long history throughout the region (Africa). Examples include the protection of "Kayas" or coastal forests as sacred groves in Kenya, (Ipara, 2004), and Nyumba nitu forest in Southern Tanzania (Personal communication with local communities).

The main focus of traditional conservation was on specific endangered species of plants, animal or an area. This approach is based on paradigm of protectionism which embraces preservation. Protected species or areas were not supposed to be used by people for whatever reason unless the chief instructed. Commenting on the pre-colonial institutional framework in Africa, Ipara, (2004) points out the significant role played by traditional institutions such as clans, the family, marriage and initiation ceremonies, religion, council elders while native courts were the communication channels, system of governance, law enforcement and social change agents. Juma & Ojwang, (1996) says "Institutions seen as necessary for development planning cannot be created a new. The local people cannot be divorced from the social structures which they are part of. The approach is for development planners to deal intelligently with existing community structures, including those for handling production and resource management issues. Having developed within specific historical, cultural and ecological contexts their strengths is in the suitability for specific areas and resources types.

Ostrom, (1992) & World Bank, (1992) in Ipara (2004), have asserted that most communally owned resources such as land, wildlife, forests and water traditionally

had well defined boundaries, collective management mechanisms to control and regulate resource use which reduced conflicts and depletion of such species.

### 2.5.2 Yellowstone model – protected areas (pa)

Yellowstone model is a vast expanse of land as a public park or pleasuring ground for the benefit and enjoyment of the people. Neumann, (2002) & Watson, (2009).

This vast expanse of land is called a protected area, a strategy that integrates the preservation and protection, where some endangered species were preserved while other species were allowed to be utilized under special license or permit Wildlife Policy, (1998). In the colonial model, the government was the custodian of the wildlife and utilization of such resources were according to the policy document and legal instruments prepared by the government. This was a disadvantage to the local communities as they were denied access to the resources they have lived with and regulated their utilization. The PAs were supervised and protected by the armed Game Scouts. **Plate 2.1.**

Formal laws and regulations also have a long history in Africa, one example is the "305 Article code of the ancient Malagarasy Kingdom, which provided protection for forests in Madagascar (UNEP - World Conservation Monitoring Centre – WCMC, 1992). Also under the colonial rule, primarily by the Germans and British, that the structure for modern PAs was established in Tanzania. However, conventional approach to wildlife protection, through paramilitary law enforcement has achieved limited success, mainly because community participation was not adequate to stimulate population to support conservation or to incite them to adapt to sustainable behavior.

**Plate 2. 1: Game Scouts conducting parade at Pasiansi Training Institute.**

**(Source : Pasiansi Training Institute, 2009)**

### 2.5.3   Post-colonial era

A number of habitats are poorly represented within Africa, there are still some common terrestrial habitats identified that needs further protection throughout the region e.g. evergreen forests, montane forests, mountain systems, etc IUCN, (1999).

The question is how well the PAs (the Yellowstone model) are responding to changing circumstances and needs of local populations?

During Post-colonial time, many African countries including Tanzania inherited the colonial strategy with an additional guidance from conventions. The African convention and other conventions provide a framework for defining a range of conservation areas. The conventions were adopted widely for the continued management of PAs in post-colonial era. The PAs, which has served as a valuable point of departure, is becoming outdated as a model in countries which are looking to

PAs to satisfy both conservation and local development needs (Wildlife Policy of Tanzania, 2007).

Most of the buffer zones are now under Community Based Conservation specifically the Wildlife Management Area (WMA). The advantages and disadvantages of the different types of conservation models from traditional to WMA has been analyzed and presented in **Appendix I.** Further the best conditions that are needed in order for the WMA system or the integrated model to be able to work effectively and efficiently are envisaged in people that are in the areas. They need to have access to the economic, cultural and social capital so as to be able to improve their livelihood.

Conflicts among PAs management and local community, wildlife and local community have been rampant in all African Countries as the local communities feel that they are delineated from their own resources which they have been protecting while utilizing them sustainably since time immemorial. As a result the human wildlife conflicts continues. These conflicts manifested themselves in different forms which include:-

### 2.5.4 Human-wildlife conflicts

Human attack is a human-wildlife conflict that occurs in many PAs. Although human attacks are not as common as that on livestock, wild animal attacks upon humans have significant impacts in terms of causing intense conflict (Quigley & Herrero, 2005, Amelia, (2008). Despite the relative global rarity, attacks on humans by wild animals can pose a significant threat in some areas, For instance, the Sundarbans region of eastern India has long been a 'hotspot' for man-eating tigers, with around 100 human deaths reported annually Sanyal, (1987), while 100 - 200 people are killed by Asian

elephants every year in India Thirgood *et al*. (2005) & Veeramani *et al*., (1996). The case of the Tsavo man-eating lions, which killed about 28 - 135 people in 1898-1899 in Kenya, is well-known worldwide, but for many people man-eating lions and other carnivores still represents a real, daily threat rather than an interesting historical tale Baldus, (2004). Anti - poaching activity is faced with political pressures of "unsocial behavior", and claims that "wildlife are better cared for than people", with calls for de-gazettment of certain PAs in favour of human settlement.

Wild animal attacks on humans clearly have particularly significant impacts in terms of causing intense conflict (Quigley & Herrero, 2005). Worldwide records of fatalities from wild animals are poorly collated or difficult to obtain in many countries, and where such data exist, they suggest that deaths from animals are a tiny minority of mortalities, e.g. 0.06% in Norway and 0.07% in the US, including domestic animals (Loe, 2002).

Human-wildlife conflict, particularly human-carnivore conflict, is a growing problem in today's crowded world, and can have significant impacts on both human and wildlife populations. Apart from the carnivores the human-elephant conflict also continues to be a major issue and widespread in rural areas across the country due to various reasons.

### 2.5.4.1 Human - nature conflicts

The main culprits of human/nature conflicts are habitat destruction, poor land practices and competition McNeely, et al., (1994). Despite the anti-poaching efforts by government, changes in the conservation models and the growing concern to protect world's biodiversity TRAFFIC in 2006 estimated that 90% Tanzania's, forest

products are harvested illegally and the land use conflicts are increasing. The Land use conflicts are further exacerbated by unplanned conversion of forest, woodland and wetland to both temporary (shifting cultivation) and permanent agriculture (irrigation), as well as competition of wildlife with livestock for grazing and water resources. According to the Tanzania Ministry of Livestock Development and Fisheries, (2009) some 23 million heads of cattle are found in Tanzania.

The conversion of land into agriculture or settlement interferes with free movement of wildlife through their traditional corridors, reduces dispersal areas, occupies dry-season water points, encroaches on wetlands grazing areas and over-abstracts water. There is also competition as a result of commercial and industrial pressures e.g. mining which exacerbates the problem of wildlife conservation. Therefore, conflicts between conservation land use i.e., wildlife for tourism and community needs i.e. land for subsistence and national economic development and poverty reduction. This hamper the long term perspective of further developing wildlife as an "economic good" that could contribute significantly to the country's economy TRAFFIC, (2006).

### 2.5.4.2    Pastoralist - wildlife conflicts

Perhaps one of the earliest and most affected groups due to the restrictive conservation policies in Tanzania is the pastoralists. Pastoralists generally depend on a broad range of land to herd livestock, as herding is their primary source of income. Prejudice against their nomadic lifestyle has brought about policies that limit their livelihood (Homewood & Rodgers 1991).

Human-carnivore conflict over livestock depredation is a serious management issue that Wildlife Managers are facing today (Ogada 2003, Patterson *et al*. 2004, Graham

*et al.* 2005 & Zimmerman *et al.* 2005). For example, it is estimated that over 75% of the world's felid species are affected by conflict with people. The severity of the conflict has also been found to increase with species body mass. (Skip & Zimmerman, 2009) also pointed out that there are six main types of species which are most important for conflicting with people i.e. caracal (*Felis caracal*), cheetah (*Acinonyx jubatus*), leopard (*Panthera pardus*), lion (*Panthera leo*), elephants (*Laxadonta africana*), rhinos (*Diceros bicornis*). However it is also important to note that some other species may be locally important as a source of human wildlife conflict and they may not feature at a global scale. For example, angry farmers in Norway were reported to have killed wolves to reduce sheep depredation (Røskaft *et al*. 2003), but at present the wolf is not seen as a species that has significant impact on livestock depredation at a global scale (Inskip & Zimmerman 2009). In Africa, killing of carnivores because of livestock loss has been widely reported e.g., between 1980 and 1990 at least 320 lions were killed on farms bordering Etosha National Park in Namibia (Berry, 1990). Leopard killing by farmers due to livestock depredation has been reported in the Cape Province in South Africa (Stuart *et al.,* 1985) and in Kenya at least 14 spotted hyenas were reportedly poisoned in a single incident in the Maasai Mara National Reserves, apparently in an attempt to reduce livestock depredation (Holekamp & Smale, 1992). Recently in Maasai Mara Kenya over 10 lions were killed by Maasai pastoralists amidst claims that the government valued wildlife more than Maasai and their livestock (KWS, 2010).

Losses due to depredation are more common with cattle, sheep and goats (Inskip & Zimmerman, 2009). Such losses can be very severe and may significantly affect local people's livelihoods and therefore their support for conservation. The scale of these

losses to livestock depredation is not well documented, probably because quantification of economic losses is difficult. However it is also equally important to understand that sometimes carnivores are killed because of perceived conflict even if the actual levels of depredation are not high e.g., in Namibia farmers intensively remove cheetahs in order to lessen the risk of depredation, although studies show they select indigenous game (Marker, 2002).

The reasons for carnivores preying on livestock vary between areas. In the French Jura, livestock predation by lynx was found to be strongly correlated with environmental characteristics, such as the proximity of farms to forest areas and the availability of prey, particularly roe deer (*Capreolus capreolus)*. Many individuals were found to feed on roe deer despite sheep being abundant and the sheep that were attacked by lynx were those that were found very close to the forest (Stahl *et al.,* 2002). Generally it is widely acknowledged that livestock depredation often tends to be higher when wild prey availability is less abundant (Polisar *et al*., 2003; Bagchi & Mishra, 2006; Johnson *et al.,* 2006; Inskip & Zimmerman 2009). For example, in northern Portugal livestock depredation by wolves was shown to be linked to a scarcity of wild prey (Vos, 2000). However, in some areas, predators may learn that livestock are easier to catch, leading some individuals to switch from natural prey to hunting livestock (Mizutani 1999, Woodroffe & Frank, 2005).

In Tanzania a study conducted in Tunduru and Songea in Selous Game reserves has indicated that a total of more than 100 cattle, 600 goats, 180 sheep, 90 pigs and 20 dogs were killed by wild animals. **Figure 2.2.**
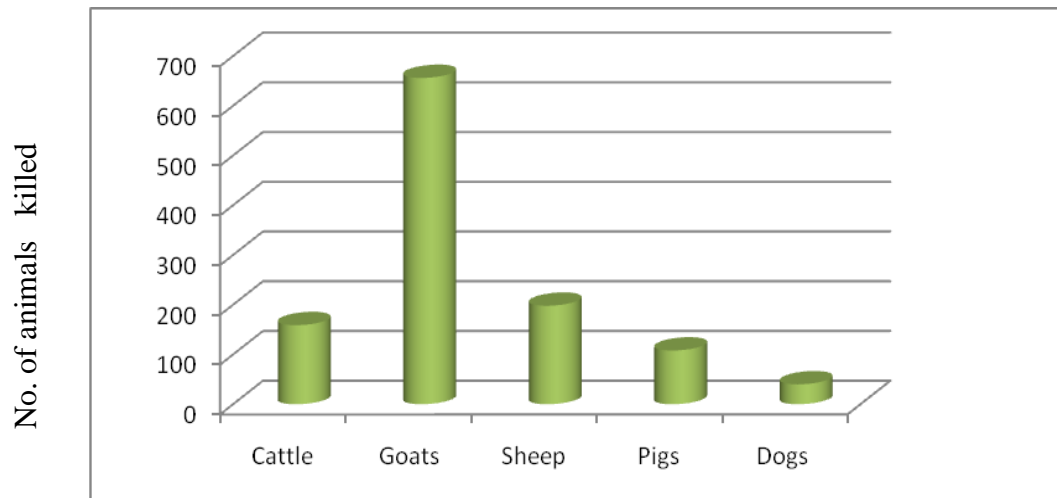
**Figure 2.2: Number of domestic animals killed in Tunduru and Songea in Selous Game Reserve. (Source: Kidegesho 2004).**

### 2.5.4.3    Incentive conflicts

Issues of addressing economic incentives pose a major challenge for the community-based nature conservation. Incentives can be defined as specific inducements designed and implemented to influence or motivate people to act in a certain way Emerton, (1995). In most African countries including Tanzania, issues of peoples' livelihood and wellbeing depend on natural resources. Therefore, an integrative system is required so as to harmonize the land use activities in a particular area as proposed and illustrated in **Figure 2.1.**

### 2.5.4.4    Agricultural – wildlife conflicts

Crop-raiding and Disease transmission are common human-wildlife conflict, with species such as elephants (*Laxodonta africana*), bush pigs (*Potamochoerus larvatus*), chimpanzees (*Pan troglodytes*), cane rats (*Thryonomys swinderianus*) and even partridges (*Alectoris chukor*) inflicting significant impacts on people in terms of crop

damage (Naughton-Treves 1998; Rao *et al*. 2002). In Latin America birds and monkeys alone can destroy up to 77% of a potential crop (Perez & Pacheco 2006). This same species causes significant problems to farmers elsewhere in Africa, including Tanzania (Ruelle & Bruggers 1982). Although studies suggest that small animals such as primates and rodents cause more damage than larger animals, but in the long-term (Naughton-Treves & Treves 2005), potentially dangerous mega herbivores such as African elephants cause particularly intense conflict, as they not only trample crops but occasionally kill or injure people too.

Liganga, (2010) indicated that, the crop damage caused by elephants has been the major source of loss running into millions of shillings incurred by Tanzania farmers each year, especially during harvest seasons. In 2008 alone, elephants caused TSh 718 million worth of damage in Rombo District and Kilimanjaro Region Wildlife Division, (2009). Similar damage has also been reported by farmers in western Serengeti, eastern Selous Game Reserve, near Mikumi, Ruaha and Tarangire National Parks.

## 2.5.4.5    Disease transmission

The interactions between humans, wildlife and livestock can be another source of humans–wildlife conflict. Diseases that originate in wildlife reservoirs can be a source of human-wildlife conflict particularly in rural communities that depend on livestock production for their livelihoods (Caasleaveland *et al.,* 2000, Cleaveland *et al*., 2001). For example, in East Africa pastoralists suffer serious losses (Thompson 1997) as a result of wildlife related disease to domestic stock such cases include malignant catarrhal fever (Thompson, 1997) & East Coast fever (Homewood *et al.,* 2006).

Similarly, domestic animals play a role in transmission of diseases that affect wildlife e.g. domestic dogs do act as reservoirs for of rabies, canine distemper and parvovirus. Domestic dogs are a contributing factor in the transmission of these canine diseases that are partly blamed for extinction of the African wild dogs in the Serengeti ecosystem (Butler *et al*., 2004; Woodroffe & Ginsberg 1999; Msuha, 2009). According to Msuha, (2009), such disease transmission account for 68.8% of all stock losses, while only 17.3% is due to theft, 9.3% is due to depredation and 4.7% arise from all other cases.

Thus in Tanzania, WMAs came at a time when discussions about conservation that believed PAs were not enough to protect biodiversity loss (Leader-Williams *et al*., 1996). The premise behind WMAs, as proposed by Planning and Assessment for Wildlife Management (PAWM), is to reduce human-wildlife conflicts, improve attitudes toward wildlife, and generate revenues from wildlife utilizations that would be brought back to the local communities and provide them with economic incentive to preserve biodiversity (MNRT 1998; MNRT 2003; Nelson *et al.,* 2009). According to USAID (2001) report to the Ministry of Natural Resources and Tourism (MNRT) for the preparation of the Tanzania WMA regulations, WMAs have the potential to solve wildlife management problems in that, they give people an alternative to the destructive use of land by making wildlife a valuable resource. Wildlife is in fact an economically and ecologically sound land use.

## 2.6    Community-based wildlife conservation in Tanzania

The dominant paradigm in the management of wildlife in many countries has been the creation of protected areas (PAs). Most PAs categories in Africa have frequently been

established and maintained by the exclusion of the traditional inhabitants or seasonal users of the area *(Leader et al., 1995)*.

It has now been realized that with the right conditions, local communities can become the strongest and most effective guardians of natural resources. As the "fence it police it" concept seemed to have many discrepancies in conserving the natural resources, another concept Community Based Conservation where the slogans "sustainable use" or "use it or lose it" were adopted. This approach emphasizes on the benefits of natural resources for rural development and encouraged stronger involvement of local communities (co-management) (Kidegesho, 2008). It promotes the notion of shared territories instead of that of PAs which displace communities and restrict access. As a result of this evolution in thinking, many conservationists began to look beyond the boundaries of protected areas and to see conservation within the broader goals of sustainable development and the growing emphasis on the participation of local people in conservation.

In the late 1980s, Tanzania's approach to wildlife conservation made a major shift in policies to community involvement referred to as Community Based Conservation (CBC). The 1998 Wildlife Policy of Tanzania (WPT) (URT, 1998) defines CBC as conservation of resources based on the participation of local communities in and outside the Protected Areas (PA) network. The CBC approach attempts to empower the local communities in managing or sharing in the management of the resources and making their own decisions on how to utilize and distribute the benefits accruing from the resources. In January 2003, the guidelines for designation and management of Wildlife Management Areas (WMAs) were inaugurated. The WMAs are defined as areas declared by the Minister of Natural Resources and Tourism (MNRT) to be so

and set aside by village government for the purpose of conservation of biological natural resources (URT, 2003). Sixteen (16) WMA pilot projects were established under the management of Wildlife Division (WD). MBOMIPA (Matumizi Bora ya Malihai Idodi na Pawaga) is one of the sixteen pilot WMAs located in Pawaga and Idodi Divisions, Iringa Rural District.

Turning village lands into WMA involves steps that requires vast amount of time and resources. Communities must meet specified criteria to be considered as a WMA, among them include: It must have a considerable, accessible resources that are ecologically viable with significant economic value and belong to one or more villages (MNRT, 2003). The respective communities must follow twelve steps as presented on (**Appendix II).**

The prevailing idea of Wildlife Management Areas (WMAs) in Tanzania takes into account the experiences from other countries. These WMAs may in some areas replace Game Controlled Areas or Open Areas, but only if they would support significant wildlife populations and/or if villagers wish to manage their land to support wildlife. The aim should first be to give title deeds of land to villages (URT, 1998). Then villagers could decide with appropriate professional advice, which forms of land use is compatible with the conservation of natural resources they wish to pursue, and how they will derive benefits from such management. The notion is if the villagers benefit from the resources, then there will be a sense of custodianship over wildlife, and schemes to employ village scouts will reduce illegal exploitation because it no longer serves the villagers' interests. The private sector will be encouraged to set up joint ventures with village communities to utilize wildlife Wildlife Policy, (1998). Furthermore, those village communities and land owners will be allowed to manage

their wildlife and to retain benefit from such utilization schemes provided they abide to regulations governing the resource use in the country. In Tanzania, the WMA guidelines prepared in 1999 were then converted into regulations to give legal power to local community to utilize natural resources and benefit from them.

In 2003, the Wildlife Division in the Ministry of Natural Resources and Tourism conducted a situational analysis and obtained baseline information from the proposed 16 pilot WMA sites in 18 Districts in Tanzania Mainland for future comparison and also to provide data for facilitating monitoring and drawing up management plans for the proposed WMAs.

Currently there are 38 WMAs which are under different development stages of which MBOMIPA is one. The Government policy on wildlife in potential Wildlife Management Areas (WMAs) is based on the premise that in order to reduce conflicts and improve attitudes towards wildlife, the proceeds from wildlife utilization should be brought back to their point of origin. This has been operationalized by returning a portion of the revenue from tourism hunting to the relevant district councils in the hope that it will find itself to the local communities. But involving the local communities in management and decision making in buffer zones around the PAs is inevitable.

The experiences from the Duru-Haitemba in Babati District are an excellent example of the devolution of power over the management of natural resources (Shackleton & Campbell, 2001; Kajembe & Monela, 2000). Samantha Russell also cited the example of the Shompole Conservation Area and tourist lodge managed since 2000 by the Masaai community on the Tanzania border near Lake Natron. "They've had wildlife

increases and they are very proud of that fact." Such projects has produced the sort of community benefits which is a key factor to changing attitudes toward wildlife and in theory, there's a lot of money to be made although perceived benefit sharing is always a tricky one to work out."

According to Songorwa, (2000), despite considerable optimism and international support over the years, community management schemes have frequently failed. In his document he recited a lengthy catalogue of impediments, including government reluctance to turn power back to locals, resistance from national park services, the inability of illiterate locals to handle new accounting systems, and lack of wildlife management expertise. But Western (2003) argued that much has changed in the years since Songorwa wrote his article. "Once you give them a voice, you give them opportunity, you give them skills and training, that changes very rapidly. Western noted that community management success stories rarely come from East Africa, but mainly from Southern Africa, particularly Namibia, which has a stable national government and a low population density unlike Kenya.

On one side, Western pushes his community-involvement approach with Richard Leakey, another former KWS Director who promote for "fences-and-fines. In any given situation, either Western's approach or Leakey's both approaches were challenged by. a columnist in Swara, the East African Wildlife Society quarterly magazine, who argued that "the case of wildlife in Kenya has not been well documented and the prospects to reverse the worsening grim trends is slim amidst pretenses to the effectiveness of both approaches given the continuous boom human population in sub-Saharan Africa". So both fences and community-friendly approaches will almost certainly need to work along with some miraculous remedy

still to be devised if Africa's rich and potentially lucrative wildlife legacy is to last through this century.

The World Bank review seminar on "People and Parks", Brandon & Wells, (1992) states, "excluding people who live adjacent to protected areas from the use of resources, without providing them with alternatives, is increasingly viewed as politically infeasible and ethically unjustifiable". Communities occupying lands adjacent to protected area boundaries frequently bear substantial costs while receiving few benefits in return (Kulindwa *et. al.* 2001:91).

In Zimbabwe's community-based wildlife use and management policy is actualized in its Communal Areas Management Program for Indigenous Resources (CAMPFIRE). The programme therefore, applies to the areas of the country under communal tenure conditions as opposed to private land or land under direct state management. Although a permissive legislative framework was provided in 1982, the development and implementation of the CAMPFIRE program was only initiated in late 1988 when two District Councils were first granted appropriate authority status. The devolution of management was inseparably linked to the devolution of benefits through full ownership status for wildlife producer units (Murphree, 1996).

Similar programs have been implemented in other countries such as South Africa and Lesotho (Shackleton & Campbell, 2001; Mwima, 1995) Zambia (Lewis et al, 1990; Tilley, 1995). In Zambia the department of National Parks and Wildlife Service (NPWS) introduced the Administrative Management Design (ADMADE) for Game Management areas (GMAs) as a method of administering wildlife and improving the standard of living of the people in GMAs. Related Community- Based Conservation programmes are the Luangwa Intergrated Resource Development Project (LIRDP)

which covers an area of 14,000 sq kms with a population of about 40,000 and started to revitalize the rural economy, manage the resources, to develop local communities and contribute to the national economy through sustainable use of natural resources in the remote rural areas (Williams *et al.,*1995). According to Mwima, (1995) there are strengths and weaknesses of the CBC programmes in Zambia. For example conserving without involving local community is inappropriate and that communities must benefit from the sustainable utilization of the resources. Further, involving communities improves cooperation and collaboration between local communities and government staff, creation of capacity building, provides social services and infrastructure to local communities all of which are paramount to the conservation success. The weakness is that in ten years no programme has attained self-sustainability due to heavy dependency of donors/government and low capacity for financial/ good governance to local community. Mwima, (1995) Further no adequate systems are in place to assess the impacts of the programmes. The frequent delay in funds disbursement is one of the weaknesses and also some local actors personalize the programmes.

In Kenya, Western (1996), advocated for involving local communities in wildlife management. He argued that the answer is to focus not only to national parks but to private and communal lands. Benefits of tourism should flow to tour operators, Kenya Wildlife Service (KWS) and local people. The local communities will in turn regard wildlife as a benefit and not threat.

Amboseli Basin in Kenya the is an area of perennial springs at the foot of Mount Kilimanjaro. Wildlife are abundant, concentrating around springs in the dry season and dispearsing during the rains. Wells at al., (1995). The people of Amboseli are

Maasai pastoralists who have occupied the area for centuries. The Maasai have traditionally relied on the springs of Amboseli to water their stock, they hold group tenure to the land and maintain open range, which is critical to wildlife dispersal.

Previous conservation areas (game reserve 1906; national park 1948) at Amboseli had permitted Masai use of the area. This right was removed when the national park was established, with a complex set of direct cash payments and development measures offred to the Masai in compensation. Wells at al., (1995). Water supply, direct compensation, community services, dispensary, school and tourism development on the masailand was provided to them. The Masai were then relocated.

Due to population growth, unsustainable resource utilization, increasing urbanization and industrial activities, Uganda's stock of natural resources has come under increasing threat of degradation or depletion. These pressures on natural resources have resulted in undesirable phenomena such as land fragmentation, overgrazing and soil erosion among others (Uganda, MoFPED, 1999, p. 95).

As the "fortress conservation" approach proved undoubtedly ineffective, this realization promoted a new thinking on how to achieve sustainable development balancing environmental concerns and poverty alleviation requirements. Community conservation approach seemed to induce more cooperative attitudes by local residents on conservation activities and since environmental issues differ widely from one area to another, local level management was suitable so as to meet different local requirements (Barrow et al., 2000, p. 144). Various donors and NGOs have therefore advocated this approach, and several projects were implemented subsequently. As a result, community conservation, by the end of 1990s, has now almost become a "new

Orthodoxy." But several questions remain (Lind & Cappon; 2001): is the community conservation approach really panacea as argued by donors and advocates? What would be the record of this new approach? What kind of lessons does it generate for us to move forward?.

Community based conservation in Uganda, one example by which grassroots people collaborate in organizing environmental activities. Some of them have been facilitated by the LC system and others have not. One such example is the Lake Mburo National Park (LMNP). The LMNP is the first park in Uganda to employ community conservation wardens and rangers in 1991 (Hulme and Infield, 2001). The LMNP borders with 13 parishes with an estimated population of more than 80,000 (ibid, p. 111). With various donors' assistance, efforts have been made to install an institutional mechanism for reflecting community concerns. Park Management Advisory Committee and Parish Resource Management Committees were established. Through the committees' consultation, relations between the Park and local communities have improved. Small-scale development activities have been carried out, mostly in the form of social infrastructure such as schools, health clinics and trading centers (interviews with Christopher Musumba and Matovu Mutwalibi, LMNP, 7 August 2002). While these are tangible benefits for local residents, the estimated benefit of US$ 2.3 per person per annum is far below the costs for wildlife conservation (ibid, p. 122; Barrow et al., 2000, pp. 126-8).

The distribution of benefits within and between local communities has not been totally fair either. Although income generating activities have also been initiated, many of them have tended to be economically unviable partly due to the very fact that the park surrounding areas are economically unattractive for business activities.

Furthermore, while illegal activities of damaging wildlife within the park appears to be decreased, sustainable biodiversity conservation still requires much further efforts particularly outside of the park areas since the park itself is not "a self-contained" ecological zone (Kangwana, 2001).

The basic standpoint is that "community conservation cannot be simply analysed in the context of levels of participation. (Barrow, et al., (2000), pp. 38-42: Hulme and Murphree, (2001a chapter 3). Participation has to be related to resource ownership and access, and is thus a tool and not a panacea". (Barrow et al., 2000, p. 37).

There are some other examples of community-based conservation. The activities are led by community-based organizations (CBOs), which often operated with support by the central government and/or international NGOs interested in promoting conservation practices, especially in areas where local governments remain inactive. Some CBOs are well organized and have been in operation for more than 5-7 years. These CBOs have a clear organization structure. Decision-making process is reasonably transparent. Benefits of group activities are shared by the members. Disputes arising from competing requirements for resources can be resolved by consultative processes Saito, (2004)

However, while community-based conservation practices are encouraging in Uganda, this approach has yet to be adequately translated into practice and procedures, particularly in wildlife conservation. Currently, Uganda Wildlife Authority appears to lack the capacity to achieve this realization (Barrow, et a., 2000, p. 76). CARE assisted Queen Elizabeth National Park Fishing Village Project includes support for community based fishing conservation (ibid, p. 74), and may comes closest this best

practice. Therefore, although some improvements have been made, this community based-conservation has not yet fully proven to be effectives. Some observers noted that "[c]ontinued failure to implement community-based conservation will certainly result in wildlife continuing to disappear from rural landscapes as they provide negative economic returns to land users" (Barrow et al., 2000, p. 76).

The Mount Cameroon Project (MCP) is a conservation project with a mandate from the Ministry of Environment and Forests (MINEF) to develop and test participatory biodiversity conservation approaches to sustainable forest management.
The project aims to "establish the means by which biodiversity on Mount Cameroon can be maintained and the livelihoods of local resource users improved" through a participatory biodiversity conservation strategy (PBCS).

Participatory Biodiversity Conservation (PBCS) is a strategy and plan of action to secure the long-term conservation of the rich but fast dwindling biodiversity of Mount Cameroon. It is centered on an approach for integrating the management of biological and social factors to support mutually beneficial development and conservation initiatives. In line with the principles of the PBCS, MCP aims to develop viable and replicable models for participatory natural resource management for all project areas. The models aim to provide a prescription of the management system (methods of exploitation, regeneration and monitoring) and agreements between government and the community on rights and responsibilities of the local community towards sustainable natural resource management. The model is based on the experiences of wildlife management groups operating in two areas that differ in their biological and socio- economic contexts (DFID, 2001).

The Mokoko Wildlife Management Association (MWMA) is another program which operates on the Boa Plains and the Mokoko-Onge forests. The West Coast Regional Wildlife Committee represents local groups in the West Coast region, along the coast, on the south- western slopes of Mount Cameroon. Community wildlife management initiatives are limited by the policy and social environment and by the biological resources of the area. These programmes have several opportunities and limitations. The opportunities are clearly stated in the National Forestry and Wildlife (1994) laws, the Wildlife Decree (1995) and more recently the Yaounde Declaration (1999) and the new concept of Zone d'Intérêt Cynegétique à Gestion Communautaire or Community Managed Hunting Concession (2001) which provides support for the concept of community management of wildlife. Models for sustainable wildlife management are being developed by the Local and regional MINEF and Communities can manage wildlife within a community forest or as sub-contractors to MINEF in a Protected Area. They can legally organize themselves as Common Initiative Groups or Operations Committees of a community forest. Further, the customary rights are recognized by law as the right to hunt non-endangered species for personal consumption only.

Using their traditional institutions the communities may form Traditional Societies and village development associations and obtain support from the existing Community Support Funds such as MCP and the MCRCF are available since the areas has a strong international conservation interest and is rich in natural resources (timber, fuel wood, bushmeat, fish and farm land) are available for local consumption. On the other hand the constraints unlisenced commercial hunting by local people is prohibited. The law does not detail the modalities for community participation or

local distribution of benefits for wildlife management. Monies from hunting permits and exploitation are administered by the national Treasury, a different government department and the 10% of the Taxe d'Affermage intended for distribution to the community is rarely distributed after reaching the Treasury. Further the processes of obtaining a community forest are slow and expensive. The customary rights exclude the use of modern weapons and wire used by local hunters, or sale of bushmeat. When the pilot initiatives ended in 2002 the community was supposed to obtain legal endorsement for its activities but this was not effected. Also the costs of monitoring, control and communication and the hunting permits fees have remained rather high (45,000 CFA). There is also high pressure on biological resources from an influx of CDC workers, the military personnel as well as frequent inter and intra community conflicts. Poor infrastructures are among the limitation for regional co-operation.

Environmental degradation is a global concern, and African is no exception. It is perhaps very ironical to observe the coexistence of rich wildlife (which attracts foreign tourists) and stark poverty of the majority of Africans. Thus, environmental issues in Africa and elsewhere are entangled with economic as well as socio-political issues, which requires comprehensive approach for effective and sustainable solution.

**CHAPTER THREE**

**THEORECTICAL AND CONCEPTUAL FRAMEWORK**

**3.1 Introduction**

This chapter analyses the various theories and present conceptual framework that guide this study. Three theories are used in this study to illustrate the importance of mainstreaming environment into holistic planning. They include the Land Use Planning theory (2004), Regional Development theory (1987) and Environmental Planning theory (1991). Other theories that work together with environmental planning include the limit of growth and the tradgedy of commons These theories are important in explaining the rationale for zoning human and wildlife activities, the use and management of land resources for the purpose of poverty alleviation, issues of sustainable development and the relationship between natural resources wildlife in particular.

**3.2 Key concepts/themes**

Key concepts/themes in this thesis include competing land-uses, wildlife conservation and land degradation; the role of wildlife conservation in socio-economic development; the integration of wildlife conservation into other land-use policies for sustainable development; the effectiveness of the WMA/CBWC paradigm as a mechanism for poverty reduction, natural resource conservation, and enhancing good governance.

### 3.2.1 Competing land-uses, land degradation and wildlife conservation

In the 1970s the UNESCO Man and Biosphere programme – developed conceptual and methodological approaches oriented towards a knowledge and understanding of regions (rural and urban) as an ecological systems/ecosystems. **UNESCO, (1970).** The programme advocated on the relationship between the urban and its hinterland and the impacts it exerts on environment, food production systems, social development lifestyles, the health and wellbeing of human population. The relationship between these parameters has to be harmonized so as to achieve the development goals as set in the Millenium Development Goals (MDG). This can be done through systematic planning. If there is no harmonization of these parameters one will end up with negative human interactions (competition and conflicts) amongst stakeholders that have different motives. The human wildlife conflicts is high when local communities are in proximity to wildlife protected areas as they are able to easily poach, encroach, burn wild fires; increase incidents of humans killed by wild animals, livestock depredation, crop damage, wild animals being killed by car accidents and spread of diseases from livestock to wild animals and vice versa. Brown, (1995) & Msuha, (2009) . When the wildlife population is high there is a risk of wildlife moving out of the PAs to peoples' fields and therefore the high risks of livestock depredation, human killed, disease transmission and therefore retaliatory killings. When human populations are high, there increased demand for land, poaching of bush meat for home use or market and also chances of disease transmission increases Brown, (1995)  Poverty and political instability, minimum low enforcement, no or minimum benefits from conservation can also increase illegal and ecologically damaging activities as people need to survive IUCN, (2006). Uncontrolled firearms and influx of refugees also increase the illegal activities such as

poaching and encroachment UNDP, (2000 - 2001) Wildlife conservation needs to compete with other land uses such as agriculture, mining and livestock keeping.

### 3.2.2 Environment

In general, the term environment refers to the surroundings of an object. IUCN, (2006) & UNEP, (2003). The surrounding can also be referred to biophysical environment which can be divided into two categories natural environment and the built environment with some overlap between the two environments.

According to IUCN, (1970) natural environment commonly encompasses all living things i.e., vegetation, animals, micro-organisms (biosphere/ecosphere) and non living things (atmosphere, lithosphere and hydrosphere) occurring naturally on earth or some region thereof. The atmosphere is earth's gases, hydrosphere the earth's water and lithosphere are earth's rocks and soils.

IUCN, (1970) continues to explain that the natural systems or ecosystems are numerous and are of different types. They are complete ecological units that function as natural systems without massive human intervention they are self-regulating communities of plants and animals interacting with one another and with their non-living environment. The natural environment is contrasted by the built environment, which is comprised of areas and components that are strongly influenced by humans. Following the industrial revolution, the built environment has become increasingly a significant part of the earth's environment. Within the ecosystems there are habitats in which organisms (including humans) exist. Habitats exists both in space and time, and in a habitat a combination of external condition physical, chemical, biological with

cultural interaction with social, political, economic and technological dimensions influence the life of individual organisms IUCN, (1970).

The concept of environment has gained increasing national and international attention in the light of observed negative consequences − the rapid depletion and degradation of natural resources, loss of biodiversity, harmful impacts of climate change and the threats to health and livelihood for present and future generations. The need to reverse environmental degradations is a direct concern of millennium development goal number 7. Industrial revolutions, unsustainable production and consumption patterns have resulted into environmental degradation, loss of biodiversity, population growth beyond the carrying capacity and unplanned urbanization.

Poverty in developing countries pollutes the environment who are poor and hungry destroy the environment in order to survive URT, (2005) & UNDP, (2000-2001). People. They cut down the forests, they overgraze, they overuse the marginal lands and growing numbers crowd into congested cities.

### 3.2.3   Land use conflicts

Conflicts refers to a condition in which an identifiable group of people/animals is engaged in conscious opposition to one or more identifiable groups because they are pursuing what are, or appear to be, incompatible goals (Nduru, 2005 & Lee, 1997). It arises between parties when at least one party becomes aware of an incompatibility of perceived interests, objectives, or future positions (Nduru), (2005 & Barringer, (1972).

The conflicts are a result of stakeholders' dynamic rights and interests, which include aspects of legal and nature of identity with respect to access, use, ownership and management of available resources Foley, (1991). At micro level conflicts manifests

themselves in various ways including; land or resource ownership, boundary disputes, loss of grazing or farming land, eviction of indigenous people and illegal exploitation of resources. But at macro level they involve conflicting mandates of government agencies and other institutions in natural resources management. The conflicts that are emanating from wildlife conservation include human wildlife conflicts, human nature conflicts, incentive conflicts, and agricultural – wildlife conflicts, diseases and pastoral- wildlife conflicts.

### 3.2.4 Community based wildlife management

Conservation is as old as humankind and that conservation practice has developed progressively, generation by generation. It is important to discuss here how conservation changed over time and the advantages and disadvantages. The four main phases of the evolutionary conservation include Traditional model of wildlife conservation, Post-colonial era, Yellowstone Model – Protected areas preservation practices, and the Community Based Wildlife Conservation Practices (carrot and stick).

As the "fence it police it" concept seemed to have many discrepancies in conserving the natural resources, another concept Community Based Conservation emerged where the slogans such as "sustainable use" or "use it or lose it" were adopted. This approach emphasizes on the benefits of natural resources for rural development and encouraged stronger involvement of local communities (co-management) (Kidegesho 2008). It promotes the notion of shared territories instead of that of PAs which displace communities and restrict access. In Tanzania Wildlife Management Areas were established in village land to enable them to manage and use the wildlife resources.

### 3.2.5   Sustainability

The word sustainability is derived from the Latin word *sustinere* (*tenere*, to hold; *sub*, up). *Sustain* can mean "maintain", "support", or "endure". According to Hasna, (2014) sustainability is a function of social, economic, technological and ecological themes. As early as the 1970s, the concept of "sustainability" was employed to describe an economy "in equilibrium with basic ecological support systems." Scientists in many fields have highlighted "*The Limits to Growth*", to address concerns over the impacts of expanding human development on the planet.

The first use of the term *sustainable* in the contemporary sense was by the Club of Rome in 1972 in its classic report on the "Limits to Growth", (Dennis & Meadows, 1972). Describing the desirable "state of global equilibrium", the authors used the word "sustainable": "We are searching for a model output that represents a world system that is sustainable without sudden and uncontrolled collapse and  capable of satisfying the basic material requirements of its entire people."

Since the 1980s *sustainability* has been used more in the sense of human sustainability on earth and this has resulted in the most widely quoted definition of sustainability as a part of the concept *Sustainable development*, that of the Brundtland Commission of the United Nations on March 20, 1987.

### 3.2.6   Sustainable development

Sustainable development is the term that rose to significance after it was used by the Brundtland Commission in its 1987 report Our Common Future. the united nations world commission on environment and development (WCED) in its report Our Common Future

(1987) defines sustainable development as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development ties together concern for the carrying capacity of natural systems with the social, political, and economic challenges faced by humanity. It emphasizes on the need to involve the local people who are the users and they also degrade the resources. Involving them in planning and decision making in conservation of natural resources will create binding interests in the maintenance and protection of the resource base.

### 3.2.7   Ecological sustainability

"The ecological sustainability is part of the relationship between humans and their natural, social and built environments WCED, (1987). It is also termed as human ecology, this broadens the focus of sustainable development to include the domain of human health. Fundamental human needs such as the availability and quality of air, water, food and shelter are also the ecological foundations for sustainable development; addressing public health risk through investments in ecosystem services can be a powerful and transformative force for sustainable development which, in this sense, extends to all species".

### 3.2.8   Sustainable conservation

United Nations, (1987) defines sustainable conservation as "The ecosystem approach, a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompasses the essential structures, processes, functions and

interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems".

### 3.2.9 Sustainable agriculture

Sustainable agriculture is defined in Brundtland report as consisting of "environmentally-friendly methods of farming that allow the production of crops or livestock without damage to human or natural systems Kikula, (1997). More specifically, it might be said to include preventing adverse effects to soil, water, biodiversity, surroundings or downstream resources—as well as to those working or living on the farm or in neighboring areas. Furthermore, the concept of sustainable agriculture extends inter-generational, relating to passing on a conserved or improved natural resource, biotic, and economic base instead of one which has been depleted or polluted. Some important elements of sustainable agriculture are agro-forestry, mixed farming, multiple cropping, and crop rotation".

### 3.2.10 Environment sustainability

Environmental sustainability concerns the natural environment and how it endures and remains diverse and productive. Since Natural resources are derived from the environment, the state of air, water, and the climate are of particular concern. "Environmental sustainability requires society to design activities to meet human needs while preserving the life support systems of the planet" IUCN, (2004). This, for example, entails using water sustainably, utilizing renewable energy, and sustainable material supplies (e.g. harvesting wildlife, wood from forests at a rate that maintains the biomass and biodiversity). By establishing the WMAs the local communities will be allowed to use natural resource sustainably as they have sense of ownership of the

resources. They are involved in planning, protection and benefits accrued from the conservation are partly returned to the villages.

An "unsustainable situation" occurs when natural capital (the sum total of nature's resources) is used up faster than it can be replenished. Theoretically, the long-term result of environmental degradation is the inability to sustain human life. Such degradation on a global scale should imply an increase in human death rate until population falls to what the degraded environment can support. If the degradation continues beyond a certain tipping point or critical threshold it would lead to eventual extinction for humanity (Rodgers, 2007).

It has been suggested that because of rural poverty and over exploitation, environmental resources should be treated as important economic assets, called natural capital. Sustainable development thus may involve improvements in the quality of life for many but may necessitate a decrease in resource consumption. Barbier, (1987) published the study *The Concept of Sustainable Economic Development*, where he recognized that goals of environmental conservation and economic development are not conflicting and can be reinforcing each other.

### 3.3    Theories used

Three theories are used in this study which include the landuse theory, regional planning theory and environmental planning theory. Other that supports the three theories are the limits of growth and the tradegy of commons. These theories explain the relationship between the major themes i.e natural resources, wildlife in particular as public goods that can be accessed freely but there is a limit of use because of the carrying capacity of the land resources in the environment. Resources are increasing arithmetically while human

population is increasing geometrically. Therefore something must be done to ensure that the resources are sustainably utilized for the benefits of the nation, the people and also global communities.

### 3.3.1 Land use planning theory

"Land- use Planning is a term used for a branch of urban planning encompassing various displines which seek to order and regulate land use in an efficient and ethical way, thus preventing land- use conflicts". Main proponents of the theory is Bengs, (1980)

In the United States, the terms land-use planning, regional planning, urban planning and urban designing are often used interchangeably, and will depend on the state, county, and/or project in question. On the other hand, land-use planning means "the scientific, aesthetic, and orderly disposition of land, resources, facilities and services with a view to securing the physical, economic and social efficiency, health and well-being of urban and rural communities" Bengs, (1980) & the Canadian Institute, (2000). Despite confusing nomenclature, the essential function of land-use planning remains the same everywhere.

### 3.3.1.1 The function of land use planning

Land use planning in Tanzania is used to administer the development of land. It guides the rational use and management of land resources where in the case of this particular study zoning of human and wildlife activities is done. Planning is done to safeguard natural resources according to the community needs/interests. It includes systematic evaluation of land and water prospective, option land uses, economic and

social conditions in order to select and adopt the best land – use options. Land-use planning often leads to land use regulation.

The American Planning Association states that "the goal of land-use planning is to further the welfare of people and their communities by creating convenient, equitable, healthful, efficient, and attractive environments for present and future generations". Bengs, (1980). Zoning regulates the types of activities that can be accommodated on a given piece of land as well as the amount of space devoted to those activities. In WMAs zoning is one of the prerequisites after the establishment.

### 3.3.1.2 The history of land use planning

Land use planning practices evolved as an attempt to overcome challenges that emerges day after day such as climate change, deforestation, encroachment etc. It engages citizens and policy-makers to plan for development with more intention, foresight, and community focus than had been previously. Various types of planning have emerged over the course of the 20<sup>th</sup> century. Below are the six main typologies of planning, as defined by Walters, (2007). They include *traditional or comprehensive planning* used before 1950's and was characterized by politically neutral experts with a rational view of the new urban development Walters (2007). Focused on producing clear statements about the form and content of new development. *Systems planning* on the other hand was common from the 1950s–1970s, the failure of a comprehensive planning to deal with the unforeseen growth of post World War II lead to the development of another type of land use practices. System planning is a more analytical view of planning and it embraces a set of complex processes, less interested in a physical plan Ferreira, (2009). In the 1960s *democratic planning* became popular as a result of societal loosening of class and race barriers. Democratic gives voice to

the people in planning for future communities and it tries to address the issues of inequality and injustice in community Ferreira, (2009). *Advocacy and equity planning* became familiar in the 1960s and 1970s. It is strands of democratic planning that sought specifically to address social issues of inequality and injustice in community planning. *Strategic planning* started in 1960s and is still common today. It recognizes small scale objectives and realistic world limitations. *Environmental planning* also started in the 1990s developed to address many of the ecological and social implications of global development.

Currently a combination of strategic and environmental planning is extensively used as it is understood that any sector of land has certain capacity for supporting human, animal, and vegetative life in harmony and that upsetting this balance has a cost on environment. In order to succeed in planning you need to involve "a balanced mix of analysis of existing conditions and constraints, extensive public engagement, practical planning and design, financially and politically practicable implementation strategies. Ferreira, (2009). Planners and citizens often take on an advocacy role during the planning process in an attempt to influence public policy. Wildlife Management Areas concept emerged so as to address the need of encompassing planning and community involvement in sustainable management of natural resources and environment in general.

The changes of paradigm shifts from traditional/conventional wildlife management to Wildlife Management Areas reveal three arguments, which have been used to argue for more popular participation in natural resource management. The first is the Ethical argument which points out that, "excluding people who live adjacent to protected areas

from the use of resources, without providing them with alternatives, is increasingly viewed as politically infeasible and ethically unjustifiable", (Brandon & Wells, 1992).

Brandon, (1992) explains that, many arguments for community-based natural resources management focus on the unfairness of protected area system, which displaces and ignores local people from land they have traditionally inhabited and depended upon for their living. A wide range of natural and social scientists, indigenous people and human rights activists put this point forward. (Dasmann, 1976 & Kulindwa, 2001) "For countries that have not yet gone too far along the European-American path, the opportunity is available to follow a different path. They can start with locally-based, decentralized, people-oriented, ecologically sustainable planning and development, which can enrich the lives of all and lead to a new dynamic balance between humanity and the natural world". Dasmann, (1976). Communities occupying lands adjacent to protected area boundaries frequently bear substantial costs while receiving few benefits in return Kulindwa *et.al* (2001:91).

The second argument is that of Indigenous Knowledge. The argument affirms that traditional wildlife/forest management systems and other common property administration are emphasized as valuable institutions for sustainable resource use Ostrom, (1990). Since the mid-eighties, a growing body of evidence has emerged from anthropologists and ethno-botanists working in the tropics, revealing that rural communities have extensive knowledge of and use a wide range of wildlife, wood and non-wood products supplied by forests representing considerable biodiversity in many forest regions Posey, (1985). 'Communities' knowledge of species and products is considered as an important resource in planning and management, and there are convincing arguments to conserve this neglected traditional knowledge, both for its

cultural and environmental significance (Richard, 1985 & Kajembe, 1994). Traditional wildlife management systems and other common property regimes are emphasized as effective institutions for sustainable resource use Ostrom, (1990). Often the government tries to enforce and build up new institutions such as game rangers, park wardens etc to manage the resources where law enforcement and isolation of people from their own land is done.

The third argument is that of declining Government Capacity to protect natural resources which is a common problem throughout Africa and undeniably much of the third world. For example, it was not until the Indian Government found it had employed more than 100,000 forest guards and yet the natural forests were still disappearing that the government began to look for new strategies Wily, (1995). It has now been realized that after all, with the right conditions, local communities became the strongest and most effective planners, managers and guardians of natural resources Wily, (1995). Regardless of the governments' resource bequest, it is simply not possible to deploy a soldier or guard behind every tree or animal.

The prevailing idea of Wildlife Management Areas (WMA) in Tanzania takes into account the experiences from other countries as well as the experiences in relation to forest management particularly Duru-Haitemba in Babati District (Kajembe & Monela, 2000). In the 1998 Wildlife Policy of Tanzania, it was stipulated that the title deeds of land will be given to villages (URT, 1998). Then villagers could decide with proper professional advice which form of land use, is attuned with the conservation of natural resources, they wish to pursue, and how they will derive benefits from such management. If villagers do benefit, then there will be a sense of custodianship over wildlife and

schemes to employ village scouts will reduce illegal exploitation because it no longer serves the villagers' interests.

## 3.4    Regional development theory

Regional planning is the science of efficient placement of infrastructure and zoning for the sustainable growth of a region" Schimidt, (2005). It deals with the efficient placement of land-use activities, infrastructure, and settlement growth across a larger area of land than an individual city or town, Mabogunje, A. & Faniran, A. (1971). A 'region' in planning terms can be administrative or at least partially functional, and is likely to include a network of settlements and character areas. The main proponents of the theory are Nikolaus Peus ner, McHarg & Keneth Frampton (Schimidt, 2005); Guo, H.C. et al. (2001); Slocombe D.S. (1993).

Although the term "regional planning" is nearly universal in english speaking countries, the areas covered and specific administrative set ups vary widely. In North America, regional planning may encompass more than one state, such as the Regional Plan Association, or a larger network of settlements than the Regional Assembly of the UK. The Ministry of Environment Forestry and Nature Conservation, (2004). Both, however, are equally "regional" in nature. "Regions require various land uses; protection of farmland, cities, industrial space, transportation hubs and infrastructure, military bases, and wilderness. The approach is promoted because it can address region-wide environmental, social, and economic issues which may necessarily require a regional focus.

Specific interventions and solutions will depend entirely on the needs of each region in each country, but generally, regional planning at the macro level for example, will

seek to resist development in flood plains or along earthquake faults, these areas may be utilised as parks, or unimproved farmland. The context theory in this case applies. It is a theory of how environmental design and planning of new development should relate to its context. (Schimidt, 2005). There are several theories in regional planning which include the picture theory, theory advocates the landscapes planning to be 'like a picture' (i.e. a landscape painting) with a foreground, a middle ground and a background. The theory was applied to landscape gardens in the eighteenth century and as Pevsner, (2000) argued to the wider topic of regional planning in the twentieth century. This produced the context theory that towns (the foreground) should be compact and urban, that the surrounding countryside (the middle ground) should retain its agricultural character and that remote areas (the background) should remain as natural parks.

Modernist town planners believed on function' led planning where there is prioritization of certain human needs over environmental considerations or deeper issues of meaning. For example, when planning a new road, the emphasis was on traffic analysis and engineering rather than on context i.e. the relationship between the new road and its environment. McHarg, (2001) opposed modernist planning in his book *Design with nature*. He believed that new development should be preceded by the fullest possible analysis of the environmental context in which building would take place. The highway planners who were, in his view, destroying the landscape at that time were described as 'highwaymen'. Frampton, (1999) put forward a Critical Regionalism theory which helped to consider the relationship between new architecture and its context Turner, (1998). He believed that "designers should make a

critical response, rather than a sentimental or copyist response, to local design traditions".

### 3.4.1 Zoning

By definition : zoning describes "the control by authority of the use of land, and of the buildings thereon in both micro and macro planning" . Areas of land are divided by appropriate authorities into zones within which various uses are permitted. Thus, zoning is a technique of land use planning as a tool of planning used by governments in most countries. Zoning is commonly controlled by local governments such as counties or municipalities, though the nature of the zoning regime may be determined or limited by state or national planning authorities or through enabling legislation. This is the case with WMAs the zoning is done under the village by-laws so may differ from one WMA to another e.g. in some WMA the zones include photographic tourism while in others only tourist hunting while in some cases both are present.

The word zoning is derived from the practice of designating mapped zones and the primary purpose is to segregate uses that are thought to be incompatible, prevents new development from interfering with existing uses and/or preserve the "character" of a community. Frampton, (1999) It may include regulation of the types of activities which are acceptable on particular space. (e.g. residential, agricultural, commercial or industrial), Zoning also considers the densities at which those activities can be performed, the height of buildings, the amount of space structures may occupy, the location of a building, The detail of how individual planning systems incorporate zoning into their regulatory regimes varies though the intention is always similar.

There are different categories of zoning. They include *functional zoning* where a land use is allocated depending on the types of activities. e.g. farming, settlement, livestock keeping, conservation etc.; density zoning allows a certain number of people to live in a certain area. *Performance zoning* is intended to provide flexibility, rationality, transparency and accountability, avoiding the arbitrariness. *Incentive zoning* on the other hand is intended to provide a reward-based system to encourage development that meets established development goals. Incentive zoning allows a high degree of flexibility, but can be complex to administer. *Form-based zoning* on the other hand regulates not the type of land use, but the form that land use may take.

### 3.4.2    Criticism of zoning

Much criticism of zoning comes from those who see the restrictions as a violation of property rights. It has been argued that zoning authorities can deny owners of their land user rights . Poor zoning works against economic efficiency, promote social and economic segregation through exclusion, hinders optimal efficient usage of a given area and development especially in a free economy. Planning and zoning have a great political dimension, with governments often criticized for favoring developers.

### 3.4.3    Relevancy to WMA

Establishment of WMAs necessitates the preparation of zones for different activities. In the study area there are zones demarcated for agriculture, livestock keeping, protection for wildlife conservation (photographic and tourist hunting) and settlement. Biodiversity conservation is a very important aspect that is emphasized during the zoning exercise.

### 3.5 Environmental planning and management

Main proponents for environmental planning theory include IUCN/UNEP/WWF (1991) Barbier, et al. (1988); Adams, (2006), Kates et al., (2005) & Hadins, (1998, 1977).

All authors warned of the dangers of over population and they called attention to "the damage that innocent actions by individuals can inflict on the environment" which "modestly implies that there is at least unwanted consequences".

They advocated that "Humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs." This flexibility allows programs of environment or development; places from local to global; and institutions of government, civil society, business, and industry to each project their interests, hopes, and aspirations onto the banner of sustainable development Kates et al., (2005).

In 1992 at Rio the discussion on environmental concern, specifically environment and development was discussed and it was found that there is a need to adjust between the people and their surroundings. It was also noted that the effects that may happen locally will ultimately have effect globally. After the Rio conference the concept of sustainable development started and major shift took place in thinking, deciding and actual doing as Kemp, (1988) explains:

In thinking: "it means breaking away from old attitudes and approaches that treat environment and development as conflicting rather than as a complementary and mutually supportive. Development that does not take environmental factors fully into

account is simply not Sustainable. Development that is not sustainable is simply not real development".

In deciding: "it means transcending arbitrary boundaries between institutions that tend to be independent, fragmented and working on rather narrow mandates with closed decision processes, interrelated and interdependent problems of environment and development require comprehensive approaches and more public participation and new institutional arrangements and processes that integrate environmental and economic factors in all planning and decision – making" . WMAs an institutional arrangement is highlighted in chapter eight page 175 of this thesis.

In doing: "it means discarding or updating practices, procedures and technologies that are seriously degrading the environment or deplete natural resources, while also developing and practicing new approaches that at least maintain and preferably, improve the state of environment and natural resources base on which human health and future economic development depend".

Kemp, (1988) argues that in most societies, these changes will require a transition period of years, perhaps decades. Exploitation of resources, the direction of investment, the thrust of technological development and the policies of major economic and sectoral agencies need to be reoriented and reconciled to enhance both present and future capacity to meet human needs. Mainstreaming the environment in national development process entails integration of sustainability principles into development strategy and building capacities at national and local level for better identification of environmental concern and opportunity and mitigation measures.

### 3.5.1    Theory of limits of growth (hardin, 1977)

In 2000 the world's population was 6 billion. It has been predicted that by 2025 it could exceed 8.9 billion (World Bank, 1992). Most of this increase is due to occur in the developing world. Such a large population can be sustained only as long as food resources are properly managed, distributed and the environmental impacts of agriculture and housing are minimized. By being prepared, population growth and development can be sustained by using sensible planning and suitable modern technology, WCED, (1987). Examples of technology include using fertilizers and thus a piece of land required for agriculture to satisfy basic needs for a family will be reduced, as half an acre will produce more because of the use of fertilizer.
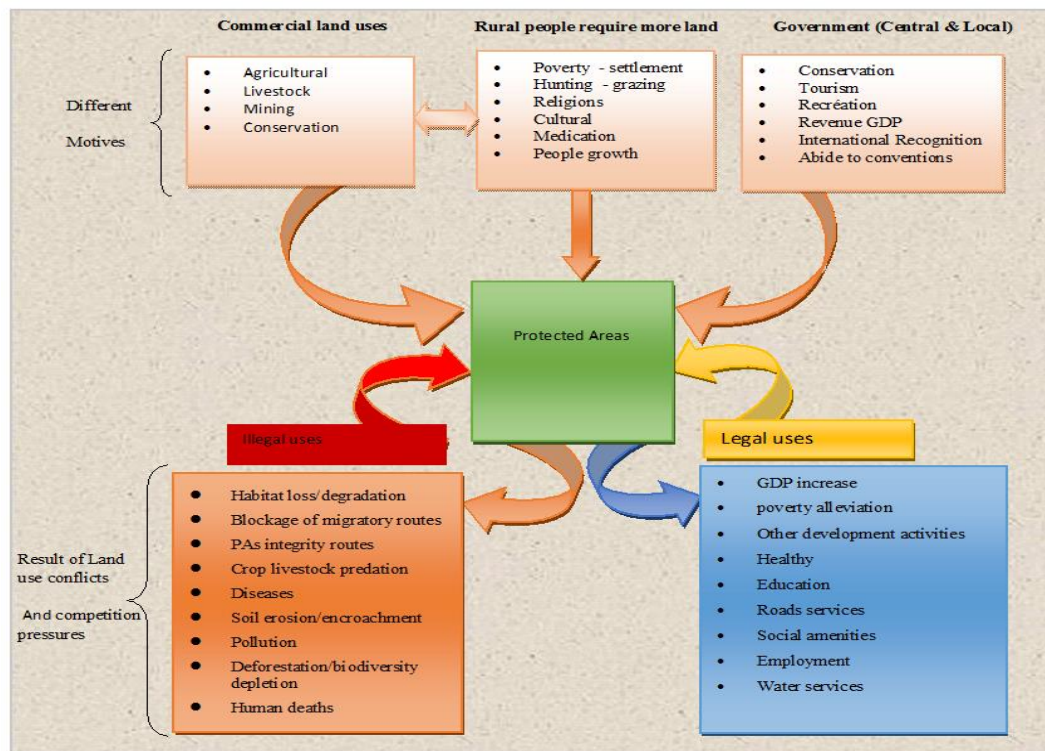
**Figure 3.1: Land use motives and impacts:** *(Source :Author, 2012)*

Resources availability limits growth because the human population increases geometrically while the resources or food production increases arithmetically, so it will reach a point that the food will not be enough to support the growing population. Moreover, the theory on which the common problem is based rests on the concept of carrying capacity, which so far we have assumed is static. The carrying capacity of a particular area is defined as the maximum number of a species/human population that can be supported indefinitely by a particular habitat, allowing for seasonal and random changes, without degradation of the environment and without diminishing carrying capacity in the future. If the present growth trends in world population, industrialization, pollution, food production and resource depletion continue unchanged, the limits to growth on this planet will be reached. They can utilize the

resources from PA illegally or legally and the consequences for both types of utilization are vividly shown in the **Figure 3.1**. The wildlife option must show how it can compete with other land uses as there are other land uses which seem to show more economic return to the local communities these include agriculture, livestock keeping, mining etc.

Population, environment and development are central facts and values of human existence and experience. Their qualities and relations combine to shape the human prospects in all times and places (Leader, 1995). Thus, the population of the country is the very objective of development itself, because population growth affects resource base in many ways. For instances, increased number of people causes increased demand for food, water, arable land and other essential materials from the natural resources pool. These resources are limited, as they increase in small quantities compared to population increase therefore it is always imperative to integrate population concerns fully into our development strategies as well as into all aspects of development planning at all levels, without that conflicts and competition for resources will continue. Hadins, (1977) has explained that we need to manage, distribute resources and minimize the environmental impacts of agriculture and housing properly.

### 3.5.2   Theory of tragedy of commons

Refers to a dilemma or situation in which multiple individuals acting independently, solely and rationally consulting their own self-interest which ultimately destroy a shared limited resource even when it is clear that it is not in any ones long-term interests of this to happen Hadins (1968). The resources such as wildlife, do not belong to any individual in the society and therefore no one is willing or ready to

protect it from degradation. However, the rehabilitation costs will be borne to the entire community including those who did not destroy. A prerequisite public participation requires that the public recognize the economic and the environmental values of biological resources such as wildlife.

This is the case with the protected area where the stakeholders have different motives but they all work to maximize profit regardless of the negative impacts. Poverty could be one of the reason that influence people to utilize the resources irresponsibly. To reconcile the problem of tragedy of commons, there is a need to involve all stakeholders in the problem identification, planning, resource mobilization, implementation, maintenance and sharing of the benefits that accrue from conservation efforts UNEP (1992). Uninformed decision making could result into further conflicts amongst different stakeholders e.g. the undervaluation of wildlife resources, focusing on extractive and commercial values only.

## 3.6    Conceptual framework

This study focused on the relationship between wildlife conservation as a type of land use in relation to existing conflicts, competition, socio-economic livelihood, land degradation and good governance.

The questions that bring focus on such perceptions are, what is the nature of the human wildlife interface prior to, and subsequent upon the establishment of MBOMIPA WMA?: to what extent has MBOMIPA WMA contributed towards meeting the policy and substantive goals of the CBWC (human/wildlife conflicts mitigation, poverty reduction through distribution of wildlife benefits, institutional capacity building in the management of wildlife areas and resources?; what insights

from MBOMIPA WMA portend for future sustainability of Tanzania's specific brand of CBWC and general global discourse on the human/wildlife interface?

The conceptual framework from which this study has preceded is founded on the popular concepts which include environment, land degradation, human wildlife conflicts, land use conflicts, sustainable development, sustainable conservation and community based conservation which seeks the integration of environment and development planning where stakeholders must be involved.

The various concepts and ideas are advocated by the policies and regulations related to conservation of the environment and natural resources. In the implementation and administration of natural resources and environmental programs, collaboration and co-ordination of policies across various sectors/stakeholders related to land use is essential. The policies also acknowledge that creating a relatively autonomous realm of authority, responsibility and entitlement, with primary accountability to communities could be the best approach that may guarantee sustainable conservation of natural resources whilst ensuring benefits to local communities.  Different land tenure regimes have been in place from the colonial time. All of them empowered the government or the president to become a custodian of the land. It is only recently that people are realizing that without involving the local community in the planning, management and decision making the land use conflicts will continue.

Nibuye (2010) in his study has shown that the world is comprised of components that must be integrated so as to achieve the positive outcomes. These components include the exogenous and endogenous, land and the socio-economic factors. The endogenous components include the natural resources such as flora and fauna and its habitat while the exogenous factors are the policies, demographic, and institutional framework. The

policies influence how the flora and fauna can be utilized but human population will always determine the demand for the resources. In order for the policies to be implemented properly, you need to have effective institutional set-up to properly guide, monitor and give feedback mechanisms. Socio-economic factors such capital is essential as it determines the magnitude of activities to be invested and that are profitable. The type of investment on the other hand will always be determined by the economic pressure and the policies in place.

This research also tackled the question of how wildlife is contributing to livelihoods of the local communities, and particularly to livelihood diversification, in the villages bordering the edge of Ruaha National Park. Economic diversification through wildlife enterprise seems to be an implicit goal of current policy directions in tourism, wildlife management, and rural development DFID, (2002). The Wildlife Policy also aims at increasing wildlife utilizations' contributions to GDP. Currently wildlife use in the study area is mainly through hunting and there is little interaction with other rural development strategies such as agriculture and livestock and that is why conflicts are escalating DFID, (2002).

The level of poverty in Tanzania is high, National Bureau of statistics, (2007; URT, (2005). The definition of poverty is a contentious, it can differs from one country to another. There are also varying degrees of poverty. From a broader perspective, poverty is defined as "the state of being extremely poor" and is understood by many to mean the lack of basic necessities such as food, water, shelter, healthcare, and primary education, IUCN, (2006). About 90% of Tanzania's population dwells in impoverished rural areas. Resources such as arable land, seasonal rainfall, and people are common to all villages; apart from these, many other villages are endowed with

resources, such as minerals, natural forests, rivers, lakes, ocean et cetera. As of 2007, 65.7% of people lived on $1.25 or less a day (World Bank, 2007).

Poverty reduction is the focus of policy-makers and donors, although effective strategies for overcoming poverty remain somewhat elusive. The Poverty Reduction Strategy paper aims to combine macro-economic stability, sector strategies, decentralization, and poverty reduction itself. It interprets the latter as reducing income poverty, improving human capabilities and containing extreme vulnerability. Devolving implementation of reforms to districts, municipalities and communities, and encouraging cost-sharing and deeper participation at local levels and the recognition of the dependence of the poor on environmental resources are important aspects that need further focus in the future in order to capture the complexities of environmental quality, dependency and environmental protection.

The research done in villages adjacent Selous Game Reserve by Ashley, (2002), showed that bushmeat income can make a large percentage boost to village government's income. In 2000 bushmeat provided by far the largest source of income, and the second largest, after a water contribution, in 2001. From this study it shows that efforts are needed to focus attention on wildlife as an economic asset, for diversification of livelihoods and diversification of the rural economy; ensure wildlife management strategies support existing livelihoods, particularly agriculture which is the mainstay; and maintain access to wildlife resources (particularly plant/woodland products) for coping with vulnerability. This will help to increase the value of wildlife to local livelihoods. **Figure 3.2** is researchers own model where it shows that population increase necessitates the increase in production, which in turn results into increased capital needed for production. However, as the capital increases (e.g. natural

resources) and due to market failure to allocate the realistic value to the natural resources i.e. they are undervalued and therefore there is over-utilization and depletion of resources, increased pollution, more land degradation, more competition and more conflicts which need to be resolved through planning, management and monitoring. Natural resources are public goods that are non-excludable, open access and their carrying capacities are limited.



**Figure 3.2: The Analytical Framework - System dynamics model.**

**(Source : Author, 2010)**

The key variables for the study are shown in the **Table 3.1.** Land use tenure is an independent variable which will influence the way people use the land and resources

in it. This will in turn create competition, illegal/legal use and conflicts (dependent variables) will increase among the resource users since they have different motives. Some stakeholders want to use the land for cultivation, others wants it for livestock keeping while to some, it is an important assert for mining. Illegal uses such as illegal hunting (subsistence and commercial) and poverty are dependent variables which are a result of land tenure. Local communities are displaced when the government establishes PAs which causes resentment. Sustainable conservation (dependent variable) will depend largely on the involvement/participation of the stakeholders (independent) in planning, monitoring, and utilization of the resources and sharing of tangible benefits accrued from natural resources. Sustainable conservation will also depend on good governance, accountability (independent) and also institutional framework in place. Good governance and accountability will also influence the benefits sharing (dependent) of tangible benefits to all stakeholders involved i.e the government, local communities, investors and international communities. Knowledge and awareness cannot be overemphasized as it includes the theoretical and practical understanding of the subject. Having knowledge and awareness to all stakeholders will help in conserving the resources through sustainable management and utilization. Sustainable development ties together concerns for the carrying capacity of natural systems with the social and economic challenges faced by humanity. As early as the 1970s, 'sustainability' was employed to describe an economy in equilibrium with basic ecological support systems Brown, et al., (1995).

**Table 3.1: Key variables in the study**

| S/N | Independent variable | Dependent variable |
|---|---|---|
| 1. | Land tenure/land alienation | Land use Illegal use, encroachment, competition and conflicts |
| 3. | Poverty/benefit sharing/costs | Illegal use of resources (Encroachment, land degradation, poaching, pollution etc.) |
| 4. | Benefits sharing | Conservation |
| 5. | Good governance and accountability | Benefits/conservation |
| 6. | Awareness | Conservation |
| 7. | Education | Conservation/less poverty |

Scientists in many fields have highlighted "The Limits to Growth", and economists have presented alternatives, for example a 'steady state economy', to address concerns over the impacts of expanding human development on the planet.

We have investors in different land use activities e.g. agriculture, mining, wildlife conservation etc. these land uses are all geared towards increasing the economic development of the country. Investors increase production so as to maximize profit. By doing so they increase the capital which will result into increased use of physical and financial resources, unsustainable use of resources will result into resource depletion. And therefore land and biodiversity degradation, competition and thus conflicts are expected to increase. (Tragedy of commons). The negative effects of

unsustainable utilization of resources may also result into pollution and is exacerbated by uncontrolled population increase. At this juncture, planning tool is required to resolve the conflicts.

A comprehensive environmental planning is advocated as it tries to harmonize between development and conservation, it recognizes that stakeholders' involvement is important as explained in the WMA concept. Environmental planning considers institutional framework that will enable the implementation of the planned activities but also will ensure that capacity building is done which will involve good governance and accountability.

# CHAPTER FOUR

# RESEARCH METHODS

## 4.1    Introduction

The research methods for this study included investigating the land use competition and conflicts whereby major issues that were considered include ascertaining the causes of conflicts, different stakeholder's motives/interests and governance, institutional and policies. The team also gathered background information on community livelihoods and the status of natural ecosystems, analyzing community influences on natural ecosystems and identifying needs and niches for incentive measures. A multi-technique study method (triangulation) was used, which includes structured and unstructured interviews, observations and group discussions. Primary data and secondary data were gathered for analysis, interpretation and making conclusions and recommendations.

## 4.2   The study area

### 4.2.1 Location

MBOMIPA is the acronym for Matumizi Bora ya Maliasili katika Kata ya Idodi na Pawaga, which in english means Sustainable Use of Natural Resources in Idodi and Pawaga divisions. It is a Wildlife Management Area (WMA) located in Iringa rural district, Iringa region – in United Republic of Tanzania (URT) and it lies between $6.9^{o}$ – $8.0^{o}$ S and 34.8 – 35.7 E (TBS, (2007). National Bureau of Statistics, (2007). The Idodi – Pawaga WMA (MBOMIPA) covers about 776.65 sq.kms, and it involves 21 villages. The 21 villages which are members to the WMA include Ilolo, Isele, Kinyika, Kisanga, Luganga, Mafuluto, Magozi, Mahuninga, Makifu, Mboliboli,

Mkombilenga, Nyamahana, Idodi, Itunundu, Kimande, Malinzanga, Mbuyuni, Mapogoro, Tungamalenga, Kitisi, and Magombwe. **Figure 4.1.** MBOMIPA is among the oldest WMAs in Tanzania having been established in 1980s.

Its long history and activities are well documented therefore a good baseline data exists to assess any positive or negative contributions from this value added planning approach to community land use. MBOMIPA lies adjacent to protected areas of significant ecological, social and economic values to local, district, national and international levels. It is flanked by a series of very important ecosystems in the southern part of Tanzania; the Great Ruaha ecosystem, the Usangu catchment (wetlands), the Rungwa, Kizigo Muhesi Game Reserves, Lunda Mkwambi Game Controlled Area, Kitulo National Park and also the Mpanga/Kipengele Game Reserve. It is therefore an important bio-diversity dispersal/breeding area**.** MBOMIPA was started to pilot the implementation of the policy the community based wildlife conservation. A portion of Lunda Mkwambi GCA (LMGCA) and part of village land was converted into WMA managed by the Idodi and Pawaga villages with a population of about 30,000 people and 6,118 households.

### 4.2.2  Geo-physical and ecological features

The Iringa Rural district comprises of 119,897.5 sq km land and 678.5 sq. km water area being 38.5% and 9.4% of regional land area respectively. All forest reserves (1,443,800 sq km being 57% of forest area) that form the catchment areas in Iringa Region and are owned by the respective district councils and village government. Iringa region lies in the southern highlands of Tanzania Mainland. It stretches from the semi-arid central Tanzania in the north to the shores of Lake Nyasa in the south

Figure 3.4. The region is located between 7005' - 36' 32' South and 33 47 -360 32' East. In the north, Iringa Region boarders Dodoma Region and, Mbeya Region in the west and Morogoro region in the east. Before 2011, south Iringa partly boarded Ruvuma Region and partly the Lake Nyasa, which marks also the boundary of Malawi.
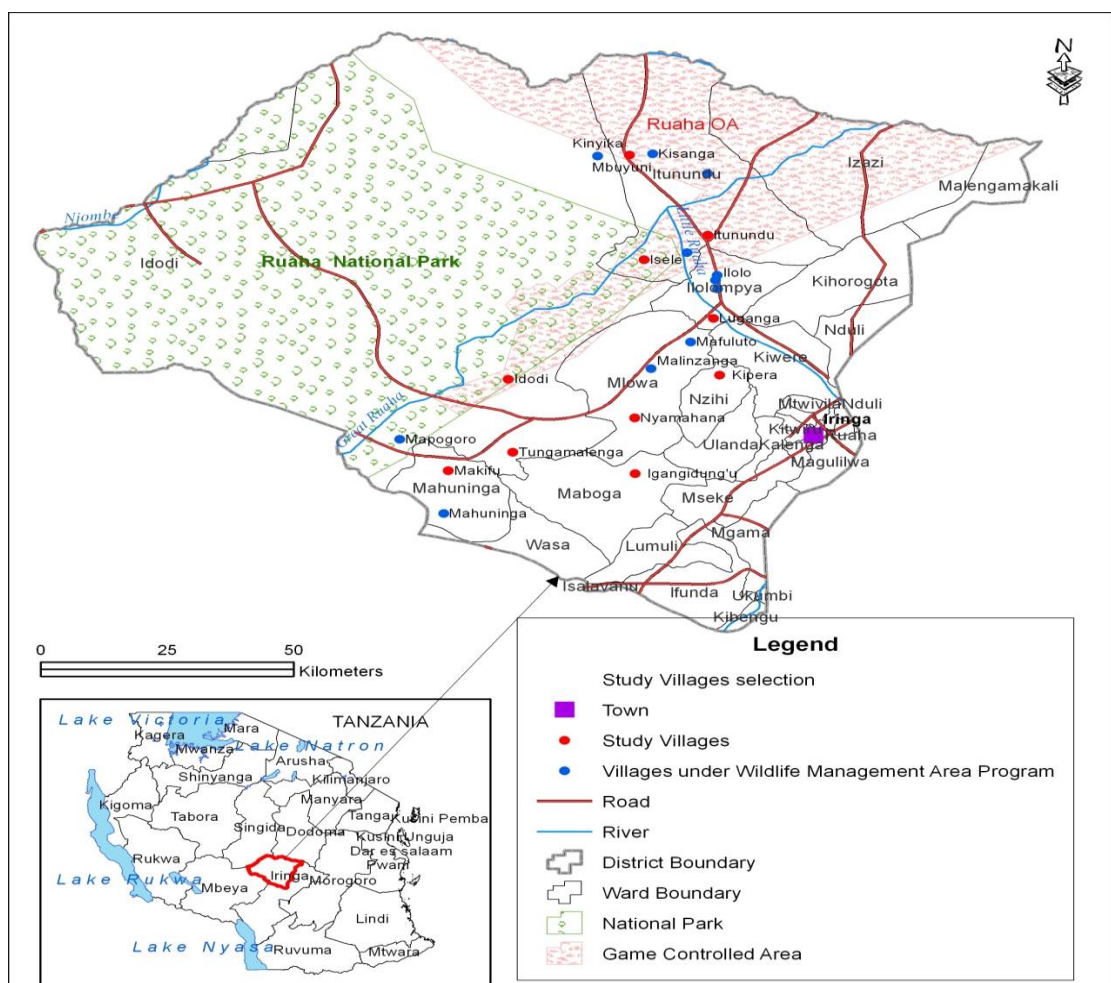


**Figure 4.1: Map showing Iringa rural district and MBOMIPA WMA member villages (Source : IRA, 2011).**

However, in 2011, Iringa region were divided into two regions Iringa and Njombe, therefore currently Iringa region does not extend to Ruvuma and Malawi in the south.

The region has an area of 58, 936 square Kilometers with 73% of it is an arable land. The area under cultivation is 4,720 sq.km. While the remaining 15,001 sq.km. is occupied by water mass, national parks, mountains etc. The population of 1,208,914 million people (Socio-economic profile – Iringa region 2007), it is among moderately populated regions of Tanzania Mainland. However, despite its relative high population, Iringa's population density of 21.3 persons pers sq.km. (1988) is among the lowest population densities in the country. Iringa region has unique features which taken together are exclusive to the region. The uniqueness of the region justifies its name "Iringa" which was imposed by the Germans who were the first to colonize Iringa. It was a war region where the only way an intruder can survive is to be behind a fortress in Hehe called Lilinga. The Germans built their own Lilinga where the regional capital – Iringa is currently located. Mkwawa chief of Hehe had his own fotress (lilinga) at Kalenga. Not only has the region a unique history but it is also unique in its economy, due to its physical features, its natural vegetation and animal life and even climate. It is part of the southern highlands where the pleasant climate attracted foreign farmers and settlers during colonial era. The farms they left behind formed the nucleus of estate or large – scale farming.

The southern highlands in Iringa include, but not exclusively, the Udzungwa mountain ranges which form part of the Eastern Arc Mountains that stretch from North Pare Mountains in the northern Tanzania through the Nguru, Uluguru and Ukaguru mountains in the central – eastern Tanzania. The arc from Udzungwa and reaches the Livingstone in Republic of Malawi (Socio-economic profile – Iringa Region 2007) and contains the highest density and diversity of animal and plant

species in the country including endangered species such as the breast feeding frog the Kihansi toad (KST). National Environmental Management Council, (2003).

The largest man-made dam (660 sq km) Mtera is found in Iringa region. Therefore the region is an important electricity producer and is part of the large Rufiji River basin. As you go to Mufindi you can find wild coffee forests of Lulanda and Kibao. Isimila stone age site provides people's historical beginnings. Iringa is among the big five maize producing regions in Tanzania. It also produces other crops such as tea, pyrethrum, round potatoes, wattle tree, tomatoes, tobacco etc.

### 4.2.3   Climate

Climate is a combination of elements that mainly include temperature and rainfall. National Bureau of Statistics, (1997). Altitude, topography and vegetation influence climate greatly, resulting in micro climate in specific area and macroclimate in larger areas. Iringa region has distinctive climatic zones. These are the highlands zones, the midland zones and the lowlands zones.

The highlands zones lies at an altitude of 1600 – 2700 meters above sea level. This includes the eastern fringe of Iringa rural and Mufindi districts; the central and eastern part of Njombe, Ludewa and Makete districts. Temperatures are normally below $150^{\circ}$C with rainfall ranging from November through May the average rainfall is between 600 – 1000 mm per annum. National Bureau of Statistics, (1997). The dry and cold season occurs after the rain season. The lowlands zone has an altitude of 900 – 1200 above sea level. This zone includes the low lying northern part of Iringa rural district along the Ruaha River. Temperature varies between $20^{\circ}$C– $25^{\circ}$C with low rainfall ranging between 599 and 600 mm per annum.

### 4.2.4   Soils

Iringa region has red/yellow soils well drained and highly weathered and leached clay soils in high altitude areas. The midlands areas are occupied by intermediate clay soils characterized by being moderately drained and leached. The lowlands are occupied dominantly by red brown loams and are highly fertile.

### 4.2.5   Topography and drainage

Iringa region is generally dominated by Kipengere and Livingstone mountains ranges in the southern part of the region and the Udzungwa Mountains separating Iringa and Morogoro region in the east. Northern part of the region is relatively flat, high plains cut by the eastern arm of the Great Rift Valley in which the Great Ruaha River runs. The region is further characterized by presence of a big plateau portion which forms the common landforms of the region.

Iringa region forms part of the Indian Ocean drainage zone with the following main drainage lines. The great and Little Ruaha Rivers join the Rufiji River outside the region to form part of the rufiji river basin. The river flow is markedly seasonal with high sediment load during the rains. The construction of the Mtera dam reservoir in Iringa (rural), one of the main sources of hydro-electricity in Tanzania, has to a greater extent modified the volume of the flow of the Greater Ruaha River.

The Central Plateau divides the rivers into a northern drainage and the southern drainage. The rivers draining north all merge into greater Ruaha to Rufiji system. The rivers draining to the south reach the Rufiji/Kilombero. Most of the southern part of the region drains into Lake Nyasa and which via the Shire and Zambezi Rivers also drain into the Indian Ocean.

### 4.2.6 Vegetation and agro-ecological zones

The dominant plant communities found in the district are Miombo Woodlands, Combretum Woodland, *Acacia commiphora* Bushland, *Acacia nigrescens* woodlands and Riparian Vegetation. The Miombo Woodlands is dominated by the genera Brachystegia, Julbernardia and Isoberlinia. Other common leguminous species include *Pterocarpus angolensis*, *Burkea africana*, *Dalbergia melanoxylon*, *Dalbergia nitidual* and *Xeroderris stuhlmannii*. Combretum Woodland is characterized by a dominated population of the genus Combretum with its constituent species of *Combretum apiculum, C. collinum* and *C. molle*. Some Commiphora species may be co-dominant with Combretum species. These include *Commiphora Africana, C. caerulea, C.edulis, C. stolonifera and C. ugogensis* (the most abundant). They include *Acacia mellifera, A.nigrescens, Acacia drepanolobium, A. Senegal, A. tanganyikensis, A. tortilis*. and *A. stuhlmannii*, woodlands is mainly occupied by *Acacia nigrescens*, *A. albida, A. polyacantha*, *A. xanthophloea*, and *Terminalia spinosa.* Riparian Vegetation is dominated by, *Ficus capraeifolia*, *Ficus sur* and *Ficus sycomorous*.

An agro-ecological zone is an area in which agricultural conditions are sufficiently homogenous to warrant the adoption of a single agricultural policy. Iringa region can be divided into four distinct zones on the basis of economic activities, topography, altitudes, climate and vegetation **Figure 3.** The zones are the Central Plateau, Rukwa – Ruaha rift zone and the Southern highlands and undifferentiated rocky terrain. The study area is in the Lowlands zone (Idodi and Pawaga) where drought resistant crops are grown such as cassava, banana, paddy etc.

### 4.2.7    Administrative units

Before 2011, Iringa region was formed by six administrative districts, but recently two of the districts were moved into a newly formed region Njombe. Currently only four districts remains namely, Mufindi, Iringa rural, Iringa Municipal council (urban) and Kilolo. Iringa rural district is comprised of a total of 31 divisions, 113 wards and 625 villages distributed throughout the districts. (Socio-economic profile − Iringa region 2007). Iringa Rural district have 123 villages out of which 21 are members of WMA as indicated in the introduction. The Idodi - Pawaga WMA is easily accessible from Dar es Salaam via a tarmac road to Iringa where one can reach the WMA via the murrum road through Tungamalenga.
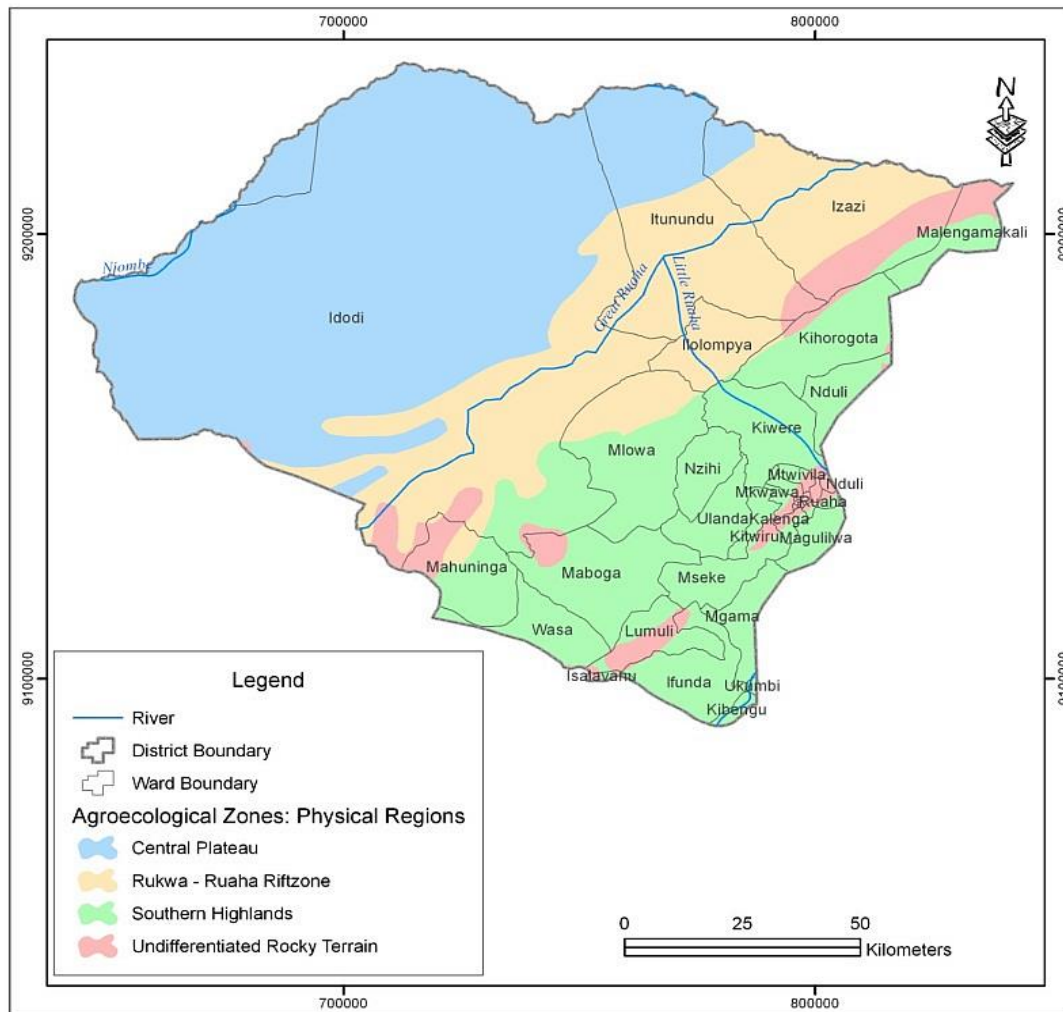
**Figure 4. 2: Map showing agri-ecological zones of Iringa Rural District**

**(Source : IRA, 2011)**

## 4.2.8 Demography and ethnicity

The main ethnic groups in Iringa (before splitting) include, the Hehe who constitutes about 43% of the total population (Socio-economic profile – Iringa region 2007) and occupies Iringa, Kilolo and Mufindi districts; followed by Bena tribe constituting 37% of the population and they occupy the then Njombe district. Kinga and Pangwa tribes account for 11% and 3 % and they occupy Makete district and Mlangali area

respectively. There are also small ethnic groups known as the Kisi and Manda.The first comprehensive national population census in Tanzania was conducted in 1967 followed by others in 1978, 1988 and 2002. According to the 1988 census Iringa population was 1,208,914, which is 5.35 percent of the total population in Tanzania mainland. Based on the 1978 – 1988 census the annual average population growth rate was 2.7%. In 2002, the population of the region was 1,490,892. (Socio-economic profile – Iringa region 2007). Between 1988 and 2002 census, Iringa regions population increased by 20% percent from 1,208,914 to 1,490,892, therefore if you make projections the population in 2012 could be 4,028,694. Population is increasing every year, therefore some deliberate efforts must be made to check the growth rate, otherwise the rate of food production to feed the population may not cope, let alone other demands on social amenities.

Factors affecting change in population of an area are births, deaths and migration. Population migration is a form of geographic or spatial mobility involving a change of usual residence between clearly defined geographic units (Shyrock, & Siegel, 1997). Migration can affect the growth and decline of populations directly and influencing fertility and mortality of the areas of origin and destination.

In 2002, out of 1,490,892 residents some 3.7 percent or precisely 55,771 people were born in other regions of Tanzania. On the other hand there were 257,708 lifetime emigrant (17.3 percent) who were born in Iringa region. Thus, the region had a net migration loss of some 201,937 lifetime migrants. Reasons for emigration are labour, proximity and development of the regions such as Dar-es-Salaam and Morogoro. (National Bureau of Statistics, Socio-economic Profile 2007).

### 4.2.9    Agriculture and socio-economic activities

Agriculture is the main contributor to the GDP in the country but it has been facing a number of problems and bottlenecks among them include:- unreliable market, poor transport network, low prices offered to farmers for their produce difficulty to access credit facilities. National Bureau of Statistics, (2007). In Iringa rural district the areas under food crops 144,543 ha and 16,945 ha cash crops. In 2001/02 season the average farm size per household was 1.6 ha in the district (Population and housing census, general report, National Bureau of Statistics, (2007). Although the soils in Iringa rural have the potential to support a variety of crops many areas especially in areas with high rainfall require application of fertilizers. Iringa rural has a fair potential for irrigated agriculture which is mainly underutilized.

Livestock development in Iringa region contributed a mere 8% of the national livestock populations in 2003 of which 3% are cattle, 3% are sheep and 2% are goats. National Bureau of Statistics, (2007).  In Iringa rural district with some 27.6% grazing land accounted for 35% livestock distribution in 2005, 52% goats and 35% sheep. Other economic activities in Iringa Rural include fishing in Mtera dam and beekeeping. In Iringa beekeeping is taken as part time activity and contributed 27.9% honey production in 2005. Wildlife reserve takes a large chunk of land in IR district there are three wildlife reserves.

### 4.3    Research design

To demonstrate the impact of a conservation project in a statistically robust manner, one of two approaches must be adopted (Ravallion, 2007). The first is a before-after comparison in which conditions prior to the project are contrasted with those occurring during or after project implementation. However, this approach requires

access to relevant pre-project data, which is seldom collected or available, particularly in developing nations. Furthermore, it can be confounded by concurrent events which affect the target variables during the period of project implementation. Such events could take the form of natural hazards, such as drought, or floods but may also be socioeconomic changes resulting from government policy or market forces (Ferraro & Pattanayak, 2006).

The second approach is to assess the differences in conditions at the project site with those in an area where the project has not taken place, commonly called an 'inside-outside comparison'. This method has been used to monitor the impact of conservation initiatives on the threat posed by deforestation (Bruner et al., 2001; Oliveira et al., 2007), fire (Nepstad et al., 2006; Roman-Cuesta & Martinez-Vilalta, 2006) and hunting (Laurance et al., 2006) as well as directly measuring target species' abundance (Caro, 1999; Kaunda-Arara & Rose, 2004; Nardi et al., 2004; Ogutu et al., 2005; Stoner et al., 2007) and habitat condition (Jansson et al., 2005).

The difficulty with this approach is the identification of suitable areas to compare project site conditions with. One commonly adopted approach is to compare a project with its immediate surroundings. A study examining the impact of conservation in the forests of Mexico highlights the problems inherent to this approach. Mas (2005) compared deforestation rates in the Calakmul Biosphere Reserve in Mexico with those in its immediate vicinity, concluding that Calakmul's establishment had reduced deforestation by 1% per year. However, when the Reserve was compared with an ecologically similar region, the impact was reduced to 0.3% per year (Mas, 2005). Similar effects have been reported in Costa Rica (Andam et al., 2008) and Peru (Oliveira et al., 2007). The problem arises because the impact of conservation is

seldom confined to the project boundary, unless that boundary coincides with a substantial geographic barrier. In the conservation sector, matched comparisons have been used to estimate the impact of protected areas on deforestation in Indonesia (Linkie et al., 2008) and Costa Rica (Andam et al., 2008) as well as to assess the contribution of marine protected areas in the Pacific to poverty reduction goals (Leisher et al., 2007). Matched comparison groups may be identified using both qualitative and quantitative techniques, with Leisher et al., (2007) identifying a comparison group using the knowledge of local experts while Linkie et al., (2008) and Andam et al., (2008) used statistical matching procedures. a novel approach which combines statistical matching with review by local experts is sometimes employed to assess the socioeconomic and ecological outcomes of a community-based conservation project e.g. in northern Kenya (Glew et al., in preparation).

This study is essentially a qualitative research where data collected, analyzed and interpreted is generated from observing what people did and said. Qualitative research means, definitions, characteristics, symbols, metaphors, and description of things. It is much more subjective and uses mainly methods of collecting information from individuals, in-depth interviews and focus groups discussions.

The nature of this type of research is exploratory. Exploratory research is a methodological approach that is primarily concerned with discovery and with generating or building theory. In the social sciences exploratory research is devoted to the notion of exploration. In this context exploration might be thought of as a perspective, 'a state of mind, a special personal orientation' (Stebbins, 2001: 30) toward approaching and carrying out social inquiry.

In depth interviews were conducted to a number of people and or a relatively small number of focus groups discussions. Qualitative research attempts to understand how one or more individuals experience a phenomenon, . Eg:-a shared attributes, values, norms, practices and material things of a group of people. It uses a variety of data sources, including quantitative data, review of records, interviews, observation and surveys. Historical data is also used to discuss past and present events in the context of the present condition, and allows one to reflect and provide possible answers to current issues and problems.

This section describes research design and methodology in terms of population, sampling, and administration of research instruments, data collection procedures, and techniques used in data analysis. A multi- technique study methods (triangulation) was used in the study because of the complexity and the inter-disciplinary nature of the study which involved a multiple stakeholders. The study relied on two complementary sources of data, primary and secondary.

### 4.3.1   Nature and sources of data

Secondary sources of data included written sources like books, journal articles, daily newspapers, government reports, articles, seminar papers, MSC and PhD theses etc. related to the subject of the study. These were accessed from libraries at Moi University, University of Dar-es-Salaam, Ministry of Environment and of Natural Resources and Tourism among others. Online journals available on Internet were also consulted. The secondary data were analyzed to provide the initial findings for the study.

Primary data source was mainly from carrying out interviews and focus group discussions within and outside the study area. In order to gather more information, participant and non-participant observations were also used. Still photographs were also taken to capture some of the observed features and participants.

Information from interviews was summarized and coded to come up with clear understandable statements and conclusions. The data collected from documentary sources and fieldwork was qualitatively and quantitatively analyzed. Counterchecking, comparing, contrasting and confirmation of the information collected from various sources together with the theoretical framework outlined, research questions and objectives was done. More often the data in qualitative research are in the form of words rather than numbers and these words are grouped into categories Mugenda and Mugenda (1999). The authors further observed that human behavior or human phenomena that cannot be investigated by direct observation such as attitudes and other emotions are best studied using qualitative methods.

Interviews and field observations were conducted in ten villages of Idodi and Pawaga divisions in the dry month of June each year of 2010, 2011 and 2012. This was considered ideal for conducting interviews in the study area as most of the people are at home and less active in the farms. Household heads, key-informants and Focus Group Discussions (FGD) were used to generate data from residents, village leaders, district leaders, game scouts, academicians, government officials and NGO representatives who were (or are) active in facilitating MBOMIPA WMA, safari companies who conduct business in MBOMIPA, and some representatives from the Ministry of Natural Resources and Tourism in Dar-es-Salaam.

A combination of structured and unstructured questionnaires was administered to key stakeholders and a range of social, economic and ecological enquiries were asked. Focus group discussion was conducted to study life styles and the land degradation in areas around WMAs and how wildlife conservation impacts on their livelihood. More time was devoted to field work which requires a thorough and wider coverage to understand variations and complexity, more opportunity for interaction and building rapport with communities, more time for probing and cross-checking of findings.

### 4.3.2 Sampling design

The sampling design took cognizant of issues such as the type of the universe or population, sampling unit, size, frame, sampling procedure and budgetary constraints. The 10 study villages were selected using purposive proportional stratified random sampling. This is a strong type of sampling as it enables the researcher to generalize directly from the final combined sample to the population (Kalton, 1983; Kish, 1995; Christensen, 2011). In this study three strata were used. The set of groups make up the levels of stratification variable (Christensen et al., 2011). The strata in this case the villages, were grouped based on their distance from the protected area. The first level was distance equal or less than five kilometers from the PA, the villages here include Makifu, Idodi, Kinyika, Isele. The second levels were the villages that their distance from PA is more than five and less than ten kilometers, which include Tungamalenga, Nyamahana and Liganga. The last group were those that were more than ten kilometers from the PA, these are Igangidungú, Kipera and Itunundu. A method of proportional allocation under which the sizes of samples from different strata were kept proportional to sizes of the strata.

A simple random sample was used to select respondents from each strata (group). Equal probability of selection method (EPSEM) helped to ensure that the samples taken represented the study population. Using a simple random sampling method ensured that each individual member of the population has an equal chance of being selected for inclusion in the sample. Target population comprised of all villagers and village leaders in the selected 10 villages in the study area (MBOMIPA) and area adjacent to the study area. The sampling unit was a household. Key informants were selected from wildlife experts, academicians and politicians.

### 4.3.3  Sample size determination

Target population may be defined as the target group which the researcher wants to know about by studying one or more of its sample (Tripathi, 2003). The target population for this study was all households in Pawaga and Idodi divisions in Iringa Region, wildlife experts, councilors, researchersb and other stakeholders.

Surveys were conducted through consultations with Community Organization Officers and District Officers to ascertain the administrative boundaries of the study area, size, settlement patterns, socio-economic activities and population. This information was used to confirm the sample frame, unit and size. According to the formula below Kothari, (2003) a total of 384 households were supposed to be interviewed. However, due cost implications and non-responsiveness of some respondents only a sample of 311 household were interviewed. **Table 4.1.**

The total number of households to be sampled for this study was obtained by using the following formula:

$$n = \frac{NpqZ_{\alpha/2}^2}{(N-1)e^2 + Z_{\alpha/2}^2 pq}$$

Where

$n$ = sample size (number of households)

$N$ = total number of households in all villages (N=6118)

$p$ = proportion in the target population

$q = 1 - p$

$e$ = predetermined margin of error

$Z_{\alpha/2}$ = area under standard normal curve

$\alpha$ = level of significance

Since N = 6118 is large then the formula used for calculating sample size was

$$n = \frac{pqZ_{\alpha/2}^2}{e^2}$$

Where α = 0.05, p = 0.5 (for optimum sample size), q =1− p = 0.5, e = 0.05 (Since the estimate should be within 5%) and 'n' is the sample size needed for the study, $Z_{\frac{\alpha}{2}} = 1.96$ is a constant coefficient (i.e. multiplier) associated with the confidence level that is being used (from a table of areas under the standard normal curve).

$$n = \frac{0.5 \times 0.5 \times 1.96^2}{0.05^2} = 384.16$$

The above formula gave the optimum number of households to be selected for the sample in the study area as 385. The probability of 5% was used to determine the required number of households for each village by using the formula below.

$$n_i = 0.05 \times N_i$$

Where

$n_i$ is number of households selected from each village.

$N_i$ is the total number of households in each village

Purposive sampling technique was used to identify key respondents. Mugenda and Mugenda (1999:50) observed that purposive sampling is a sampling technique that allows a researcher to use cases that have the required information with respect to the objectives of the study and also for politicians that is their constituents. In the study the key informants comprised 12 wildlife experts, 10 Councilors, 10 Private sectors other stakeholders (5) and from other ministries (5).

## 4.4 Training research assistants

Four research assistants were recruited and trained by the researcher on how to administer an oral interview and make field observations. Each of them was given ample time to go through the research proposal before discussing it in detail with the researcher. A training session was conducted with all the four research assistants and the perspectives of the study and issues were explained, concerns and any enquires were responded to. They were enlightened on the proper questioning techniques and on general issues concerning ethics in social research. More time devoted to preparation means a more thorough review of existing information, more time for team building,

more time to developing a better understanding of issues and key concepts among all the team members, more consistent data collection in the field based on a better general understanding of issues and concepts.

**Table 4.1: Distribution of respondents in the surveyed villages in MBOMIPA**

| Village | Total number of households | Number of sampled households | Sample size |
|---|---|---|---|
| **Tungamalenga** | 1200 | 60.00 | 60 |
| **Kitisi** | 203 | 10.15 | 11 |
| **Itunundu** | 1,000 | 50.00 | 50 |
| **Isele** | 544 | 27.20 | 28 |
| **Nyamahana** | 456 | 22.8 | 24 |
| **Makifu** | 425 | 21.25 | 22 |
| **Kinyika** | 481 | 24.05 | 25 |
| **Luganga** | 720 | 36.00 | 36 |
| **Igangidung'u** | 569 | 28.45 | 29 |
| **Kipera** | 520 | 26.00 | 26 |
| **Total** | **6118** | **305.9** | **311** |

**(Source: Village & Author's data, 2009)**

## 4.5 Research procedures

### 4.5.1 Secondary data collection

Secondary data collection were obtained through reviewing WMAs archives, historical documents, WMA strategies, baseline studies, policy documents, plans, budgets, natural resource management plan and other monitoring, evaluation and progress reports that portray a historical picture of the development of the WMA and its current status and social economic (SE) profile from different sources.

Tools such as land use plan, maps, and photographs, geographical information systems were used to find out the land cover changes in the study area. Information

gaps were identified and data to fill the gaps sought from the field. Details of data to be collected are attached in **Appendix III.**

### 4.5.2   Primary data collection

Primary data used in this study were collected in the villages of Idodi and Pawaga Divisions. A survey covering 305 house-holds was conducted and 12 wildlife experts. Interviews with 10 councilors were conducted in July and August, 2012. In addition, visits to farmlands in the study area were done and focus group discussions organized in each village with discussions centered on poverty, land management, land tenure, environmental processes, perceptions of land degradation, gender roles in production and wealth ranking. From the ten villages interviewed two of the villages Kipera and Igangidung'u are not in the MBOMIPA WMA. They were used for comparison purposes.

### 4.5.3   Field studies

### 4.5.3.1   Household survey interviews

Information that are expected to come from the interview include socio-economic progress versus baseline information and livelihood changes, needs for incentive measures and success/failure of the WMA process to achieve its objectives, and recommend to planners and decision makers how to improve matters. The villages adjacent to Ruaha National Park were chosen and household interviews and focus group discussions conducted. These villages are prone to having conflicts with wildlife and PAs management. The questionnaires used consisted of four main topics i.e. social, economic, human-wildlife conflicts and ecological issues **Appendix IV.** Interviews were conducted mainly in Swahili. The primary data obtained from both

formal and informal settings were from verbal and written responses. The information obtained was used to fill gaps in the secondary data.

### 4.5.3.2   Key informants interviews (KII)

A combination of Structured, Semi structured and Unstructured questionnaires were conducted for different clusters, groups or individuals, as follows:-

- **The training and research institutions representatives** were interviewed using questionaires. Issues of importance here include how WMA policy, laws, and regulations have been adopted, and what is the institution's capacity for wildlife conservation through WMA's in the country and analysis of WMA progress vs. land-use plan i.e. what are the impacts (positive and negative) of WMA plans to the community, natural resource management plan, business plan, etc. Information on other land uses in the study area, the nature and magnitude of land uses conflicts (if any) in and around the WMA and the stakeholders involved, stakeholder's interests, people's perception in wildlife conservation and their planning success/failures in effecting biodiversity conservation and stopping resource depletion and land degradation in WMA and outside the WMA.

- **Government Officials**: decision makers, technical experts and extension agents both at district and national level, particularly from the following Ministries - Natural Resources and Tourism, Agriculture and Cooperatives, Finance and Planning, Livestock and Fisheries development and Local Authorities Officials. Open ended questionnaires were also used so as to give them room for availing more detailed information about the WMA initiatives.

- **Politicians:** E.g., Councilors and Village leaders. Structured questionnaires on people's livelihood and perception on protected areas and the WMA paradigm were used.

- **Other Stakeholders:** Purposively selected academia and Researchers, private investors and NGOs involved in issues related to this field were interviewed.

### 4.5.3.3   Focus group discussions (FGD)

Focus group discussions were done in villages outside and inside the wildlife management area using a checklist **Plate 4.1.** The purpose of the FGD was to gain knowledge about WMA and benefits accrued from it. This method is essential as it provides relevant, timely, reliable, cost- effective and useful information. During the FGD a fair representation of both gender and youths was ensured. Prior to group discussion and in depth interactions, the purpose of the survey was adequately explained. This session was important for the exercise and it resulted into a lot of interesting questions from the participants in most villages.

Focus group discussion was used to study life styles and the land degradation in areas around WMAs and how wildlife conservation impacts on their livelihood. Local knowledge on issues such as land –use practices in areas around WMA, their life styles and the land degradation in areas around WMA, priorities for efficient use of wildlife resources, identification of who can use wildlife resources and how wildlife conservation impacts on their livelihood were tapped during the focus group discussions.

**Plate 4.1: Focus groups discussions in Isele, Kitisi, Mahuninga and Nyamahana villages - Iringa. (Source: Author, 2012)**

### 4.5.3.4   Observation

The observation method is the most commonly used method especially in studies relating to behavioral sciences. Kothari, (1990) observed that in a way we all observe things around us, but this sort of observation is not scientific observation. Observation becomes a scientific tool and the method of data collection for the researcher when it serves a formulated research purpose, is systematically planned and is subjected to checks and controls on validity and reliability. Photographs of important vegetation types and other biological features were also taken.

### 4.5.3.5   Event diaries and long-term monitoring

Households underwent two weeks monitoring, during which time a member of a household was given an event diary in order to record the food and other items expenditure pattern. The household data was collected after two weeks period and

analysed to detemine the purchasing power of different household in terms of gender, education and other parameters.

## 4.6    Tools

### 4.6.1    Questionnaires

This is a self − report data collection method that is the questionnaires are filled by research participants using a paper and pen. This method was used for Wildlife experts in government institutions such as academicians, researchers and government officers. Questionnaires measure participant's opinions and perceptions and provide self − reported demographic information Christensen et al., (2011).

### 4.6.2    Semi - structured interviews

Semi-structured interviews (SSIs) formed the primary method of data collection. Interviews have previously been used to assess attitudes in a wide range of situations, such as measuring views on deforestation in Vietnam (Pham & Rambo 2003), knowledge of biodiversity in the U.S. (Hunter & Brehm 2003) and perceptions of wildlife conservation in the U.S., Germany and Japan Kellert (1991). SSIs can be used to effectively assess attitudes, and have provided valuable information regarding peoples' perceptions of large carnivores in previous studies (Conforti & de Azevedo 2003; Marker et al. 2003b; Oli et al. 1994). Semi-structured interviews enable respondents to provide more elaborate and complete answers than fully structured questionnaires, and are flexible enough to allow people to explain their views in their own words, which can be valuable in terms of truly understanding the nature of a particular situation (Hunter & Brehm 2003; Schensul et al. 1999). However, SSIs have drawbacks in terms of the time and money needed to collect and analyze large

amounts of data and they can also be biased both by the interviewer and by the articulacy of the respondent concerned (Glastonbury & MacKean 1991).

### 4.6.3   The structured questionnaires (SQ)

Structures Questionaires are frequently used in quantitative social research. They are a valuable method of collecting a wide range of information from a large number of respondents. Adequate questionnaires construction is vital to success of the survey. It assessed attitudes towards wildlife in general, species composition and number, migratory patterns, intensity of conflict, as well as their conservation concerns, the socio-economic characteristics of respondents, in terms of their livestock holdings, losses and income sources, interviewees' attitudes and knowledge regarding wildlife, etc. The questionnaires were pre-tested among a small group so as to ensure that appropriate questions are formulated. Inappropriate questions, incorrect ordering of questions, incorrect scaling, or bad questionnaires format can make the survey valueless as it may not accurately reflect the views and opinions of the participants.

### 4.6.4   Unstructured questionnaires

Unstructured or in-depth interviews are those which do not have strictly predefined questions, and were used to allow investigators to learn more about the complex behavior of people without imposing prior categorizations and therefore limiting their responses Punch, (1998). This approach allowed the researchers to gain a more holistic view of an interviewee's point of view, and can highlight important avenues that are worthy of future consideration Berry, (1999). Moreover, conducting unstructured interviews, which often take the form of seemingly informal discussions, allows people to explain their thoughts in their own words, and the specific language chosen can be very indicative of respondents' underlying perceptions and attitudes

(Knight, 2000b). The interviewer must still have a clear idea of the aims and intentions and format of the interview in order to elicit the desired information, for instance by asking more probing questions to further the discussion where necessary (Berry, 1999; Patton, 1987).

The guided interview form of the unstructured interview was used, i.e., a checklist was developed so that certain key topics would be covered during the discussion. These topics included the respondent's background, the length of time they had lived in the Pawaga-Idodi area, the reason they moved here, attitudes towards the local area in general, attitudes towards Ruaha National Park , attitudes towards Park authorities and other wildlife-related authorities, personal experiences and interactions with the Park, perceived costs and benefits of the Park's presence, where did the benefits went to, views towards wild animals, perceived costs and benefits of wild animal presence.

Questionnaires once administered in the field were then inspected to detect errors, omissions and also ascertain completeness. Information editing and coding helped to summarize data and transfer into smaller sheets. Revisits for clarifications, verifying gaps were done as required.

## 4.7   Analytical framework

### 4.7.1   Content analysis

The data obtained were analyzed using a content analysis method. Content analysis generally describes a method of objectively and systematically describing the content of a message Whyte, (1977). It uses simple techniques of tabulating frequencies of occurrence for the different categories. Content analysis is standard analytical procedure in environmental perception studies Whyte, (1977). The underlying

principle of the content analysis approach in perception studies is that a more widely held perception will be expressed much more frequently among respondents.

Frequency distribution is a systematic arrangement of data. Values are ranked ordered and the frequencies are provided for each of these values. The first column shows the data values for a variable, the second column the frequencies for each of these values, and the third column the percentages.

### 4.7.2   Graphs

Graphs are pictorial representations of data. Graphs used are for one variable or for more than one variable. The graphs used depend on the nature of the data.

### 4.7.3   Statistical package SPSS

Statistical package SPSS which has a comprehensive set of procedures for data transformations were also used to analyze most of data where frequencies, percentages, means, mode etc. were obtained. Using this statistical package multivariate statistical tests was done, used to analyze data represented in terms of many variables.

### 4.7.4   Chi – square tests

In inferential analysis, the Chi Square test at 5% level of significance was used to examine the relationship between selected categorical variables from the objectives of the study. The Chi–square test has been described as a test for independence or relatedness in contingency tables (Agresti, 1995). It is useful in testing the compatibility of observed frequencies in two way tables for the purpose of studying the relationship between the two variables of classification (Hoel, 1983). It thus makes it possible to test the statement of independence of two variables.

Test Statistic for Independence (Chi – square $\left(\chi^2\right)$) formular were used

$$\chi^2 = \sum_i^r \sum_j^c \frac{\left(f_{ij} - e_{ij}\right)^2}{e_{ij}}$$

where

$f_{ij}$ = observed frequency for contigency table category in row i and column j

$e_{ij}$ = expected frequency for contigency category in i row and column j based on the assumption of independence.

With r rows and c columns in the contigency table, the test statistics has a Chi-square distribution with $(r-1)(c-1)$ degrees of freedom provided that the expected frequencies are five or more for all categories.

### 4.7.5    Data validity procedures

Perakyla, (1997) & Leninger, (1994) point out that it is possible to ensure validity of qualitative data if the researcher follows procedures that minimize biases. In the present study, several strategies were used to ensure the accuracy of the findings. Data collected through different techniques like observation, interviews and focus group discussions was triangulated to build coherent justification for various themes. The researcher and assistants compared notes at the end of every data collection to ensure what was recorded was not subject to personal bias.

# CHAPTER FIVE

# RESULTS

## 5.1    Overview

This chapter presents the findings of both secondary and primary data from the study

conducted in MBOMIPA, Iringa Rural District and is presented based on the set

specific objectives. The types of data presented include village population size,

structure, trend, migration and settlement patterns; division of labour and

specialization. Others are availability of social services and their use; accessibility and

institutional set up. The chapter also presents results on how the establishment of

WMA has influenced the ecosystem especially wildlife status in the study area i.e. the

key wildlife species, their numbers, habitats and seasonal movement and forest status

as well as related biological resource utilization and water resources. The finding also

provides information on existence of resource use conflicts in the area and analyzes

how the WMA has contributed to resolving the conflicts.

Data on the influence of WMA on socio-economic activities including current land

uses practices and changes on production status; consumption and income levels;

human social capital and physical asserts, poverty levels, and natural resources uses as

well as existing opportunities for the communities living in the study area are all

presented.

There is also information about health and education facilities; levels of household

livelihood security, community empowerment and accountability. The governance

and institutional framework for the management of the MBOMIPA WMA has also

been examined and the findings are provided in this chapter. All tables and plates in

this chapter were obtained from the interviews, observation and focus group discussion in year 2011 and 2012.

## 5.2    Contributions of MBOMIPA – WMA to wildlife conservation

### 5.2.1    Framework for wildlife protection

The present framework for wildlife protection in Tanzania comprises the following broad categories of Protected Areas (PAs)**;** National Parks (NPs), Game Reserve (GRs), Game Controlled Areas (GCAs, Ngorongoro Conservation Area (NCA) and Wildlife Management Areas (WMAs). **(Figure 5.1) & (Table 5.1)** Wildlife in Tanzania is owned by the state, except where a permit or ownership certificate has been issued to an individual that allows the possession of a specimen or trophy. The government issues a variety of licenses and permits for people to hunt or capture wild animals including birds and reptiles. These permits and quota are issued to allow the government to obtain revenue which can be used for conservation and other development activities. Hunting and live animal capture are management tools that are used by the wildlife managers to ensure that the animals are not exceeding their carrying capacities. Local communities also can obtain the legal rights to wildlife resources. Applications to the Director of Wildlife are done through their Authorized Associations or individually. For instance, the local hunting or tourist hunting permits are given under wildlife laws and regulations.

**5.2.2 The Idodi – Pawaga Wildlife Management Area (WMA) – MBOMIPA**

This study examined the WMA strategy as employed in Tanzania for the wildlife management in MBOMIPA in Iringa rural district. The first step in establishing the WMA is planning, where issues regarding resource values (biological & physical, socio-economic, and cultural) are identified, qualified and quantified.
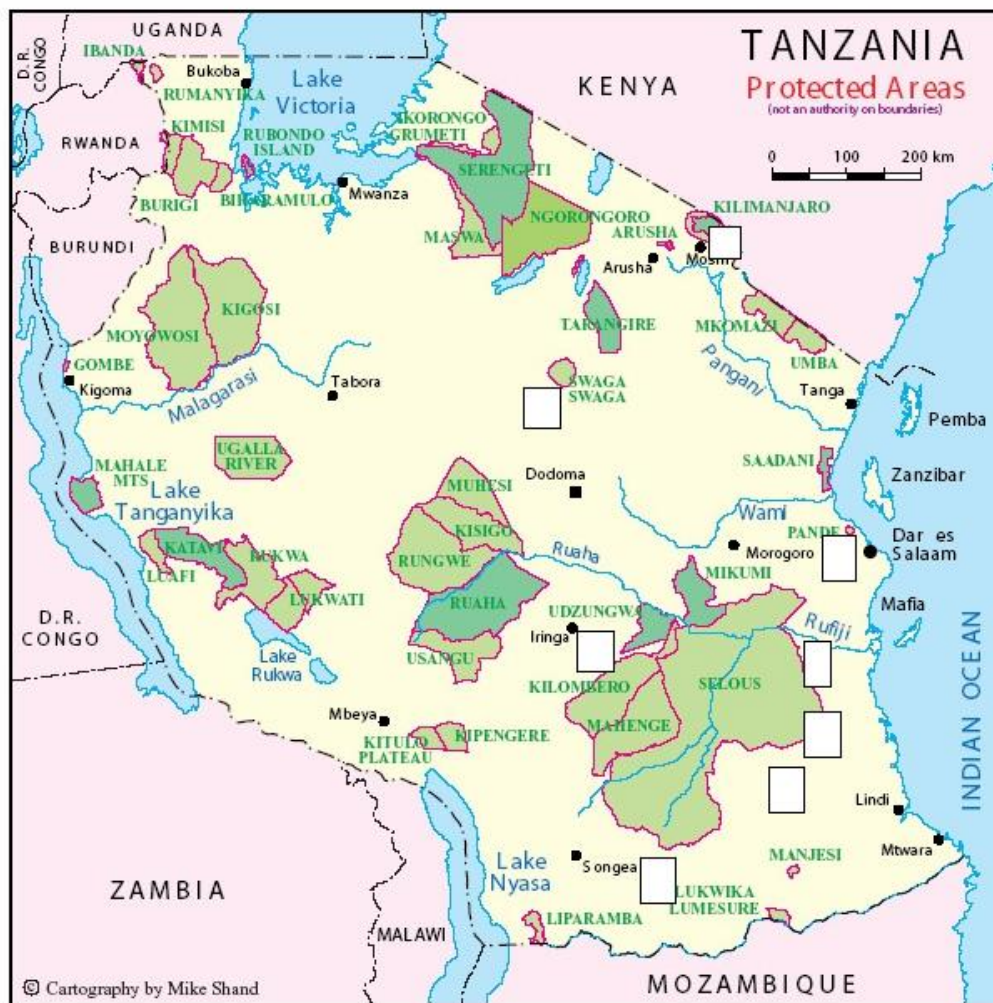


**Figure 5.1: Map of Tanzania showing protected areas (Source: Wildlife Division)**

The area identified for a WMA must fulfill certain conditions. For instance the area must have significant resources (biological and non- biological) that can be accessed and must have significant economic value.

Subsequently, Resources Management Zone Plan (RMZP) or General Management Plan (GMP) for the WMA is developed by the local communities in collaboration with othe key stakeholders, which include officials from the District & Central government, Conservation NGOs etc. **Appendix V.** According to the secondary data, the process of establishing a WMA include some preliminary steps (initiation) based on key criteria set in the regulations. Also the area must be ecologically viable or part of an ecologically viable ecosystem. It should belong to one or more villages in accordance with the relevant provisions of the law governing village land, and other legislation relating to ownership of village land.

**Table 5.1: Land devoted for Wildlife Conservation in Tanzania Mainland**

| S/N | Categories of PAs | No of PAs | % Total PAs | Size km² (approx. total area) | Status |
|---|---|---|---|---|---|
| 1. | National Parks (NPs) | 16 | 4 | 57,365.05 | Devoted to wildlife and no human co-existence. In NPs only photographic tourism is allowed |
| 2. | Game Reserves (GRs) | 27 | 11 | 114,782.47 | Devoted to wildlife and no human co-existence. In GRs tourist hunting & photographic tourism is allowed. |
| 3. | Game Controlled areas (GCAs) | 44 | 6 | 58,565.02 | Devoted to wildlife and no human co-existence. In GCAs tourist hunting & photographic tourism is allowed. (heavily encroached) |
| 4. | Multiple land –use (NCAA) | 1 | 1 | 8292.00 | Human and wildlife co-exists, no hunting in NCAA. |
|  | Total |  | 28 | 239,005.29 |  |
| 5. | Wildlife Management Areas | 38 | NA | 29,518.40 | Village land designated for wildlife management and tourism (hunting or photographic) |
| 6. | Wetlands (Ramsar site) | 4 | 5 | 48,684.00 | Currently we have four Ramsar sites in the country |

**(Source: Wildlife Division, 2012)**

Finally, the conservation activities will be managed and controlled by the village(s) in collaboration with the WD, TANAPA, NCAA, DC, GR, and NP. Potential areas which are completely depleted of large game and may be deemed as not economically viable upon assessment and thus unsuitable to be a WMA, may also be considered. Through village government, the concerned villager(s) must agree and inform the Director of Wildlife (DW) in writing of their intention and attach the minutes of the Village Assembly meeting. Applicants are also required to complete a WMA information data sheet provided by the Director of Wildlife. Sensitization of the local communities so as to make them aware of the importance/cost-benefits of conserving wildlife resources must be done after authorization from relevant authorities and without prejudice to existing administrative and cultural/traditional systems and in collaboration to several key stakeholders including wildlife authorities and local NGOs. When sensitizing the target communities various methods including village meetings/assemblies, audio-visual, drama, songs, posters, newsletters, etc. are used. Then the villagers are given time to digest, give feedback and take actions before making a decision to establish the WMA as well as get organized and prepare themselves to set up the necessary institutions, structures and instruments for managing the resources as clearly articulated in the Wildlife Management Areas regulation (2010). Further, the Village Government(s) is required to prepare a Land Use Plan (LUP) as stipulated in the  Village Land Act No. 4 (1999) section 11 and 13 and  the National Land Use Guidelines or their revised versions Chp.2.7) as well as being subjected to EIA. Further, the formed Community Based Organization (CBO) with the technical support from the wildlife authorities must prepare a General Management Plan (GMP) for their WMA. With the technical support from the wildlife authorities, the GMP will serve as a tool for rationalizing different land uses

and management of resources in the WMA in order to improve the environment and ensure economic benefits to the stakeholders. The WMA proposed by a CBO may be authorized and gazetted as WMA upon fulfillment of all the requirements.

### 5.2.3   MBOMIPA historical background

This Community Wildlife Management initiative (MBOMIPA) is among the first established Pilot WMAs which started about 20 years ago (1980s). A portion of Lunda Mkwambi Game Controlled Area (LMGCA) and part of village land were converted into a WMA managed by the Idodi and Pawaga villages. Initially, community wildlife management in the MBOMIPA was established through individual Village Natural Resources Committees (VNRC), with each of the 19 villages employing its own Village Game Scouts (VGS). Nevertheless, in May 2000, the villages resolved to form and register the MBOMIPA Association under the Societies Ordinance (Cap 337) (URT, 1954). The sole purpose was to manage the wildlife resources in their area. MBOMIPA became the first local, and conservation initiative of its kind in Tanzania. It currently comprises 21 villages of Idodi and Pawaga Divisions bordering Ruaha National Park (RUNAPA).

Between 1997 and 2002, the WMA was facilitated by Department for International Development (DFID) (U.K, then by World Wide Fund for Nature (WWF) and Wildlife Conservation Society (WCS) in 2004 took over the facilitation role to support CBO. MBOMIPA has a long history and good baseline data to allow tracing of the success story and/or assess any positive or negative contributions from the WMA approach to land use management. Currently they have built an office in Tungamalenga. **(Plate 5.1).**

### 5.2.4   MBOMIPA objectives

The MBOMIPA Association was established with the following objectives:-

- To create an effective and sustainable wildlife management system under

  Community authority and responsibility in the Pawaga - Idodi WMA; and

- To promote sustainable management to all natural and cultural resources as a

  means of enhancing local economic development and contributing to the

  reduction of poverty in the 21 member villages.



**Plate 5.1: Buildings of MBOMIPA head office at Tungamalenga village -**

**Iringa – (Source: Author, 2012)**

### 5.2.5  Types of utilization

Currently there is consumptive utilization of wild animals and limited non-consumptive utilization of resources. The use of resources in the WMA should conform to the written laws of the respective sectors e.g., wildlife, forest, fisheries etc. In case of wildlife we have, resident hunting (egulation 52), tourist hunting (Regulation 53), non-consumptive tourism (Regulation 61) such as cinematography & commercial photography and live animal capture (Regulation 56). According to the wildlife census information, a conservatively low hunting quota is proposed by the district authorities and approved by the wildlife division for communities, tourist and resident to be able to hunt. The hunting season is from July to December of each year. The game scouts from District or Wildlife Division authorities are the only persons authorized to do the wildlife shooting for the villages. The Authorized Association (AA) may also issue a permit and license  for utilization of the following biological resources for example, forest products (trees) (Regulation 58; Forest Act 2002), Bee resources (Regulation 59; Bee-keeping Act 2002); and Fisheries (Regulation 62; Fisheries Act, 1970).

### 5.2.6  Significance of the mbomipa wma

The study found that the significance of **MBOMIPA** WMA lies in its:-

Exceptional resource values, namely:-

High biological diversity, owing to its location as a transitional zone between the Zambezian (*miombo*) floristic region to the south and west and the Somali-Maasai (*Acacia-Commiphora*) floristic region to the northeast (White, 1983);

Dense concentration of a large variety of wildlife along the Great Ruaha River particularly during the dry season, including over 500 bird species and over 57 mammal species in and around the WMA**. (Appendix VI)** Charismatic species include greater kudu (*Tragelaphus strepciceros*) and lesser kudu (*Tragelaphus imberbis*), roan (*Hippotragus equinus*) and sable (*Hippotragus niger*) antelopes (this is one of the few landscapes in Africa harbouring all the four species). Others are lichtenstein's hartebeest (*Alcelaphus lichtensteinii*), wild dog (Lycaon *pictus*), cheetah (Acinonyx *jubatus*), lion (*Panthera leo*), ostrich (*Struthio camelus*), elephant (*Loxodonta africana*), buffalo (*Syncerus caffer*), hippopotamus (Hippopotamus *amphibius*) and nile crocodile (*Crocodylus niloticus*). The ease with which one can see large concentrations of elephant, hippo, buffalo and crocodile makes the area exceptionally important; and high diversity of landforms within and around the strict WMA, such as mountains, hills and rocky outcrops (e.g. Idelemule and Chambelasi caves, special water pools, waterfalls and Mahuninga hot springs), a mosaic vegetation, creating unparalleled opportunities for game viewing, camping and walking safaris. Wildlife population trend estimates for the Ruaha-Rungwa Ecosystem between 2002-2011 are shown in **(Table 5.2).** Where there is a blank, it means in that year that specie was not counted.

**Table 5.2: Wildlife Population Trend in the Ruaha-Rungwa Ecosystem, 2002-2011**

| Year of Surveyed area | 2002 36,071 km$^2$ | | 2006 43,601 km$^2$ | | 2009 43,641 km$^2$ | | 2011 43,763 km$^2$ | | 2009/2011 43,763 km$^2$ |
|---|---|---|---|---|---|---|---|---|---|
| Species name | Estimated | SE | Estimated | SE | Estimated | SE | Estimated | SE | d-test |
| Elephants | 25,170 | 1,200 | 35,430 | 4,183 | 34,664 | 4,178 | 21811 | 3,929.22 | -2.241006766 |
| Species with increasing population | | | | | | | | | |
| Duiker | | | | | 502 | 107 | 1125 | 266.18 | 2.171631029 |
| Giraffe | 4,875 | 691 | 5,123 | 890 | 3,762 | 546 | 7483 | 1,020.53 | 3.214937311 |
| Impala | 5,213 | 932 | 8,463 | 2,147 | 6,180 | 1,479 | 13,089 | 3,056.51 | 2.034727688 |
| Sable antelope | | | 310 | 166 | 637 | 173 | 2433 | 750.89 | 2.330768346 |

| Species with Stable population | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Baboon** | | | | | 471 | 236 | 626 | 318.14 | 0.391298054 |
| **Buffalo** | 64,228 | 12,760 | 35,326 | 12,464 | 9,749 | 2,827 | 17514 | 6,075.12 | 1.158838907 |
| **Eland** | 1,102 | 520 | 1,618 | 967 | 3,085 | 1,281 | 3199 | 1,181.09 | 0.065427247 |
| **Hartebeest** | 2191 | 284 | 1291 | 425 | 2514 | 567 | 2389 | 584.25 | - 0.153534 |
| **Lesser Kudu** | 298 | 141 | 401 | 304 | 445 | 141 | 810 | 237.51 | 1.321457999 |
| **Ostrich** | 155 | 92 | 18 | 14 | 336 | 179 | 600 | 215.88 | 0.941386329 |
| **Reedbuck** | | | | | 336 | 142 | 1663 | 782.73 | 1.668120066 |
| **Roan Antelope** | 1,037 | 594 | 244 | 147 | 1,475 | 515 | 1322 | 524.7 | 0.208103548 |
| **Waterbuck** | 180 | 135 | | | 393 | 331 | 1081 | 556.81 | 1.062114992 |
| **Zebra** | 8,623 | 1,205 | 19,463 | 6,278 | 7,964 | 1,529 | 10713 | 2,754.36 | 0.872617508 |

| Species with unclear population | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Greater Kudu** | 1,789 | 332 | 737 | 379 | 1,108 | 341 | | | |
| **Ground Hornbill** | | | | | 310 | 137 | | | |
| **Hippo** | 1,167 | 949 | 170 | 78 | 489 | 256 | | | |
| **Warthog** | 1,685 | 109 | 924 | 301 | | | 1764 | 367.99 | |
| **Elephant - Carcass** | | | | | | | 1099 | 212.25 | |

**(Source: TAWIRI, 2009)**

### 5.2.7   Location

MBOMIPA WMA is adjacent to protected areas and has significant ecological, socio-economic values to the local communities, district, national and international level. It is flanked by a series of very important ecosystems in the southern part of Tanzania (**Figure 5.2**); the Great Ruaha ecosystem, the Usangu catchment (wetlands), the Rungwa, Kizigo Muhesi Game Reserves, Lunda Mkwambi Game Controlled Area, Mpanga/Kipengele Game Reserve and also the Kitulo National Park and therefore it is an important bio-diversity dispersal or breeding area.
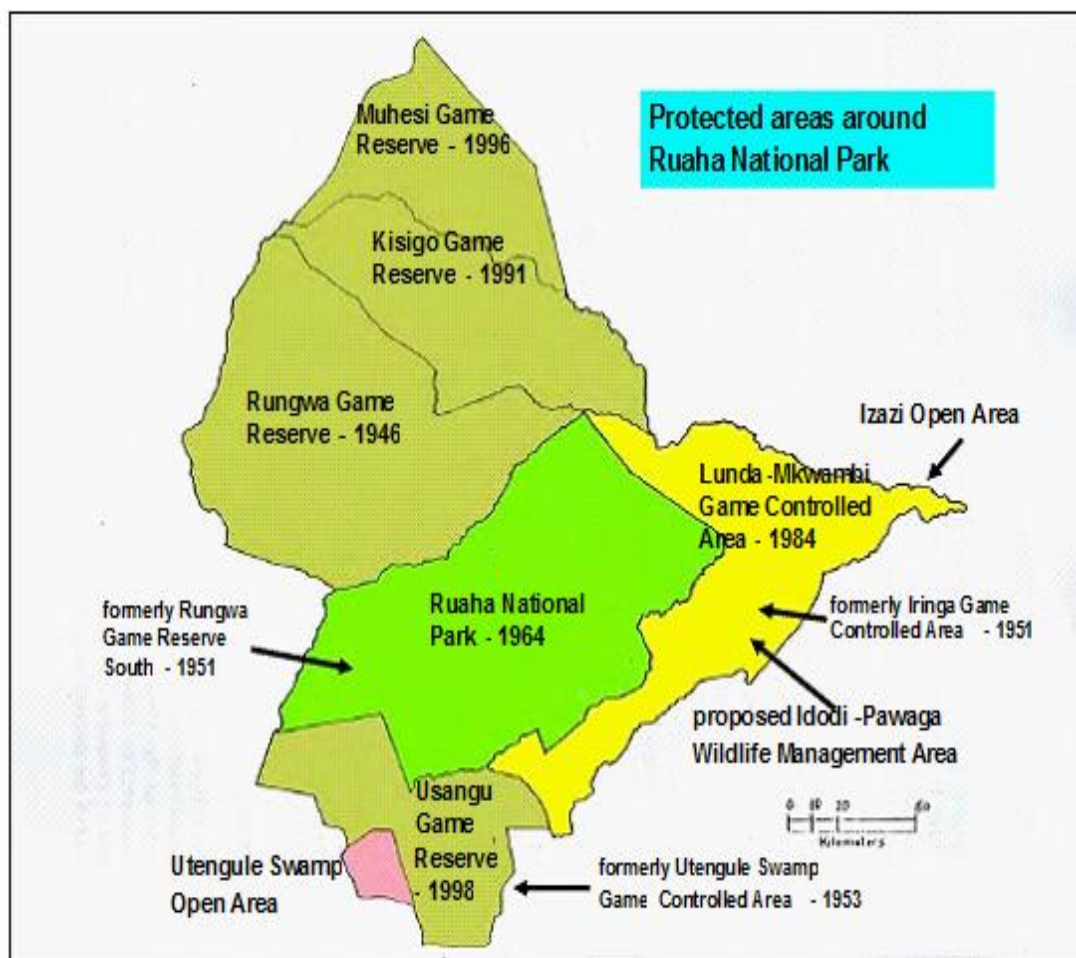


**Figure 5.2: WMA flanked with important protected areas (Source: Walsh, 2006)**

### 5.2.8    Ecological aspects

### 5.2.8.1    Environmental/wildlife issues

The majority of household interviewees (71.6%) acknowledged the importance of wildlife as inputs into other productive sector **(Table 5.3).** They urged the government to involve the local communities in conservation and management of the resources (11.2%) and also conservation education should be given to local communities (30.6%). They are aware that cutting trees haphazardly may in the long run cause drought (12.1%).

### 5.2.8.2    Land use plan and Wildlife Management Area

MBOMIPA prepared land use plan and Resource Use Management Zone Plan (RUMZP) that took into account their needs and the ecological needs of wildlife species. **Appendix VI** shows the (RUMZP) of WMA.

**Table 5.3: Importance of Wildlife as an input to other productive sectors in MBOMIPA - Iringa**

| Wildlife as inputs into other productive sectors | Frequency | Percent |
|---|---|---|
| Yes | 197 | 71.6 |
| No | 57 | 20.7 |
| I don't know | 21 | 7.7 |
| Total | 275 | 100.0 |

**5.2.8.3  Encroachment/habitat destruction**

During focus group discussions the local people indicated that soil conservation is a very important aspect that can help in survival of the rivers, which include adhering to resource use plan and avoid deforestation. While they gave some activities that may cause habitat destruction which include unplanned tree cutting and clearing forest for farming (30%), encroachment and poor irrigation system (10%), poor agricultural and livestock practices (50%) and unplanned charcoal making, timber cutting (10%). **(Table 5.4).** They also mentioned activities that may save the Ruaha River**.**

**Table 5.4: Activities done by communities in MBOMIPA that caused environmental destruction**

| Activity | Frequency | Percent |
|---|---|---|
| Tree cutting and clearing forest for farming | 3 | 30.0 |
| Encroachment by farmers and poor irrigation system | 1 | 10.0 |
| Agriculture and livestock keeping | 5 | 50.0 |
| charcoal making, timber, and agriculture | 1 | 10.0 |
| **Total** | **10** | **100.0** |

**5.2.8.4  Wildlife population and species composition & distribution**

Most interviewees (90%) explained that there are many animal species in the WMA and the most common ones are shown in **Plate 5.2.** Some of the observed species are rare and endangered including wild dogs, elephants, dikdik, kudu, ostrich and eland. The factors that cause the species to be endangered include illegal hunting and climate change.
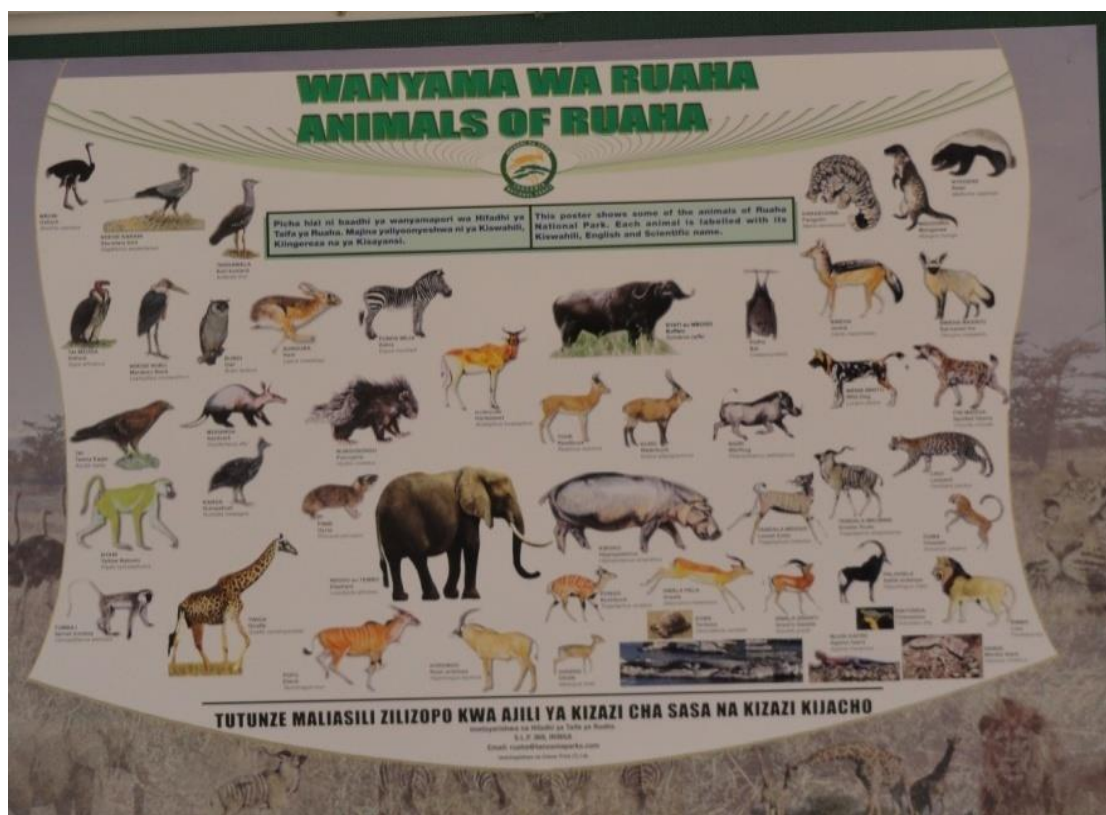


**Plate 5.2: Animal species that are commonly found at Ruaha Ecosystem. (Source: TANAPA, 2012)**

It was difficult for respondent to know the population sizes or numbers of each species but on the overall all respondents in the focus group discussion said the number of various animal species have increased in WMA. Other respondents 37.5%

explained that large numbers of animals are found in the forest habitat and animals like baboon and eland are found on the mountains.

### 5.2.8.5    Animal movements and migrations

It was found that migration behavior do occur in some animal species such as elephants (62.5% of respondents), zebra, wild dogs, lesser and greater kudu (12.5%). Migrations by most species are related to seasonal fluctuation, breeding behavior and sources of food. **(Table 5.5).**

**Table 5.5: Migratory Seasons as indicated by local communities at MBOMIPA - Iringa**

| Animal species migrate | Frequency | Percent |
|---|---|---|
| **During dry season (kiangazi)** | 5 | 62.5 |
| **June- July** | 1 | 12.5 |
| **April- June** | 2 | 25.0 |
| **Total** | **8** | **100.0** |

### 5.2.8.6    Dominant plant species

The vegetation cover varies greatly with dominant plant species being Mikungugu *(Terminalia catappa*) (42%), Mibuyu *(Adansonia digitata)* (28%), Milama (*Combretum* spp.) (14.3%) and Mihangu (14.2%). The remaining 15.7% are other species. The WMA also contains some threatened plant species such as Mikuyu (*Ficus sycomorus*), Mikungungu, Miyota, Mikochi *(hyphaene compressa),* Mninga

*(Ptrocarpus Spp.)* and Ilapula. Other common species include *Acacia* spp.and *Commiphora* spp. **Appendix VII, Plate 5.3.**



**Plate 5.3: Types of vegetation (Acacia Spp.) and some rice field in the study area.**

**(Source : Author, 2011)**

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**Table 5.6: Dominant plant species found in the study area**

| Dominant species | Frequency | Percent |
|---|---|---|
| **Mikungugu (Terminalia catappa)** | 3 | 42.9 |
| **Mibuyu ( Adansonia digitata)** | 2 | 28.6 |
| **Milama (Combretum Species)** | 1 | 14.3 |
| Mihangu | 1 | 14.2 |
| **Total** | **7** | **100.0** |

### 5.2.8.7    Natural resource use patterns

The local forest is depended upon by the local people for wood fuel (70%), charcoal (10%), for building materials (20%). (**Table 5.7**). (30.5%) of the people are practicing beekeeping and only 7% do fishing and very few do artisanal mining. Wildlife is recognized as an important natural resource in both divisions because of the activities of MBOMIPA WMA. Bush meat is one of the natural resources used by the locals.

 A few respondents (10.9%) agreed that they buy bush meat. Other wildlife utilization include cultural and commercial/business activities such as camping.

### 5.2.8.8       Access mechanisms to resources

In accordance with the tradition of different ethnic groups, resident in the two divisions believed that men control all resources, including land and income generated in a household. For protected areas natural resources can be accessed with the permission from the respective authorities. For example, in Selous Game Reserve

traditional rituals are allowed but under the supervision of game scouts who will escort them to their ritual places.

**Table 5.7: Natural resource use patterns by local communities in MBOMIPA WMA – Iringa.**

| Natural Resource Use Patterns | Frequency | Percentage |
|---|---|---|
| Tree cutting and clearing forest for fuelwood | 7 | 70.0 |
| Tree cutting and clearing forest for charcoal | 1 | 10.0 |
| Tree cutting and clearing forest for building | 2 | 20.0 |
| **Total** | **10** | **100.0** |

### 5.2.8.9   Land cover changes

The positive and negative land use patterns has influence on the type of vegetation in the study areas as shown in **Table 5.8, Figure 5.4 & Figure 5.5**. In 1995, the land was mostly covered by bushland 534,236 ha, but in 2010 the bushland were reduced to 401,235 ha.  Scattered cultivation was 393,265 ha in 1995 and in 2010 it was 372,318 ha. Woodland was 361,075 ha in 1995 which has been reduced to 91,217 ha in 2010. Bare soils was only 590 ha in 1995 but in 2010 there was a significant change to 52,852 ha.

**Table 5.8: Land cover changes in study area from 1995 to 2010**

| Land Use/ Cover Types | 1995 | 2010 | % Cover change Ha) | Percentage change |
|---|---|---|---|---|
| | | | IN HECTARES | |
| Bare soils | 590 | 52,852 | (52,262.08) | 3 |
| Bushland | 534,236 | 401,235 | 133,000.74 | 14 |
| Cultivated Land with Scattered Settlements | 26,751 | 351,453 | (324,702.15) | 21 |
| Forest | 7,090 | 35,219 | (28,128.16) | 2 |
| Grassland | 169,601 | 295,159 | (125,558.22) | 16 |
| Inundated Grassland | 107,445 | 43,040 | 64,404.29 | 2 |
| Inundated Woodland | 43,702 | 949 | 42,752.54 | 0 |
| Scattered Cultivation | 393,265 | 372,318 | 20,947.23 | 18 |
| Settlements | 798 | 1,044 | (245.71) | 0 |
| Water | 7,354 | 7,420 | (66.68) | 0 |
| Woodland | 361,075 | 91,217 | 269,858.19 | 2 |
| Total | 1,651,907 | 1,651,907 | | 22 |

**(Source: Produced by Institute of Resource Assessment, 2009)**
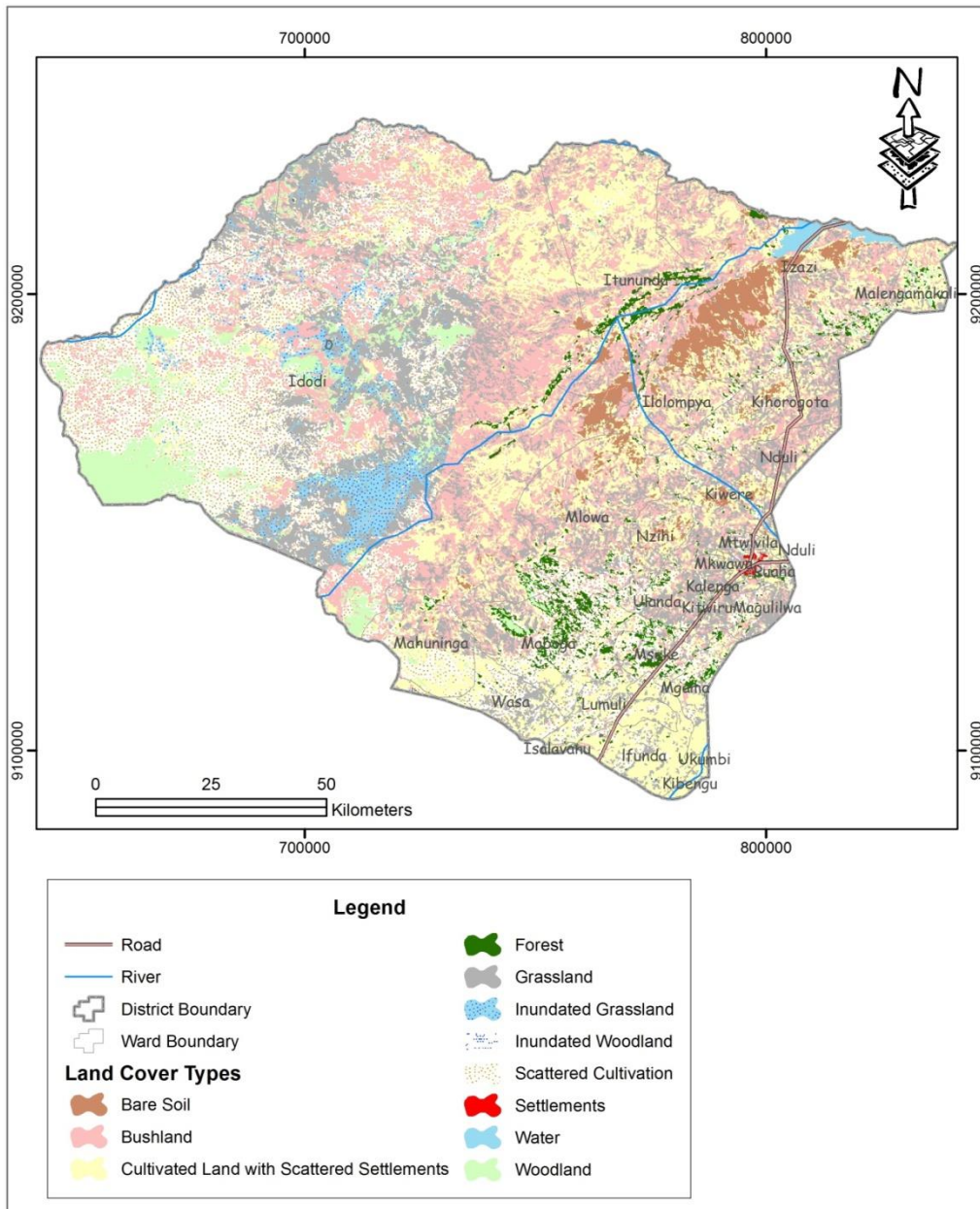
**Figure 5.4: Land cover in Iringa rural district - 1995. (Source: IRA, 2012)**
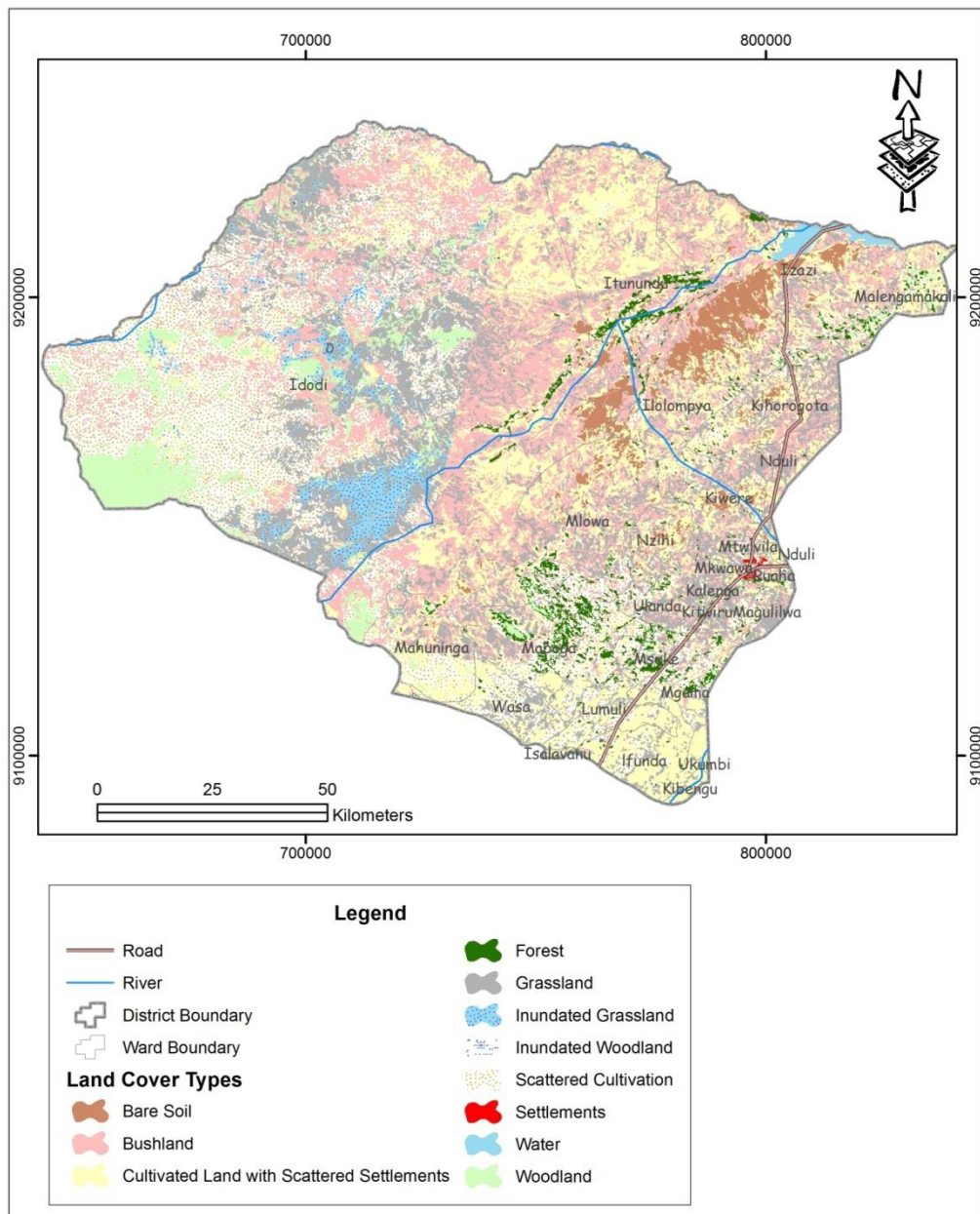
**Figure 5.5: Land cover in Iringa rural district - 2010. (Source: IRA, 2012)**

## 5.3    Awareness and perceptions

### 5.3.1    Conservation awareness, people's perceptions and benefit sharing

Only1.1% (n= 305) of the respondents said benefit sharing is paramount to them, while some 44.4% of the respondents agreed that the relationship between WMA management and local community is good, others (26.6%) said it is relatively good and only 12.6% said the relationship is very good. **(Table 5.9).** During the study, most of the respondents (72.1%) said that they do participate in wildlife conservation, while (22.5%) said that they do not participate and (5.4%) of respondents said they don't know. **(Table 5.10),** Some respondents (55.8%) said they do not participate in the management of the reserve and only (30%) of respondents said they often participate . They also said they are not participating in decision making (65.8%) while (29.3%) do often participate through meetings. However, (91%) of respondents do participate in providing information on poaching and some in tree planting and problem animal control. Most local communities (70.6%) said they were consulted before the WMA started and (26%) said they did not know anything.

The study revealed that (77.2%) there has been a change in attitudes and perceptions among the communities towards the National Park and its wildlife since the establishment of the WMA in the area, while some respondents (14.8%) reported that there has been no any change at all in people's perception. Further (73.9%) of the respondents said they are aware that WMA is managed by villages. and that (30.1%) of the respondents said they often integrate indigenous wildlife resource management system in conservation (IWRMS). However, (64.5%) of the households restated that there is no integration of (IWRMS) in wildlife conservation. **(Table 5.11).**

**Table 5.9: Relationship between village communities and MBOMIPA WMA management in Iringa region,**

| How do you rate your relationship with management of WMA | Frequency | Percentage |
|---|---|---|
| **Very good** | 37 | 12.6 |
| **Good** | 130 | 44.4 |
| **Relatively good** | 78 | 26.6 |
| **Bad** | 10 | 3.4 |
| **I don't know** | 38 | 13.0 |
| **Total** | 293 | 100.0 |

**(Source: Author, 2012)**

Table 5.10: Local people's participation in wildlife conservation in MBOMIPA

WMA – Iringa region.

| Idodi/Pawaga people's participation in WD conservation | Frequency | Percent |
|---|---|---|
| Yes | 215 | 72.1 |
| No | 67 | 22.5 |
| I don't know | 16 | 5.4 |
| Total | 298 | 100.0 |
| Participation in the management of the reserve | Frequency | Percentage |
| Often | 80 | 30.0 |
| Not often | 38 | 14.2 |
| Not at all | 149 | 55.8 |
| Total | 267 | 100.0 |
| Idodi/ Pawaga communities were consulted before the designation of the WMA | Frequency | Percentage |
| Yes | 209 | 70.6 |
| No | 10 | 3.4 |
| I don't know | 77 | 26.0 |
| Total | 296 | 100.0 |

(Source:  Author, 2012)

**Table 5.11: Integration of indigenous knowledge into wildlife conservation management system in MBOMIPA WMA Iringa region.**

| Integration of indigenous wildlife resource management system in conservation | Frequency | Percent |
|---|---|---|
| Often | 28 | 30.1 |
| Not often | 5 | 5.4 |
| Not at all | 60 | 64.5 |
| **Total** | **93** | **100.0** |

**(Source: Author, 2012)**



**Plate 5.4: Information used by local leaders to create awareness to Local communities in MBOMIPA. (Source: Kitisi village Office, 2012)**

### 5.4    Human wildlife interface in MBOMIPA WMA

### 5.4.1    Nature and extent of conflicts in the wma

Conflicts are a result of stakeholders' dynamic rights and interests, which include aspects of legal and nature of identity with respect to access, use, ownership and management of available resources Foley, (1991). At micro level conflicts manifests themselves in various ways including; land or resource ownership, boundary disputes, loss of grazing or farming land, eviction of indigenous people and illegal exploitation of resources. But at macro level they involve conflicting mandates of government agencies and other institutions in natural resources management.

The Idodi/Pawaga communities (15.3%) felt that they don't see any positive impact of WMA to the local communities and that law enforcement by rangers has led to hostility and resentment towards wildlife. But (76.3%) of the respondents agreed that there is significant positive impact **Table 5.12.** They said that the indirect benefit is for the government earning foreign exchange from tourist. A number of people said they also benefitted through illegal activities particularly fishing and hunting.

**Table 5.12: Response of positive socio-economic impacts of WMA to local communities**

| Are there any socioeconomic benefits you or the Idodi/Pawaga community get from wildlife conserved within and outside PAs | Frequency | Percent |
|---|---|---|
| Yes | 229 | 76.3 |
| No | 46 | 15.3 |
| I dont know | 24 | 8.0 |
| Total | 299 | 99.7 |

**(Source: Author, 2012)**

The majority of respondents in this study preferred to have regulated and controlled access to wildlife resources in the reserve/WMA (92.8%), while only 4% were after compensation for wildlife damage and injury and others said we need to integrate indigenous resource management knowledge in wildlife conservation. **Table 5.13** Some respondents (22.2%) from the study area stated that WMA has led to accelerated human/wildlife conflicts and 27.8% said have led to better conservation of wildlife resources. Most of the people explained that WMA management rarely met with local communities (38.7%) to discuss issues and they said it is important to meet and discuss to enhance awareness about wildlife conservation (47.3%). Lack of incentive or tangible benefits is one of the reasons which local communities feel that WMA is not of value to them.

**Table 5.13: Mitigation measures that can be used to minimize the costs of human-wildlife conflicts in MBOMIPA WMA – Iringa region.**

| Minimizing the costs | Frequency | Percent |
|---|---|---|
| Regulated and controlled access to Wildlife resources in the reserve/WMA | 258 | 92.8 |
| Compensation for WD damages/death/injury | 11 | 4.0 |
| Benefits revenue sharing | 3 | 1.1 |
| Integration of indigenous resource management systems in the wild life conservations. | 6 | 2.2 |
| **Total** | **278** | **100.0** |

### 5.4.2 Human - wildlife conflicts

Human - wildlife conflicts related activities such as poaching continue to be rampant in Tanzania. Currently, Tanzania is experiencing two types of poaching namely; subsistence and commercial poaching **Plate 5.5.**

Bush/game meat are consumed, often illegally or traded as meat and/or other products such as skins, ivory, teeth, etc.

**Plate 5.5: Bush meat confiscated from poachers in Tanzania**

**(Source: Wildlife Division, 2009).**

Commercial poaching is mainly for acquiring trophies of high value and targets species include elephants (for their ivory) and rhinos (for their horns). Due to high prices of these trophies in the black market, poachers get high profit and therefore, have created syndicates in and outside the country in order to sustain this illegal trade (TRAFFIC, 2006).

The price of elephant tusk per kilogram has increased from USD 100 in 1990 to USD 1,500 in 2012 Wildlife Division (2012). As for the rhino, the black market in the Middle East and Asia can offer as higher as USD 6,000 per kilogram of rhino horn (TRAFFIC, 2006). In the past three years (2010 – 2012), there has been a steady increase in elephant poaching of which 1,008 were poached as shown in **Table 5.14.** Further there is also subsistence poaching which is basically "for the pot". Here, the poor local people poach wildlife as a source of protein. However, due to poverty and increasing demand in urban area, they could sell the surplus to cater for other basic needs (Wildlife Division, 2012). Under the current economic crisis, this type of

poaching is no longer for the pot, but has been commercialized affecting a wide range of wildlife from small to large mammals **(Plate 5.5 & Table 5.15).**

**Table 5.14: Poached Elephants in Tanzania from 2010 to 2012**

| | Year | No. of Carcass |
|---|---|---|
| 1 | 2010 | 259 |
| 2 | 2011 | 276 |
| 3 | 2012 | 473 |
| | **Total** | **1008** |

**(Source: Wildlife Division, 2012)**

### 5.4.3 Human – human conflicts in the study area

### 5.4.3.1 Pastoral – ethnic conflicts

The indigenous ethnic groups who live in the study area now have fewer livestock than in the past, but other immigrant groups such as the Maasai, Barbaig and Sukuma have substantial livestock numbers. It is estimated that depending on the season and movement of pastoralists in 2003, there were between 40,000 and 60,000 cattle in the area Mung'ong'o et al. (2003).

This is one source of potential conflicts in resource use i.e. scarcity of land and water but also cattle raiding. Some people report that the numbers have been greatly

reduced, partly because of the drought which has killed them off, and partly because many animals have been sold in times of hunger to buy food.

**Table 5.15: Bush meat poached in Tanzania from 2010 to 2012**

| S/N | Species | YEAR / Weights in Kgs (meat) | | |
|-----|---------|------|------|------|
| | | 2010 | 2011 | 2012 |
| 1 | Giraffe | 14,000 | 0 | 323 |
| 2 | Zebra | 2,950 | 5,890 | 1,212 |
| 3 | Buffalo | 3,800 | 4,514 | 1,634 |
| 4 | Wildebeest | 3,225 | 5,010 | 110 |
| 5 | Eland | 1650 | 3250 | 1,812 |
| 6 | Elephant | 0 | 1260 | 8,880 |
| 7 | Hippopotamus | 1,650 | 2,050 | 8,000 |
| 8 | Impala | 1,602 | 341 | 135 |
| 9 | Topi | 100 | 0 | 0 |
| 10 | Puku | 950 | 0 | 0 |
| 11 | Hartebeest | 174 | 785 | 120 |
| | **Total** | **30,101** | **23,100** | **22,226** |

**(Source: Wildlife Division, 2012)**
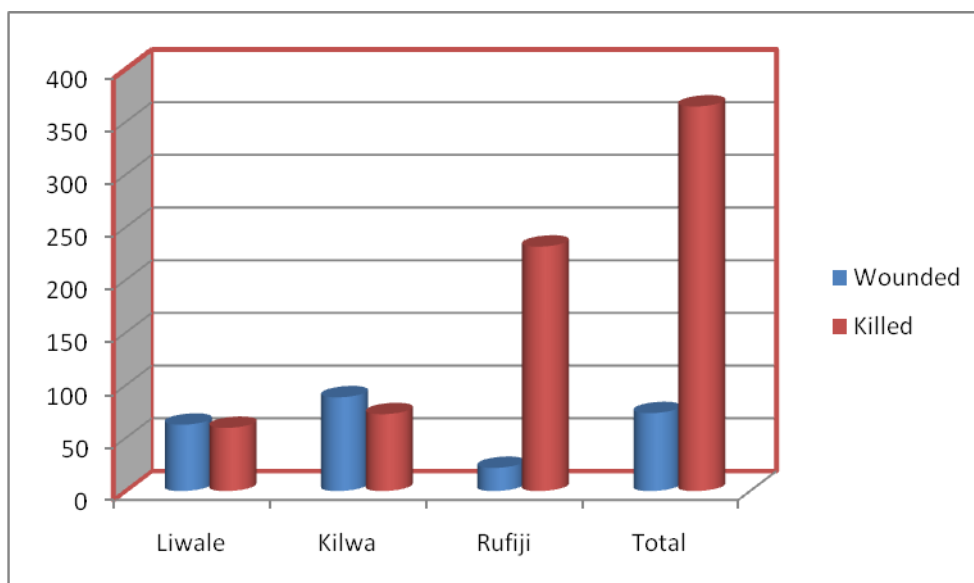
**Figure 5.6: People killed or injured in Liwale, Kilwa and Rufiji Districts in the period between 1975 and 1995. (Source: Kidegesho 1995)**

### 5.4.3.2 Pastoral – wildlife conflicts

Shortage of grazing land is a problem facing livestock keepers in the study area, especially the nomadic Maasai and Barbaig who have a lot of cattle. Pastoralists have a tendency of grazing in the WMA due to availability of pasture and water. This creates conflicts in resource use with wildlife as they are limited. Further the practice often; leads to diseases transmission between wildlife and domestic animals and even people. According to the survey done about (60%) of respondents, the indeginous ethnic tribes said pastureland is not a major problem to them while (40%) said there is a problem. Livestock usually graze near the residential area of the village land and they thus graze onto shambas during the dry season therefore creating conflicts.

(10%) of respondents said that there are diseases that can be transmitted from the livestock, wild animals to human beings. These include the rabies which is common

in domesticated dogs and can also be transmitted in wild dogs and humans and therefore it is one of the potential conflicts.

**Table 5.16: Human activities that cause habitat disturbances in the MBOMIPA WMA, Iringa region,**

| Human activities that cause habitat disturbances in the WMA | Frequency | Percent |
|---|---|---|
| Tree cutting and clearing forest for farming | 3 | 30.0 |
| Encroachment by farmers and poor irrigation system | 1 | 10.0 |
| livestock keeping | 1 | 10.0 |
| Agriculture | 4 | 40.0 |
| Charcoal making, timber, and agriculture | 1 | 10.0 |
| **Total** | **10** | **100.0** |

### 5.4.3.3   Conflict between the park/wma and humans

In the study area communities were found to carry out subsistence poaching mainly by trapping smaller animals such as rodents, birds, antelope, porcupines, bushpigs and warthogs for food, fish and honey. At the same time there is also commercial poaching done for large profits gained by the illegal sale or trade of animal parts, meat etc. According to the local residents the village called Kipera which is not in the WMA is the centre for poaching. Poaching records for the years 1989 – 1993 show that 64% of poachers apprehended originated from the two divisions **(Figure 5.7)**.

Despite the constraints that the village game scouts are having in terms of inadequate financial capacity and working facilities, they have managed in collaboration with NPs and anti-poaching unit staff in Iringa to apprehend poachers and exhibits as shown in **(Table 5.19).** and poaching reduced from 122 poachers in 1989 to 60 in

1993 **(Figure 5.8)** and from 351 poachers in 2000 to 105 in 2010, Wildlife Division (1995). According to a study done in 1999, there was a ranger force of 72 working in an area of 10,200 km$^2$, each ranger in Ruaha is supposed to patrol on the average 142 km2. Ruaha NP is underfunded spending about 72.4 US\$ km$^{2/}$ year. The adjacent Rungwa/Kizigo/Muhesi GRs spend only 2.5 US\$ km$^2$ /year for all expenses including development and recurrent expenditure.
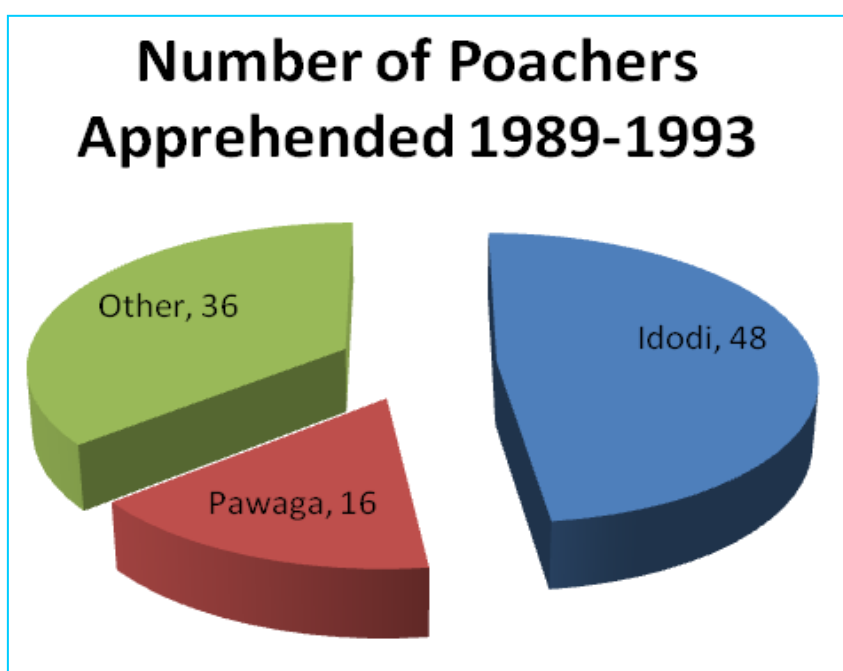


**Figure 5.7: Poachers apprehended in Idodi and Pawaga Division 1989 – 1993. (Source: TANAPA, 2012).**
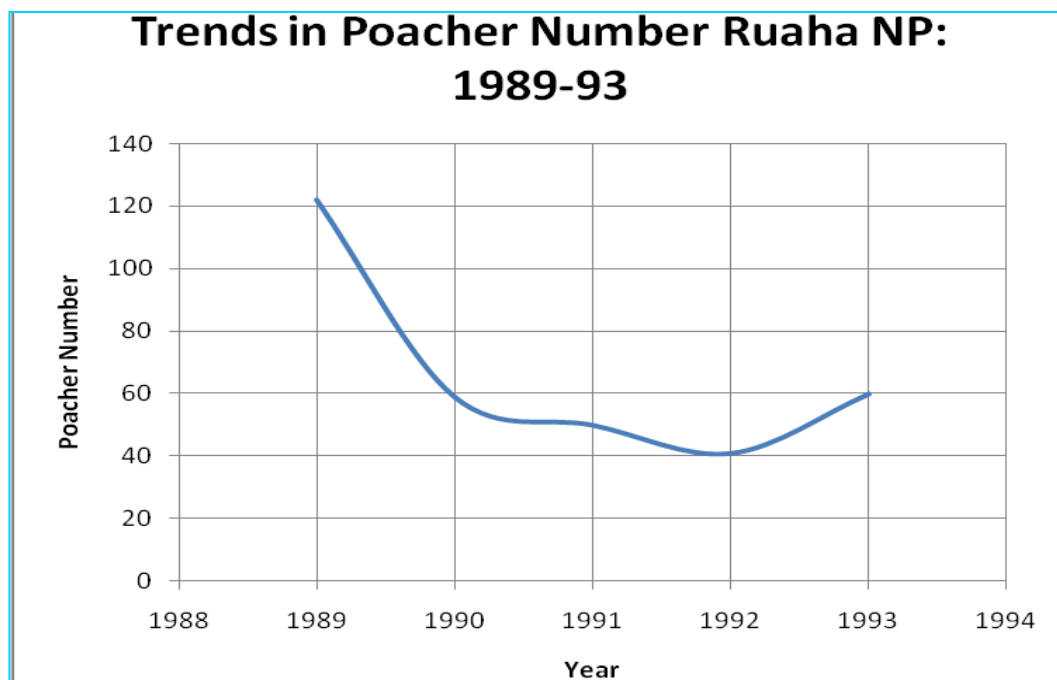
**Figure 5.8: The numbers of poachers caught in RNP in 1989 to 1993.**

**(Source TANAPA, 2012).**

### 5.4.4 Forests and water resources

Illegal harvesting of forest products in the WMA is one of the problems indicated by the village leaders especially in the surrounding communities. This threatens the ecological integrity of the area because animal numbers will decline or go extinct due habitat isolation and reduction in plant diversity. Study results show that tobacco farming which is taking place in some villages adjacent to the WMA tend to use a lot of chemical fertilizers and pesticides resulting into water pollution since most of the pesticides are poisonous and may have long term effects to wildlife if discharged to the Rivers Little and Great Ruaha. Tree cutting and Agricultural activities are a common practice in the study area. This threatens the intergrity of the habitat and wild animals. In the survey done, 60% of the respondents agreed that the local

communities are cutting trees mostly for building purposes,fuelwood and charcoal burning. (30%) said overgrazing and (10%) cultivation near the river to the catchment area are activities that are affecting the rivers (**Table 5.17).**

**Table 5.17: Activities done by local communities that threatens the rivers' survival (Ruaha) in Iringa region.**

| Activities that threatens the rivers' survival (Ruaha) | Frequency | Percent |
|---|---|---|
| Tree cutting and cultivation near river source | 6 | 60.0 |
| Over grazing near to the river source | 1 | 10.0 |
| cultivation near to the catchment area | 3 | 30.0 |
| **Total** | **10** | **100.0** |

### 5.4.5    Crop raiding and livestock depredation

MBOMIPA WMA in Idodi and Pawaga Divisions have a human population that encroached into the RNP land. Therefore their activities lead to frequent human wildlife conflicts such as crop raiding, livestock depredation **Table 5.18**, **Figure 5.10,** human attacks and injury.

Crops heavily raided include maize, rice and sweet potatoes, groundnuts, pumpkins. The main species cited as crop raiders include elephants, monkeys and bushpigs. In this study the majority of respondents (60%) said sometimes the whole farmlands were raided while some (40%) said it is only two (2) acres**.**

**Table 5.18: Livestock depredation in the study area as indicated by local communities.**

| What hindrances you encounter in Livestock keeping | Frequency | Percent |
|---|---|---|
| Predation by wildlife | 1 | 10.0 |
| Theft | 2 | 20.0 |
| Diseases | 3 | 30.0 |
| Total | 6 | 60.0 |

## 5.4.6 Human attacks by wildlife

In this study 70% of the respondents agreed that the human – wildlife attack is a serious problem while 30% say it isn't a problem. In this area the problem animals include leopard, elephants, lion, hyena and python. Information from that ecosystem show that between 1975 – 1995, a total of about 350 people were killed and over 50 wounded by wild animals in three districts (Liwale, Kilwa and Rufiji) in Tanzania.

**Table 5.19: Successess of village scout patrol in the study area**

| Activity | Success 1996 - 2000 | Success 2001 -2005 | Success 2006 – 2010 |
|---|---|---|---|
| **Arresting poachers** | 351 | 130 | 105 |
| **Recovering guns used in poaching** | 97 muzzle loaders, 5 shotgun, 1 Rifle | 99 muzzle loaders, 5 shotgun, 1 Rifle | 26 muzzle loaders, 2 shotgun, 2 Rifle |
| **Recovering elephant ivory** | 32 tusks recovered | 45 tusks recovered | 86 tusks recovered |
| **Recovering timber** | 559 timber pieces | 292 timber pieces | NA |
| **Recovering other trophies** | 4 Leopard skins recovered<br>1 Lion skin recovered<br>1 Cerval cat skin recovered<br>3 Greater kudu skins recovered<br>4 Pygmy antelope skins recovered<br>3 Otter skins recovered<br>1 Warthog skin recovered<br>1 Bush pig skin recovered | 1 Leopard skins recovered<br>1 Lion skin recovered<br>1 Cerval cat skin recovered<br>1 Pygmy antelope skin recovered<br>1 Bushbuck skin recovered<br>1 Nile monitor skin recovered<br>1 Otter skin recovered | 2 Leopard skins recovered<br>1 Wild cat skin recovered |
| **Wildlife related cases** | **54** | **51** | **52** |

**(Source: Anti – poaching Unit – Iringa, 2011).**
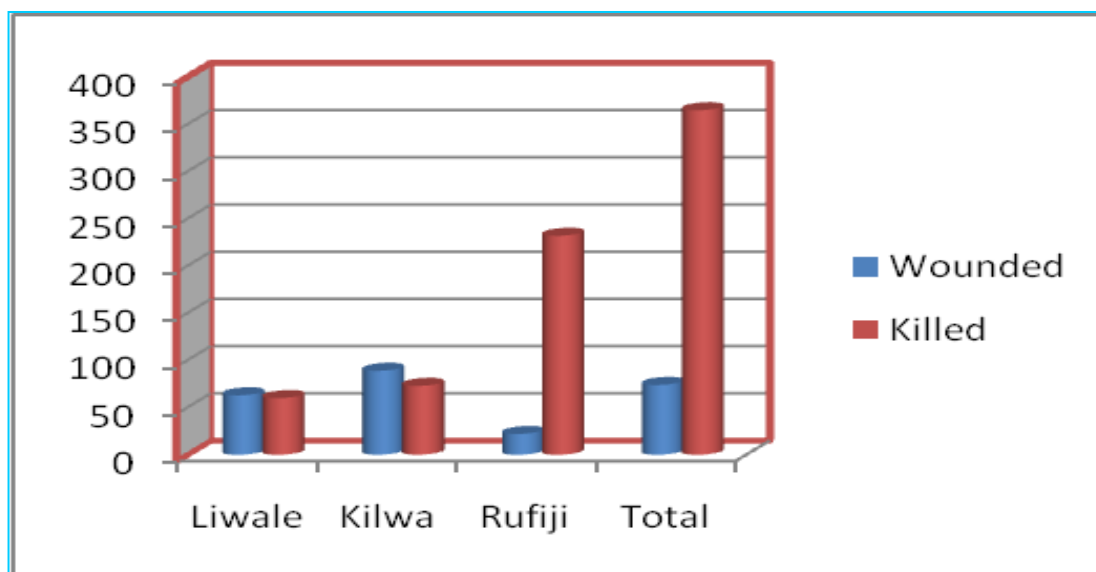
**Figure 5.9: Humans killed and wounded by wildlife (Source: Kidegesho, 1995).**
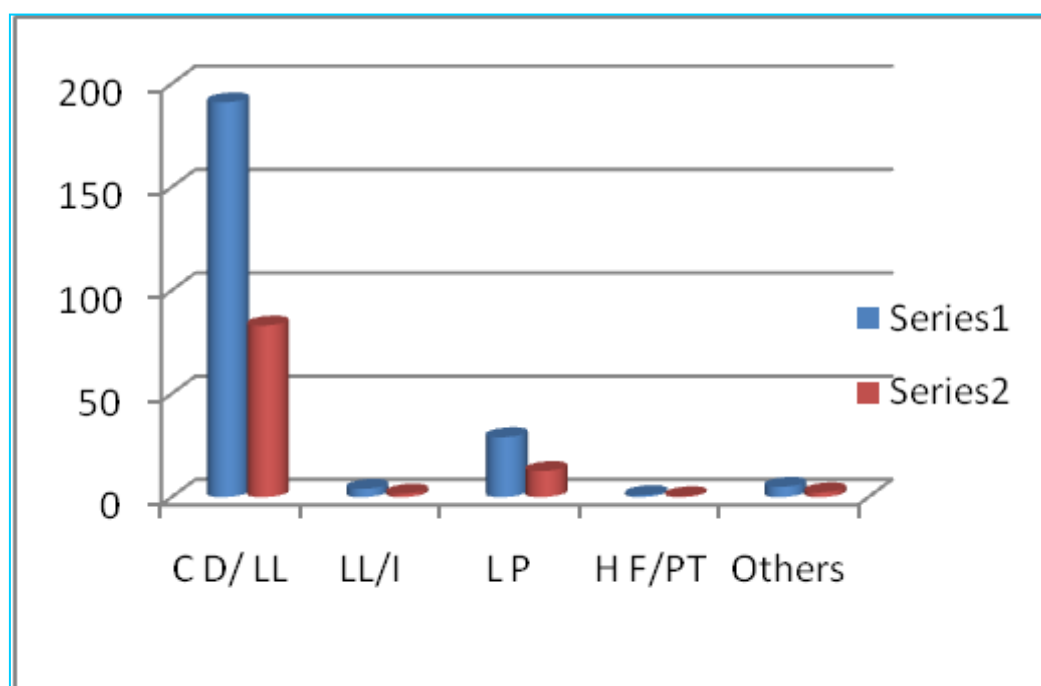


**Figure 5.10: Livestock killed by wild animals:**

**CD –crop damage, LL= loss of human life, I= injuries, HF/PT = heavy fine/penalities for trespassing, LP= livestock predation.**

**(Source: Kidegesho, 1995)**

### 5.4.7 Conflicts resolution strategies

The community strategies to prevent conflicts vary according to different groups of interviewees. These include regulated and controlled access to natural resources in the reserve and WMA **(Table 5.19),** compensation programmes **(Appendix VIII)** for death, injuries and livestock depredation and crop damage. The government needs to act immediately when the problem occurs. They also said about the need to share more benefits from wildlife utilization. Integration of indigenous knowledge and systems are among the issues that need to be taken into consideration during planning.

**Table 5.19: Minimizing the costs. Source interviews 2011.**

| Minimizing the costs | Frequency | Percent |
|---|---|---|
| Regulated and controlled access to Wildlife resources in the reserve/WMA | 258 | 92.8 |
| Compensation for WD damages/death/injury | 11 | 4.0 |
| Benefits revenue sharing | 3 | 1.1 |
| Integration of indigenous resource management systems in the wild life conservations. | 6 | 2.2 |
| **Total** | 278 | 100.0 |

**5.5    The contribution of MBOMIPA WMA to socio-economic development and institutional capacity building**

**5.5.1    Household characteristics**

**5.5.1.1    Population trend**

The Population trend in the study villages shows an increase of 26.06% from 23,656 in 2002 (census data) to 26,265 in 2009 and 34.12% (27,068) in 2012 (projections data) **(Table 5.20).** Likewise the household number in study villages has increased from 4,607 in 2002 to 6,118 in 2009. All tables and plates were obtained during field from year 2010 to 2012.

**5.5.1.2    Gender and households composition**

The results from this study show that in 2009, most (77.0%) of the respondent households were headed by males and only 23.0% of households by females, despite the fact that males population is slightly low compared to women in most villages and in all the years **(Table 5.21.).** However, available secondary data at the National Bureau of Statistics (NBS) show that the trends of the female headed household have been on the increase between 1991 and 2001. The data for 2002 to 2009 is yet to be released by the NBS.

| Table 5.20: Population Change in Communities of Idodi-Pawaga divisions | | | | | |
|---|---|---|---|---|---|
| | **Iringa Rural** | **Year** | | | |
| | | | 2002 | 2009 | 2012 |
| | | Male | 118,639 | 133,556 | 138,810 |
| | | Female | 125,105 | 136,158 | 139,122 |
| | | Total | 243,744 | 269,714 | 277,932 |
| **1.** | Kipera | Male | 1,000 | 1,128 | 1,159 |
| | | Female | 1,172 | 1,266 | 1,288 |
| | | Total | 2,172 | 2,394 | 2,447 |
| **2.** | Igangidungu | Male | 1275 | 1445 | 1501 |
| | | Female | 1401 | 1508 | 1510 |
| | | Total | 2676 | 2953 | 3011 |
| **3.** | Makifu | | | | |
| | | Male | 569 | 644 | 674 |
| | | Female | 555 | 606 | 613 |
| | | Total | 1,124 | 1,250 | 1,287 |
| | | | | | |
| **4.** | Idodi | Male | 1,995 | 2,277 | 2,378 |
| | | Female | 2,019 | 2,221 | 2,273 |
| | | Total | 4,014 | 4,498 | 4,651 |
| | | | | | |
| **5.** | Tungamalenga | Male | 1,122 | 1,271 | 1,330 |
| | | | | | |

| TABLE 5.20 CONTINUES | | | | | |
|---|---|---|---|---|---|
| | | Female | 1,205 | 1,316 | 1,340 |
| | | Total | 2,327 | 2,587 | 2,670 |
| **6.** | Nyamahana | Male | 862 | 989 | 1030 |
| | | Female | 828 | 900 | 934 |
| | | Total | 1690 | 1889 | 1964 |
| **7.** | Isele | Male | 1,293 | 1,444 | 1,500 |
| | | Female | 1,356 | 1,482 | 1,514 |
| | | Total | 2,649 | 2,926 | 3,014 |
| **8.** | Kinyika | Male | 876 | 989 | 1,034 |
| | | Female | 935 | 1,021 | 1,044 |
| | | Total | 1,811 | 2,010 | 2,078 |
| **9.** | Itunundu | | | | |
| | | Male | 1,345 | 1,521 | 1,587 |
| | | Female | 1,441 | 1,569 | 1,604 |
| | | Total | 2,786 | 3,090 | 3,191 |
| **10.** | Luganga | Male | 1,204 | 1,362 | 1,421 |
| | | Female | 1,203 | 1,306 | 1,334 |
| | | Total | 2,407 | 2,668 | 2,755 |
| | | | 23,656 | 26,265 | 27,068 |

**Table 5.21: Gender and households composition in the study area**

| Population by gender in the study area | | | |
|---|---|---|---|
| Variable | 2002 | 2009 | 2012 |
| Male | 11,541 | 13,070 | 13,614 |
| Female | 12,115 | 13,195 | 13,454 |
| Total | 23,656 | 26,265 | 27,068 |

### 5.5.1.3  Household size, composition

On average the household size in the study area range between 3 and 5 people, with an average of 4 people per household **(Table 5.22)** compared to 1991 where the average size was 5.9. The age breakdown in a five person's household in 2009 is 3 children (aged between 0-17 years), 2 adults (aged between18-59).

**Table 5.22: Number of persons per household in MBOMIPA WMA, Iringa Region**

| No of persons | Frequency | Percentages |
|---|---|---|
| 2 | 46 | 15.5 |
| 3 | 50 | 16.9 |
| 4 | 46 | 15.5 |
| 5 | 37 | 12.5 |
| >5 | 41 | 13.8 |
| Total | 296 | 100 |

**(Source: Author, 2012)**

**5.5.1.4 Dependence ratios**

It was found that in the WMA most households (34.7%) are poor, a few middle class (13.5%) and very few who are well off (9.4%). Most of the youths (18-35 years of age) (83.3%) are not gainfully employed and mainly help the parents with farm work and depend on the family income for a living **(Table 5.23).**

**Table 5.23 Households dependence ratios in MBOMIPA WMA, Iringa Region**

| Employed youths | Frequency | Percent |
|-----------------|-----------|---------|
| 1 | 5 | 4.9 |
| 2 | 5 | 4.9 |
| 3 | 4 | 3.9 |
| 4 | 3 | 2.9 |
| **Dependents** | 85 | 83.3 |
| **Total** | **102** | **100.0** |

**5.5.1.5      Migration and settlement patterns**

Migration here refers to a permanent change of residence, which is an active population process. Migration can either be emigration or immigration. This study found that people keep moving from different regions such as Dodoma, Njombe, and Iringa town to the study area. However, some move out of the study area to settle in more lucrative rice farming area such as Madibira-in Mbeya. **Table 5.24.**

**Table 5.24: Reasons for people migrating into MBOMIPA WMA migrating**

| Why did you migrate to this place | Frequency | Percent |
|---|---|---|
| Drought | 9 | 10.0 |
| Raiding and land acqusition | 5 | 5.6 |
| A combination of all of the above | 4 | 4.4 |
| Others | 72 | 80.0 |
| **Total** | **90** | **100.0** |

**(Source: Author, 2009)**

**5.5.2   Education**

**5.5.2.1  Children at school**

The results show that between 24.7 to 29% of the total households in the study area
have 0-2 children per household going to school. It was further found that 24% of
household had one child at primary school while 21.5% had two children at primary
school level. Some 15.5% had one child at secondary school and 6.7% two children.
Only 1.9% of the children are at college level. In the household survey conducted in
2001 few adults (29%) had no education while in 2009 only 12.5% have no education
**(Figure 5.11).** Rural women have the lowest levels of education.
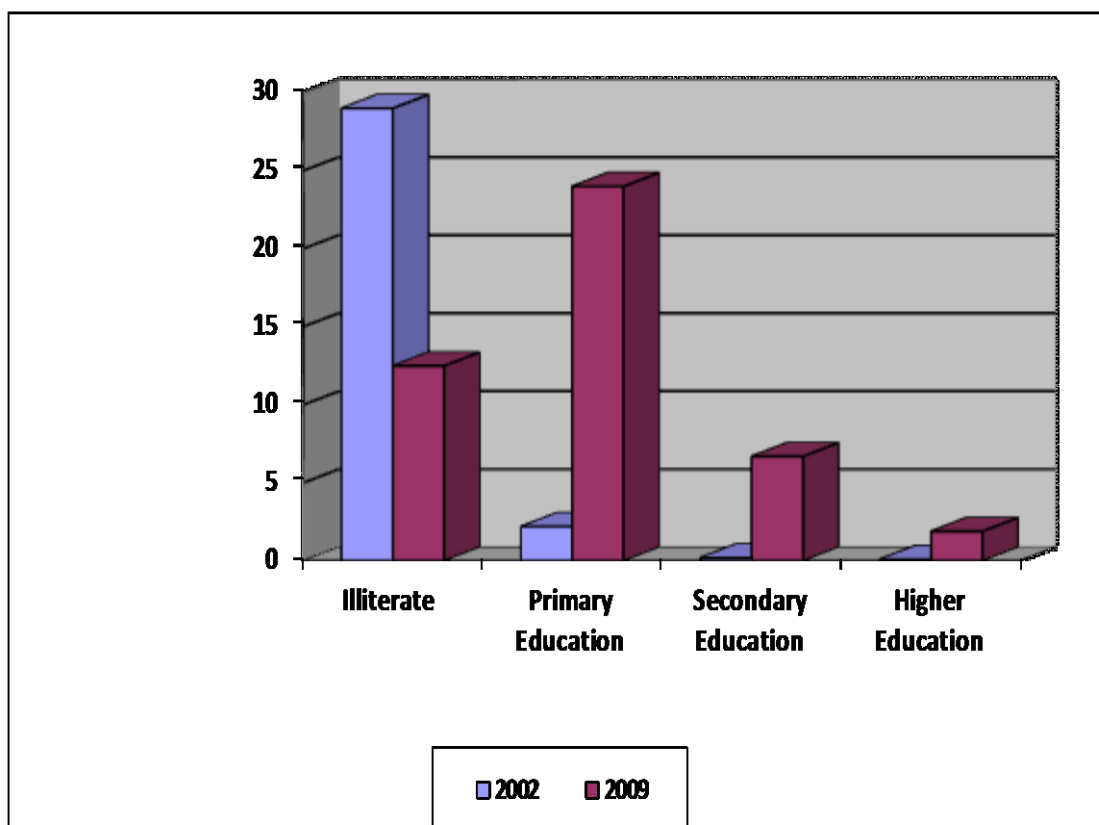
**Figure 5.11: Changes in level of education of people from MBOMIPA WMA between 2002 and 2009. (Source: Author, 2012)**

### 5.5.3   Health services

Most households are reasonably close to primary health care facilities. In 1999 and 2001, (25.7%) of household and (27.7%) household had a health care facility at 2 kms distance. In 2009 (39.9%) live 2 kms or less to a health facility. But over (46%) of households were found to reside at about 6 kms of a dispensary or health facility in 2009 while in 2001 and 1992 it was (41.6%) and (44.5%) respectively. The average distance to a dispensary appears to have shortened slightly while the average to a hospital is still far i.e. more than 40kms. **(Table 5.25).**

### 5.5.4 Water sources

The results show that sources of water in the study area include springs, protected shallow wells **(Plate 5.6)** and surface waters such as rivers. On the overall 20% of people in the study area use unprotected source of water from shallow wells such as Mahove, Balali and Isanga as well as from Little and Greater Ruaha Rivers, River Tungamalenga, Idodi and Mdweka. It was further found that only 5% of the residents use piped water. During dry season water is scarce therefore they sometimes go to tourist camps to look for water. **Plate 5.9.**

**Table 5.25: Available health services in MBOMIPA WMA and mean distance to health facilities. (Source: Author's data, 2012)**

| Dispensary/Health centre | 1991/92 | 2000/01 | 2009/10 |
|---|---|---|---|
| **Distribution of distance** | | | |
| **Less than 2kms** | 25.7 | 27.7 | 39.4 |
| **2 – 5.9kms** | 44.5 | 41.6 | 46.0 |
| **6 – 9.9 kms** | 18.4 | 19.9 | 10.6 |
| **10 – 19.9 kms** | 8.8 | 9.0 | 4.0 |
| **20+** | 2.6 | 1.9 | 0 |
| **Mean distance** | 5.1 | 4.7 | 4.3 |
| **Hospitals** | | | |
| **Less than 2kms** | 4.7 | 5.1 | 2.2 |
| **2 – 5.9kms** | 12.4 | 13.1 | 13.1 |
| **6 – 9.9 kms** | 11.2 | 14.9 | 14.4 |
| **10 – 19.9 kms** | 30.4 | 25.0 | 19.3 |
| **20 – 39kms** | 16.4 | 20.2 | 23.6 |

**Plate 5.6 Typical shallow wells used by many families in MBOMIPA WMA (Source: Author, 2012).**

During the drier periods the water from these sources are inadequate for human, livestock and wildlife use, leading to competition during dry season. The distance from drinking water varies greatly. In 2009, over (50.3%) of household were reported to walk one to two kilometers to obtain water compared to 3.6% in 2001 and 6.1% in 1992. About 16.5% go up to 6+kms to fetch water in 2009 and in 1992 and 2001 it was 48.9% and 43.8% respectively. **(Table 5.26).**

The distances from the villages to other services also vary greatly. Although majority of households live closer to grain milling machines, churches and shops some services such as banks and farm produce market centres are far (i.e., Iringa municipal).

**Table 5.26: The average distance to drinking water facilities in MBOMIPA WMA – Iringa Region.**

| % Distribution of distance | | | |
|---|---|---|---|
| **Distance** | 1991/92 | 2000/2001 | 2009/10 |
| **Less than one kms** | 6.1 | 3.6 | 50.3 |
| **1– 1.9kms** | 7.1 | 6.7 | 6.1 |
| **2 – 2.9 kms** | 8.8 | 8.2 | 7.6 |
| **3 – 3.9 kms** | 11.2 | 9.4 | 8.7 |
| **4 – 5.9kms** | 25.0 | 21.1 | 10.8 |
| **6+** | 48.9 | 43.8 | 16.5 |
| **Total** | **100** | **100** | **100** |

**(Source: Author, 2012)**

## 5.6 Contribution of WMA towards local people's socio-economic well-being and poverty reduction.

The social aspects such as schools, health facilities, and drinking water are in the household information in (Para. 5.1).

### 5.6.1 Main economic activities

About 66.3% of the respondents said they are farmers (**Table 5.27**), depending on agriculture for all their requirements**.** Some respondents (22.7%) are doing farming and at the same time keeping livestock at small scale except for the Wasukuma and Maasai who are nomads; they migrate with a lot of livestock **(Plate 5.7).** Seven percent (7%) of the respondents are doing farming and small scale businesses such as

selling vegetables, kiosk for hotels and shops for different items. Very few are working in formal job (1.7%).

**Table 5.27: Main Occupation of the local communities in the study area**

| Occupation | Frequency | Percentage |
|---|---|---|
| Farming | 199 | 66.3 |
| Farming and business | 68 | 22.7 |
| Farming and livestock keeping | 21 | 7.0 |
| Others | 12 | 4 |
| **Total** | 288 | 96 |

**(Source: Author, 2012)**



**Plate 5.7: Large herds of livestock in Pawaga. (Source: Author, 2012)**

### 5.6.2 Farming

Most of the farmers (73.8%) depend on rain fed agriculture and only 25.8% depends on irrigation **(Plate 5.8).** Available information shows that the irrigation potential of the area is greater than they are currently utilizing. Most of them are using hand hoe to cultivate with exception of a few farmers who have power tillers**.** Only (7%) of the households in Idodi and Pawaga divisions depend on fishing for income and food. The major crops grown are maize (*Zea mays*) and rice (*Oryza glabemma*)**. Figure 5.12.** The study found that only (56.1%) of households produce enough food for their family and the rest do not. According to some (57.5%) of the respondents each household cultivates an average of 2 acres **Figure 5.13**. The crop yields are rather low leading to perennial food scarcity and over dependence of relief food especially between October and March**.**

In this study the low crop yields was reported to be a problem in some villages and household. The results of the survey indicate that 60% of respondents perceived a decrease in farm productivity, which 10% of the respondents associated with droughts 10% and 20% noted that it was caused by lack of farm inputs while another 20% linked it to low capital base including land. In the project area farmers also identified crop raiding (60% respondents), lack of water for irrigation and grazing by livestock (10%) as limiting farm productivity.

Study found that farmers often change the type of crops grown. The reasons for this include drought**,** villagisation where more crops were introduced, crop based cooperatives motivation such as in the case of sunflower (*Helianthus annuus*) and simsim (*Sesamum indicum*.). There are also external influence such as market, supply and demand etc. In some cases water becomes a limiting factor even for livestock and

wildlife (e.g. elephants **Plate 5.9**) which have to travel long distances in search of
water.
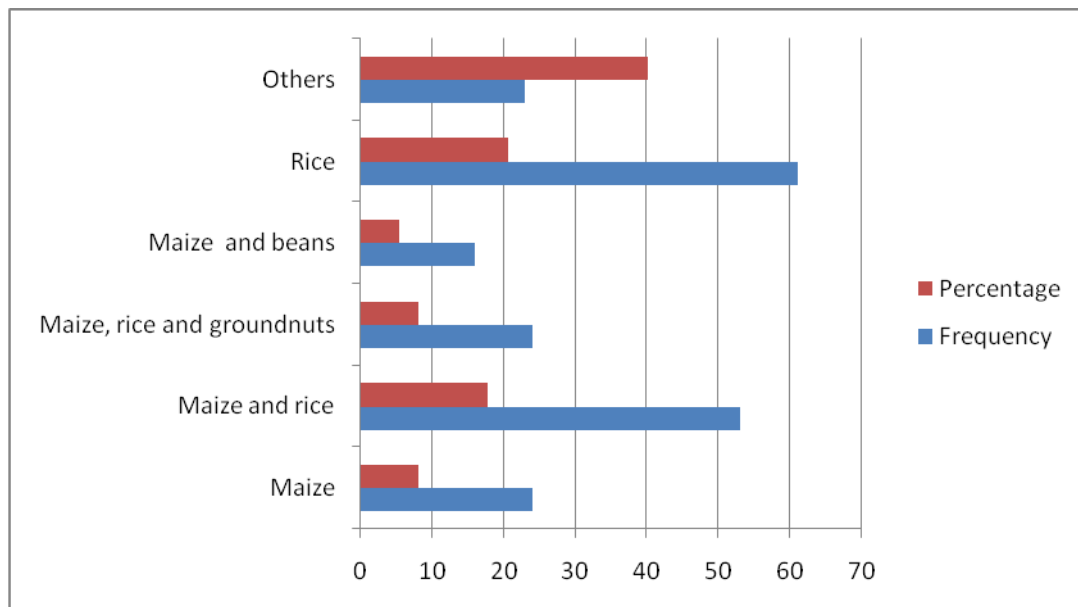


**Figure 5.12: Main crops grown by farmers in MBOMIPA.**
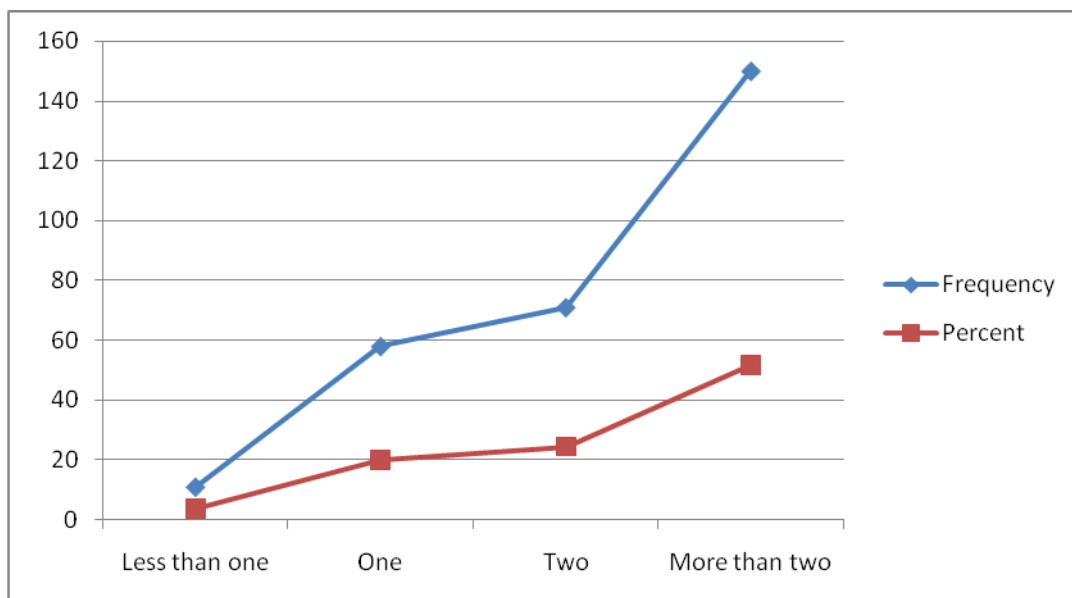


**Figure 5.13: Area in ( acres) cultivated by farmers in MBOMIPA, Iringa.**

**Plate 5.8 Water intake point for irrigation scheme in Luganga village.**

**(Source: Author, 2012)**



**Plate 5.9: Elephants watering at water point near tourist camp.**

**(Source: Author, 2012)**

### 5.6.3   Benefits accrued from wildlife conservation

The study revealed that both the government and the local communities benefit a lot from the WMA. The benefits vary considerably as described below.

### 5.6.4   Tourist/resident hunting in WMA

**Table 5.26** shows the commonly hunted wildlife species by tourists. These include elephant, buffalo, eland, kudu, gazelle, leopard and lion. The local residents (39.8%) are aware that part of the funds accrued from the legal tourist or resident hunters is ploughed back to WMA **(Figure 5.14)** and **Annex 9**.

The fund is used for building of schools (**Plate 5.10**), and paying fees for orphans and poor children (31.8%). Some funds are used in village development schemes like building dispensaries (38.8%) **(Plate 5.11).** Some respondents (41.9%) were however not aware of these benefits **(Table 5.28 & 5.29).** According to **(**50.9%) of the respondents poor people living around the area do not benefit from such monies while (36.4%) said the local people do benefit.

**Table 5.28: Wildlife species commonly hunted in WMA, Iringa.**

| What animal species are hunted in the WMA | Frequency | Percent |
|---|---|---|
| Elephant | 2 | 20.0 |
| Elephant, Buffalo, Eland, kudu | 2 | 20.0 |
| Elephant and gazelle | 2 | 20.0 |
| lion, leopard, elephant | 1 | 10.0 |
| All animal species except Giraffe | 1 | 10.0 |
| Do don't know | 2 | 20.0 |
| **Total** | 10 | 100.0 |

**(Source: Author's own data, 2012)**

**Table 5.29: Money from wildlife conservation ploughed back to villages by government**

| Money going to the government reinvested into the economy | Frequency | Percent |
|---|---|---|
| Yes | 96 | 39.8 |
| No | 44 | 18.3 |
| I don't know | 101 | 41.9 |
| Total | 241 | 100.0 |

**(Source: Author's data, 2012)**
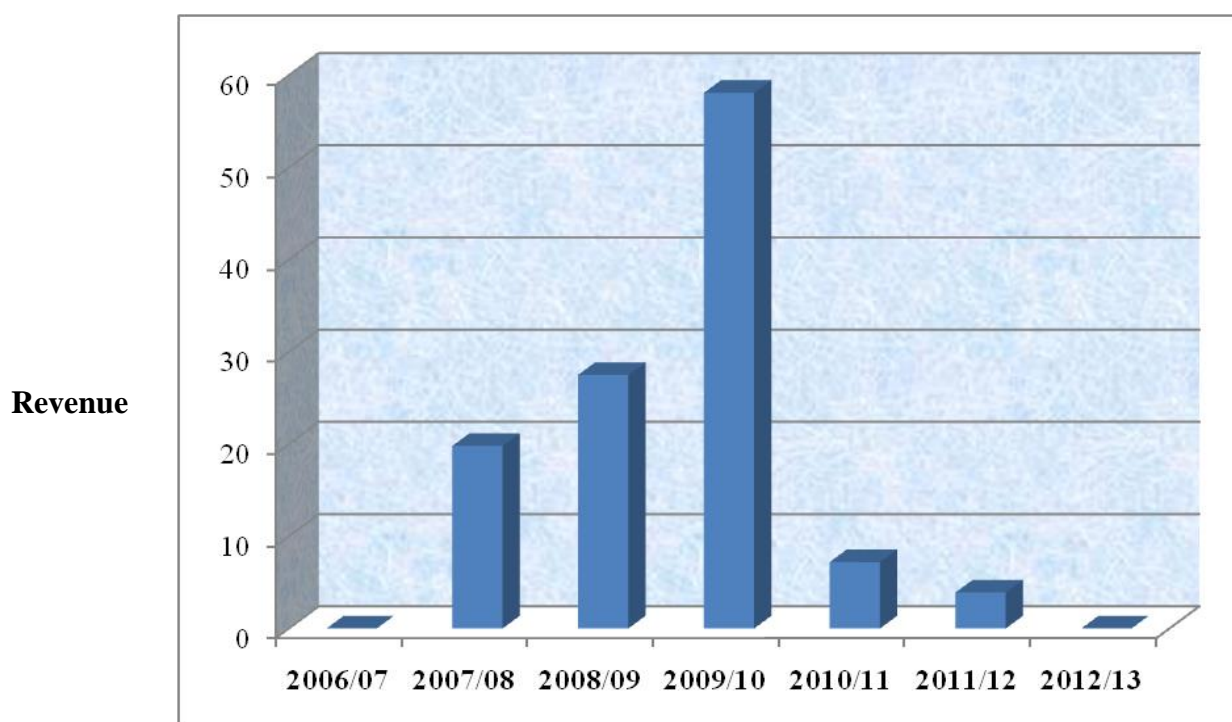


**Figure 5.14: Revenue from tourist hunting ploughed back by the government to WMA (Source: Wildlife Division 2009).**

**Table 5.30: Benefits from wildlife conservation activities to local people in MBOMIPA, Iringa region.**

| How do poor people living in or around the area benefit | Frequency | Percent |
|---|---|---|
| Benefit | 100 | 36.4 |
| Not benefit | 140 | 50.9 |
| I don't know | 35 | 12.7 |
| **Total** | **275** | **100.0** |



**Plate 5.10: A classroom built using funds from wildlife conservation ploughed back to MBOMIPA, Iringa. (Source: Author, 2012)**

**Plate 5.11: A dispensary built in Makifu village, Iringa using funds accrued from wildlife conservation. (Source: Author, 2012)**

On the overall therefore, the study finds that (88.3%) of the respondents agreed that WMA are of value and a useful approach towards wildlife conservation and its socio-economic benefits are acknowledge by many (76.6%). Most residents are aware that such benefits include earning foreign exchange from tourism and recreational areas. The distribution of the earnings from natural resources conservation to local government and WMAs is in (**Appendix IX – XI**) and Tourism earnings are shown in **Appendix XII.**

They also observed that wildlife conservation provides ecological benefits including other non-consumptive values (**Table 5.31). A**lthough most local people depend on

crop production, some rural people have diversified economic activities such as livestock keeping which are important household assets.

Information on the overall household consumption is presented in **Figure 5.15**. It indicates the consumption by category. The trend in household consumption by category has been increasing since 1991. It has been found that rural household (39.05%), spend the highest proportion of their money on food, and the expenditure on education and health are lowest. Only 1.07% of household consumption is on education and 1.06% on health. (**Table 5.33).** Food security is one dimension of poverty, assessing whether a household can meet its food needs and its vulnerability to shocks. The food poverty estimates is a direct measure of a household's ability to meet its food needs. This study reveals that some of the respondents (56.7%) agree that they are able to meet their food needs and eat 2 meals per day **(Table 5.32),** the level of income in the area is rather low. The study found that 34.7% of the local households earn between 50,000 – 100,000 TZS equivalent to (30 – 60 USD). (**Figure 5.16**), Income group with less than 45,000/= TZS were (25.9%) and a few of them (16.5%) earn between 350,000 – 500,000 TZS and only 9.4% are above TZS.500, 000 TZS these results show that the majority are still living below poverty level that is 1.02 USD per day (exchange rate 1USD =1.617 TZS). Income generating activities done by local communities' include as curio shops where they sell small cultural artifacts to tourists who are visiting Ruaha National Park so as to increase their income and alleviate poverty. (**Plate 5.12).**

**Plate 5.12: Cultural artifacts marketed by local communities as income generating activities in MBOMIPA. (Source :Author, 2012)**

**Table 5.31: Response from local communities on benefits to MBOMIPA WMA from wildlife conservation.**

| Rank | Benefits | 2003 | | 2010 | |
|---|---|---|---|---|---|
| | | Frequency | % | Frequency | % |
| **1.** | Forex to the government | 18 | 32.1 | | 70.1 |
| **2.** | Protection of environment, such as rain for farming | 11 | 19.6 | | 5.2 |
| **3.** | Seeing wild animals | 10 | 17.8 | | 4.5 |
| **4.** | Able to eat meat | 9 | 16.1 | | 10 |
| **5.** | Poles for building | 4 | 7.1 | | 8 |
| **6.** | Able to eat fish | 3 | 5.4 | | 3 |
| **7.** | TANAPA built a new office | 1 | 1.8 | | 5 |

**(Source: Wildlife Division, 2012)**
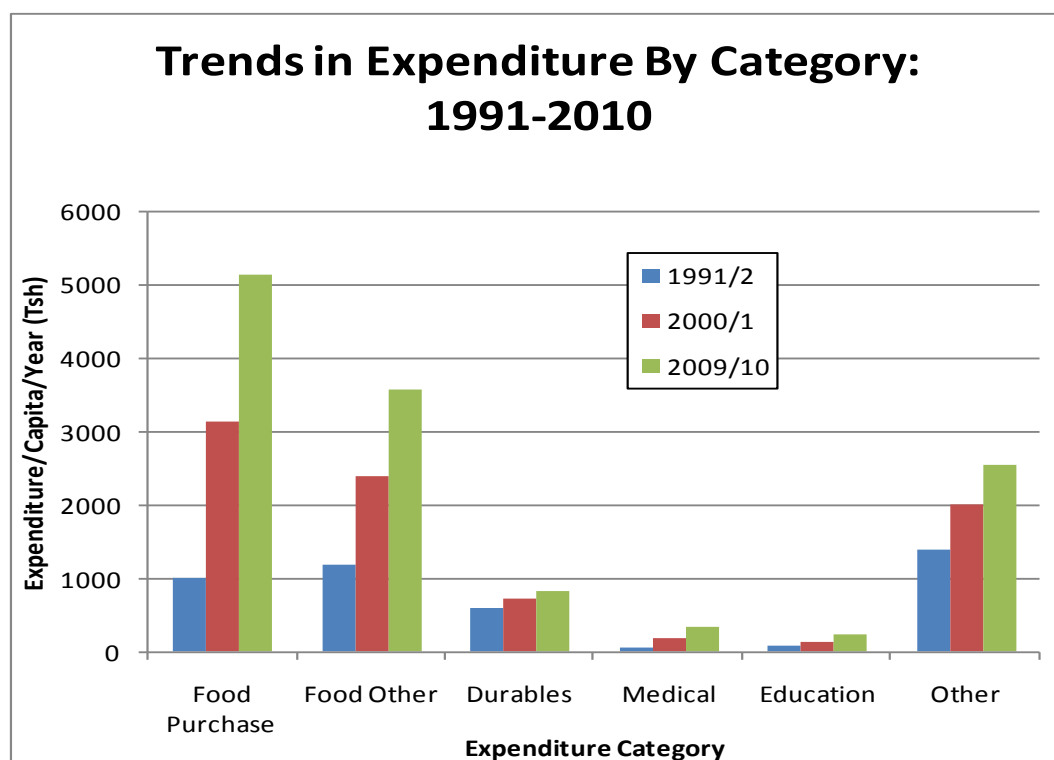
**Figure 5.15: Trends in households expenditure pattern for the local commuties in MBOMIPa, Iringa. (Source: Author, 2012)**

**Table 5.32:.Percent number of meals per day that are taken by local communities in MBOMIPa, Iringa.**

| Usual number of meals per day | 2000/01   % | 2009/10 % |
|-------------------------------|-------------|-----------|
| 1                             | 1.2         | 3         |
| 2                             | 55.8        | 56.7      |
| 3                             | 42.8        | 40.3      |
| 4                             | 0.2         | 0.0       |
| **Total**                     | 100         | 100       |

**Table 5.33: Mean Expenditure per capita by category of item (TSh.)**

| Expenditure on category | 1991/92 | 2000/2001 | 2009/10 | % of total purchased items 2009/10 |
|---|---|---|---|---|
| Food purchased | 1,011 | 3,118 | 5225 | |
| Food not purchased | 1,175 | 2,375 | 3,575 | |
| Total food | 2,186 | 5,492 | 8,091 | 39.05 |
| Durables | 577 | 706 | 831 | |
| Medical | 52 | 190 | 344 | 1.6 |
| Education | 66 | 138 | 223 | 1.07 |
| Other non durables | 1,377 | 2,012 | 2,534 | |
| **Total** | **5,982** | **8,538** | **20,716** | |

**(Source: National Bureau of Statistics: 1991/92, 2002/01, 2009/10)**

N.B. Food not purchased includes food produced and food received in kind. Only important indicators have been shown by percentages
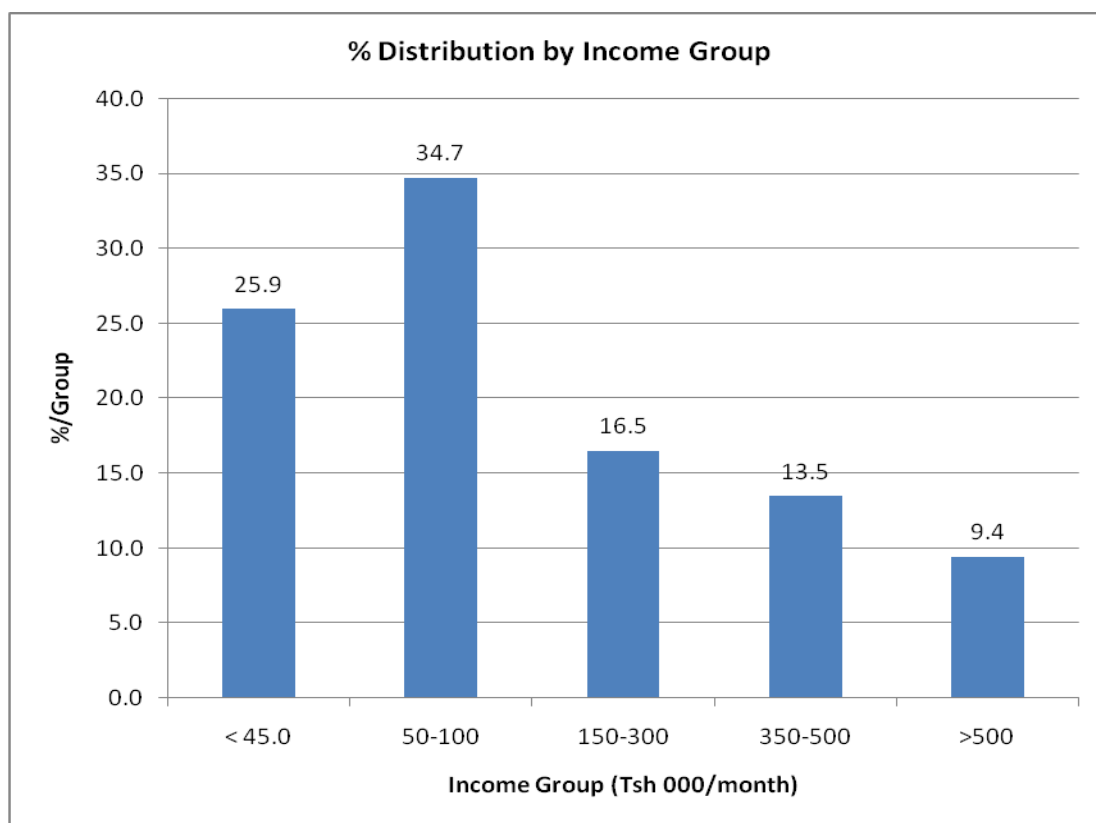
**Figure 5.16: Level of income generated by local communities (TSh. per month). (Source: Author, 2012). Exchange rate 2015 , 1 USD = 2015 TSh.**

Availability of good sanitation such as toilets is indicator of the health status among a community living in the study area. National Bureau of Statistics, (2007). The results from the study show that there has been little change in the use of a toilet over the years from 1991 through to 2010 as most (88.3%) of the respondents are still using simple pit latrine although households with no pit latrines have been on the decline since 2001 **(Table 5.34).** Further it was found that the distances to important social services such market, shops, public transport, banks have been decrease while that for firewood and farmland has been increasing **(Table 5.35).**

Other indicators of community social welfare can be accounted for by common sources of community government income as well as expenditure. In the study area it

was found that, the income sources for village governments depend on development levy (10% of the collected), cess from petty trade in the villages, fines for by-laws violators, wildlife quota and other natural resources. In 2002 villages received on average about TSh one million each, the highest being T.shs 1,500,000 and the lowest being T.shs 700,000. Currently they can get up to 5 million TSh. from wildlife alone. Income from wildlife accounts for high proportion of the VG incomes in many villages visited ranging from 40% to over 80%. Village expenditure varies from one village to another depending on the various sources of income, immediate needs, vision and standing of the committee and village government. Expenditure on the other hand includes allowances for village game scouts on patrol, stationeries, office repairs etc. The results also show that there has been slight improvement on the proportion of households built with modern materials. Some respondents (13.3%) have houses built from concrete, stones, cement, while (35.7 %) of the respondents have burnt brick walls and mud bricks (61%). Metal roof some (35%) of respondents and the rest (65%.) still use local material thatching grass to build their houses **(Plate 5.13).**

**Table 5.34:.Trends in changes in types of toilets in households in MBOMIPA, Iringa. (Source: Author's own data, 2012)**

| Type of toilet facility | 1991/92 | 2000/01 | 2009/10 |
|---|---|---|---|
| No toilet | 8.7 | 8.1 | 5.4 |
| Flush | 0.2 | 0.5 | 6.2 |
| Pit latrine | 90.3 | 90.8 | 88.3 |
| Other | 0.2 | 0.1 | 0.1 |

**Table 5.35: Mean distance to selected social and economic facilities in MBOMIPA, Iringa.**

| FACILITY | DISTANCE (KMS) | | |
|---|---|---|---|
| | 1991/92 | 2000/2001 | 2009/2010 |
| Firewood | 3.24 | 3.15 | 5.06 |
| Market place | 5.30 | 3.54 | 2.78 |
| Shop | 2.13 | 1.85 | 1.67 |
| Church/ Mosque | 2.01 | 1.68 | 1.38 |
| Primary court | 10.23 | 11.91 | 9.56 |
| Household's main farm | 1.98 | 2.14 | 4.32 |
| Public transport | 6.07 | 5.40 | 4.53 |
| Milling machine | 4.41 | 2.35 | 2.45 |
| Bank | NA | 37.55 | 35.90+ |
| Post Office | NA | 28.14 | 27.40 |
| Police post | NA | 18.68 | 15.76 |

**(Source: National Bureau of Statistics, 2007)**



**Plate 5.13: A typical house in one of the villages (Makifu) in MBOMIPA WMA – Iringa. (Source: Author, 2012)**

**5.7    Contribution of WMA in enhancing framework to the local democratic culture in wildlife management.**

**5.7.1    Protected area system in tanzania**

Protected area system in Tanzania is comprised of the following broad categories of Protected Areas (PAs); National Parks (NPs), Game Reserve (GRs), Game Controlled Areas (GCAs, Ngorongoro Conservation Area (NCA) and Wildlife Management Areas (WMAs). The NPs and NCA are directly managed by Tanzania National Parks (TANAPA) and Ngorongoro Conservation Area Authority (NCAA) respectively. National Parks are a high status PA where consumptive utilization is not allowed, only non-consumptive (game viewing) is allowed. NCA is a multiple landuse where cultivation is not allowed and the area is mainly inhabited by the local pastoral Maasai communities.

GRs and GCAs on the other hand are areas where no human activities are allowed. Hunting and game viewing are allowed with permission from the Director of Wildlife (Wildlife Act No. 5 of 2009 - WCA). The previous arrangements in the GCAs however, allowed human settlements which the law now prohibits (Wildlife Management Areas regulation 2010).

**5.7.2    MBOMIPA organization structure**

MBOMIPA organization structure is shown in (**Figure 5.17.**). The study found that the General Assembly has 42 members two from each Village Executive Offices (21 villages). Each village has a Village Natural Resources Committee (VNRC), which oversees wildlife management at village level. Several institutions are the main players in the management of WMAs (WMA Guidelines 2005 and Regulations 2012). At the local level, these include the Authorized Association, the Village Council, the

Village Assembly, the District Council and the District Natural Resources Advisory Board.

At the national level they include the Wildlife Division, the Ministry of Natural Resources and Tourism, TANAPA, NCAA, TAWIRI and Non-Governmental Organizations (NGOs). The rights, responsibilities and linkages between each of these institutions and to other stakeholders in the implementation of WMAs are outlined below.
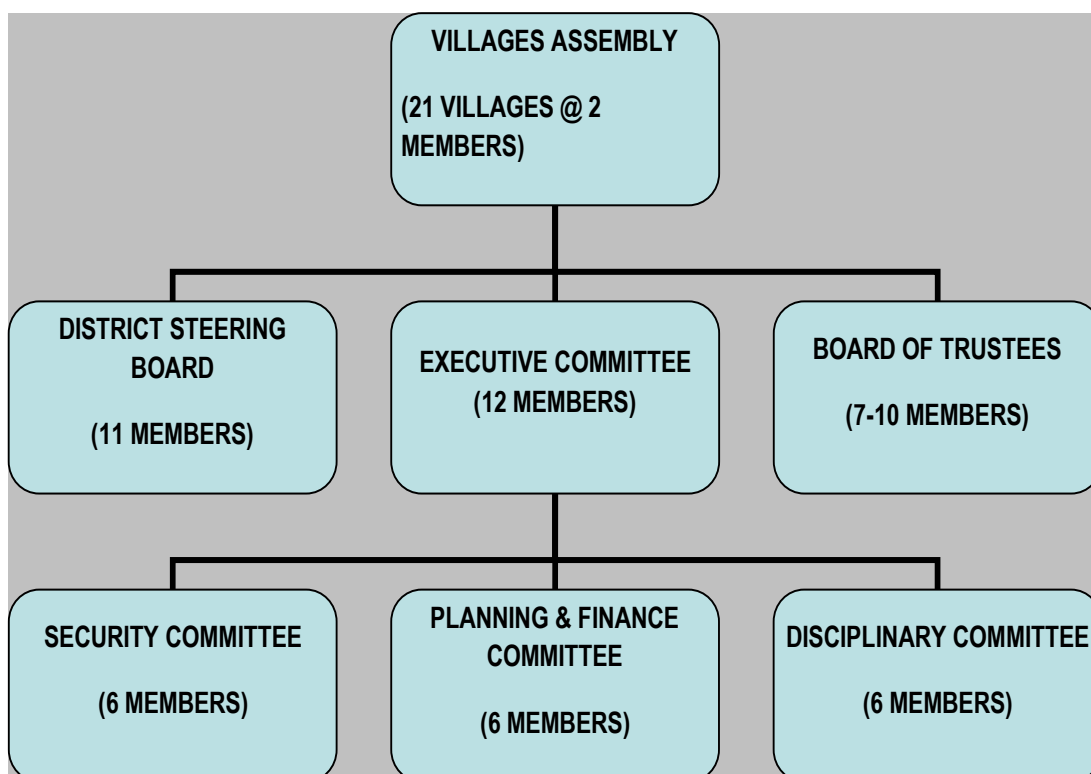


**Figure 5.17: Organization Structure of Authorised Association in MBOMIPA. (Source: MBOMIPA reports, 2012)**

It was found that a few Village Game Scouts (VGS) have been employed some of whom have been trained on basic wildlife management techniques by the Wildlife

Division. These VGS are managing wildlife on behalf of the villages by carrying out patrols and maintaining security in the WMA.

### 5.7.3   The Village Council

According to Regulation 21(a) to 21(h) the Village Council (VC) has several responsibilities in the management of WMAs. These responsibilities include providing land for designation of a WMA, preparing village land use plans, coordinating natural resources activities at village level and formulating natural resources management by-laws. Other responsibilities include:-

approving mechanisms for benefit sharing among member villages, monitoring of the activities of the AA and report to the Village Assembly (VA) and the District Council, and ensuring that there exists a secure and favourable business environment in a WMA. Lastly, the VC is expected to ensure that the AA implements relevant sector policies while entering into agreements with the VC and the private sector. **Plate 5.14** is one of the meetings.



**Plate 5.14: Village Council members in one of its meeting in Makifu village in MBOMIPA, Iringa. (Source: Author, 2012)**

### 5.7.4    The Authorized Association (AA)

In the context of the WMA process an AA is "a community-based organization whose primary objective is to conserve wildlife resources for the benefit of riparian community and given the mandate by the Director to do so on village land". Both the Guidelines (2002:15), Regulations 22, 36, 37 and 38 outline the functions of the AA to include acquiring User Rights through preparation of a 5-year General Management Plan (GMP) or Resource Management Zone Plan (RMZP) and submission of the same to the Director of Wildlife for approval. Other administrative functions include entering into agreement with the VC on the management of a WMA, managing a WMA in accordance with existing GMP/RMZP and the current Regulations, and cooperating with the Director of Wildlife and the authorities of TANAPA and the NCAA in the management of a WMA. Others are maintaining proper records and providing quarterly, semi-annual and annual reports to the Village Assembly, acquiring and disposing of the AA's property, recruiting and training some of the AA staff, and engaging competent experts in any task assigned by the AA, with the approval of the Director of Wildlife previously sought and obtained as and when required.

Other responsibilities relate to maintaining ecological integrity of a WMA. These include reviewing the GMP/RMZP of the WMA, recruiting and training of Village Game Scouts (VGS) in accordance with the relevant Regulations, lobbying and providing a supportive role in the making of wildlife conservation by-laws of member villages, undertaking basic resource monitoring in accordance with the provisions of the Regulations and submitting the data to the wildlife management authorities, and proposing quota to the District Natural Resources Advisory Board. Others include

protecting biodiversity resources, supporting control of problem animals, issuing permits for utilizing resources in a WMA, and keeping government trophies in safe custody.

The functions related to wildlife business include negotiating and entering into contractual agreements regarding the utilization of resources and investment in a WMA, seeking authorization of investment from the VA, overseeing investment and development activities, collecting and remitting fees to relevant authorities and managing finances according to the laid down procedures. Lastly, the AA has the responsibility of developing and implementing mechanism for equitable benefit sharing between the AA and member villages.

MBOMIPA acquired "AA" Authorized Association status in July, 2007 and received Wildlife Resources User Right No. 00000562 of 6/07/2009 to allow the AA to manage the WMA.

The "AA" status enables MBOMIPA to:
- Enter into agreements with different investors according to WMA regulations of 2005 reviewed 2011.
- Carry out analysis of compliance of the following with respect to the Wildlife Conservation Act No. 5 of 2009. (WCA) (URT, 2009):-
- Match licences sold in Iringa to those recorded and/or used at Mkupule and Lunda; Evaluate quality of records; Evaluate utilisation of the quota;
- Compare quota allocation and utilisation with systematic reconnaissance flight (SRF) estimates from six MBOMIPA surveys (URT, 2002) and report to MBOMIPA outlining successes, failures and areas of improvement.

- Make recommendations on improving the quota allocation and hunting to ensure compliance and to generate more revenue.

### 5.7.5 The District Council

Both Guidelines (2005) and Regulations (2012) place an important role on the District Council, via the District Game Officer (DGO), as a primary facilitator for the implementation of the WMA strategy in Tanzania. In this respect Regulation 26 outlines 9 facilitation responsibilities, including facilitation of establishment of a WMA, application by a CBO to become an AA and facilitation of the District Natural Resources Advisory Board to carry out its functions and to link the AA and the Director of Wildlife on issues specified in the Regulations. Village assembly functions are shown in Box 5.1.

Legal activities include approving of village natural resources by-laws, advising and giving guidance on the village Land Use Plans and resource zone plans **Annex 8**, monitoring enforcement of wildlife laws in and outside WMAs, monitoring investments in the WMAs, and issuing resident hunting licenses to AAs. The District Council also has the responsibility of conducting problem animal control in collaboration with the relevant AAs.

**Box 5.1 Village Assembly in MBOMIPA WMA, Iringa.**

- The village assembly is composed of all villagers, women and men, who have reached the age of 18 years, and chaired by the Village Chairperson. It operates as the village parliament.

- The village assembly is a formal body that is supreme within the village government structure.

- The village assembly is required to meet, by law, every three months. There must be proper notification so that all villagers in all sub-villages have had adequate notice of the meeting and its agenda.

- The village assembly has the power to elect village government leaders, to recommend village by- laws to be sent to the District Council for approval, and to direct the village government to take specific action and to monitor implementation, to receive village government budgets and financial reports, to discuss policy, and to supervise allocation and use of all village resources,

- The village assembly has the final power to allocate land within the boundary of the village.

- By law the village assembly is a very powerful body

**(Source: MBOMIPA,2009)**

### 5.7.6 The District Natural Resources Advisory Board (DNRAB)

This is an advisory Board established at the district level by the District Council. It is established according to Regulation 27 and Regulation 28 spells out the composition of the DNRAB. Generally, it should comprise of no more than 12 members, They include: District Commissioner (Chair), District Executive Director (Member), District Game Officer (Secretary), District Land Officer (Member), District Forestry Officer (Member), District Community Development Officer (Member), District Fisheries Officer (Member), District Planning Officer (Member), and Representative from AA. Where applicable: a representative from a Game Reserve (Member), Representative from a National Park (Member), Representative from Ngorongoro Conservation Area Authority (Member), and Other co-opted experts resident in the district. Where a WMA comprises of more than one district, the officials mentioned above meet and decide who will sit on the Board. Co-opted experts have no voting powers.

### 5.7.7 Issues of governance in wildlife management

In this study local government institutions were analyzed in each of the visited villages to examine their effectiveness. Generally, there are weaknesses in governance in all the villages. In addressing the issue of integrating wildlife conservation and rural development cases of accountability, transparency and sustainability were found to be must be considered during planning. Village leaders are not trained so that they can have enough skill and knowledge to manage the Authorised association. Only game scouts are trained. **Table 5.36.**

**Table 5.36:  Response by the village leaders to a question on whether training is conducted to village officials in MBOMIPA WMA, Iringa.**

| Is there training received by village officials | Frequency | Percent |
|---|---|---|
| Yes- (village game scout) | 8 | 80.0 |
| NO | 2 | 20.0 |
| **Total** | **10** | **100.0** |

**(Source: Author, 2012)**

# CHAPTER SIX

# DISCUSSIONS

## 6.1 Overview

Monitoring the impact of community-based approaches to the management of biological resources, poverty alleviation, conflicts resolution and increasing local democratic culture in managing natural resources is rare. Despite many calls from conservationists over the past decade (Croze, 1982; Thorsell, 1982; Kremen et al., 1994; Pullin & Knight, 2001; Brooks et al., 2006; Sutherland et al.,2009), little progress has been made toward the inclusion of scientific monitoring as an essential element of conservation initiatives (Ferraro & Pattanayak, 2006). This led the authors of the 2005 Millennium Ecosystems Assessment to conclude that 'few well-designed empirical analyses assess even the most common biodiversity conservation measures' (Millenium Ecosystems Assessment, 2005: 122).

In this chapter, interpretations of the assessment results from both primary and secondary information/data are presented in a comparative manner. MBOMIPA WMA is a land use approach that started officially in 2002 with the objectives of creating an effective and sustainable wildlife management system under community authority and responsibility of Idodi/Pawaga divisions Wildlife division, (2002) & Mung'ongó et al., (2003). In this study, it has been established that this arrangement has to some extent promoted sustainable management of natural and cultural resources and also enhanced local economic development while contributing to poverty reduction in the 21 member villages. Natural resources are scarce, population and livestock numbers are increasing and there are many different stakeholders with

different interests or motives over the land and resources in the area. Therefore, without an integrated planning that ensures proper resource utilization for the benefit of both stakeholders, the conflicts will escalated leading to land degradation, depletion of biodivesity, loss of revenue and poverty.

## 6.2 Population and social characteristics

Population in MBOMIPA has steadily increased despite the continued emigration from the area into other areas. Population dynamics, both quantitatively and qualitatively, has a profound influence in the development process in an ecosystem since population increase lead to increased pressure on natural resources Nibuye, (2010); Msuha (2009) and Hardins (1968). The manner in which these resources are used depends on the diversity of the population in question. The population grows when there is excess (in-migration) of births over deaths (natural increase) or there is more people arriving than departing, and population decline is the opposite of the above. It is possible for natural increase to be balanced by out-migration however the sex ratio distribution will be significantly altered. Data obtained from the Tanzania National Bureau of Statistics show that there are other reasons behind rapid population growth in rural areas. They include high fertility rates, marriage patterns and non – use of family planning control methods such as contraceptives (Iringa region GDP report, 2008). The reasons mentioned above and immigration are true to the study area. In this study very few said they moved to another area to do business or employment.

Often, education, gender, occupation, and age affect attitudes of people toward wildlife and PAs (Mordi 1991; Mehta and Heinen 2001). However, Mugisha, (2002).,

concluded that these variables such as male and female, or education levels were not associated with many significant differences in attitudes and knowledge.

### 6.2.1    Female-headed households

In the household surveys done in 1991 and 2001, the trend showed that women household heads were increasing in the rural areas of Tanzania although they are still fewer than men headed households. The  situation is similar to the surveys conducted by Mungóng'o et al., (2003) and in the Burunge WMA Kulindwa et al., (2003) . This also conforms to the African cultural norms where even without the husband in a household then any male next of kin becomes responsible for the household. Therefore women headed households are rather few even with the increasing number of widows.

Simasiku et al., (2008) did a survey in General Management Area in Zambia and he found that only 28% of GMA households are female-headed. Furthermore, he foun that the higher rates of polygamous relationships in remote areas such as GMAs may result in higher incidences of female-headed households if different wives live in separate households. Male heads spend long periods away from home while engaging in poaching, resulting in the house being headed by the female spouse Simasiku et al., (2008).

Secondary data from household surveys conducted in 1991, shows that in the study area the average household size in 1991 was 5.9 persons National Bureau of Statistics, (2007) while in this study in 2009, the household size was 4. This decline was attributed to the increased family planning awareness campaigns and poverty which is forcing them to have fewer children.

Further, the study finds that enrollment into primary education has slightly increased but secondary schools enrollment levels are even lower. The main reasons for the latter case are that secondary school education is expensive, distance from school, high rate of examination failure, girl child pregnancies and/or early married and some discriminative cultural norms and preference for boy education over girls. Further, the Maasai community prefers their young men children to be pastoralists rather than go to school. On the other hand women are considered not worth educating as this is seen as a waste of money.

The average distance to any health, education and water facilities appears to have shortened slightly in the study area due to government policy that ensures these vital services be provided at village level depending on availability of funds. In some villages these facilities were constructed by conservation partners such as Tanzania National Parks, funds accrued from wildlife conservation, Tanzania Social Action Fund, etc. In the study area the common water sources were found to be springs, unprotected wells, and surface waters such as rivers.

The study found that health and education facilities were poorly manned due to inadequate qualified personnel e.g. medical staff and teachers and also lack of drugs for dispensaries. The distances from the villages to other services such as milling machines, churches and shops have also been reduced. However, services like banks and markets for their crops are still far in Iringa Municipal. The roads were reported to be poor in all villages except the roads from Iringa to Itunundu and Iringa to Tungamalenga which are not tarmac but are passable all year around. Therefore farm products marketing and prices still posed a challenge. It was observed that fuel wood

was the main source of energy for almost all the villagers. Charcoal is used by very few residents and kerosene is used mainly for illumination, this was the case since 2003 and in many villages in Tanzania Mungóngó et al., (2003) & Kulindwa et al., (2003) . This phenomenon is still a challenge to the natural woody vegetation since the practice of agroforestry was still to pick up amongst the local communities.

## 6.3    WMA contribution to wildlife conservation.

The present framework for wildlife protection in Tanzania is comprised of five broad categories of Protected Areas (PAs). These include national parks, game reserves, game controlled areas, Wildlife management areas and Ngorongoro conservation area. Although PAs are important for in situ conservation, the approach has proved difficult to implement in many settings particularly in developing countries for several reasons explained in literature review (Gao & Chapel 1990, Pimbert & Pretty, 1997; Kiss, 2004)). Franks (2008) examined the socioeconomic complexities of conservation outcomes in developing nations. While the protected areas analysed had both costs and benefits, these accrue to different stakeholders and operate at different spatial scales (Franks, 2008). Benefits were typically found to occur at a global scale, through the provision of ecosystem services while costs to the global community were limited (Franks, 2008). At the local scale, direct financial benefit was relatively small and opportunity costs resulting from livelihoods restrictions higher (Franks, 2008 & Kidegesho 2008). Therefore it is necessary to find the best community preferred practices based on experiences from other countries without compromising the conservation ethics.

Community conservation thus emerged from the recognition that strictly protected areas often failed to consider the interests of local communities, reducing their

willingness to support or abide by conservation regulations (Robbins et al., 2006), and in some areas, strict protection resulted in active hostility between conservation authorities and local communities (Robbins et al., 2006). Wells & Brandon, (1993) & Mungóngó et al., (2003) reiterated that the realization of these weaknesses in the prevailing approach to conservation, perhaps, resulted in initiatives like that of the Ngorongoro Conservation Area Authority in 1975 which began experimenting the idea of *multiple land use* in Tanzania. (Hulme & Murphree, 1999; Hughes & Flintan, 2001; McShane & Wells, 2004).

The need to engage communities in conservation was heightened by the realisation that biodiversity resources are both subject to, and depend upon processes and policies, which act at national and global scale (Ancrenaz et al., 2007). Consequently, an approach which can reconcile the needs of biodiversity conservation and economic development was seen a vital tool particularly in developing nations (Ancrenaz et al., 2007).

The success story of the operationalization of the concept of multiple land use have led not only to attempts by other conservation areas wishing to emulate the experiment, but they have also virtually fostered the emergence of a new rural development. (Mungóngó et al., 2003 & Boshe, (1989). MBOMIPA WMA a community based conservation in Tanzania were evaluated and were observed to have made a considerable progress towards integrating wildlife conservation with development, fostering awareness in wildlife conservation, in ensuring local people participate in wildlife conservation and in enhancing socio-economic benefits accrued from wildlife and democratic culture in wildlife conservation.

### 6.3.1 Awareness that WMA has helped in conservation

The assessment done in 2009 showed that communities acknowledged the importance of wildlife as an input into other productive sectors in the study area. Knowing the importance, the local communities would like to participate in the planning and decision making. The communities were also aware that wildlife generates revenue from tourism and also it has natural heritage values nationally and internationally. This awareness is due to the presence of WMA a strategy to wildlife conservation. However, they urged that the local communities should be more involved in wildlife conservation and management activities and that conservation education is necessary for local communities. In Uganda in a similar study done by Mugisha (2002.) the local communities said the main reasons given for positive opinion on conservation is that PAs are a source of natural resources, influence climatic factors, and contribute to community welfare. It is important to note that although it was expected that respondents from CBC would justify the existence of the PA as a conservation areas, this was never mentioned as a justification. Provision of natural resources, contribution to community welfare and influence on local climatic conditions are therefore the values communities attach to PAs that justify the existence of the PAs.

Similar approaches like Communal Area Management Plan for Indigenous Resources (CAMPFIRE) in Zimbabwe and Integrated Resource Development Project in Zambia in Luangwa (ADMADE) were established and have recently taken the limelight as models of this supposedly new outlook in the management of natural resources (Leader Williams (1995, 1998 & Mwima 1992).

The question is the Importance of wildlife as inputs into other productive sectors understood & appreciated? was asked and chi square analysis done Independent variable is wildlife conservation and dependent variable is other sectors. From the chi square analysis, 85.2% Idodi/Pagawa community said there is a wildlife sector play an important role as inputs into other productive sectors such as tourism depends on wildlife, while 3.8% said wildlife is not important as inputs into other productive sectors. Thus the relationship is statistically significant at X2 = 83.514, df = 5, P < 0.000.

### 6.3.2 Land destruction/degradation and biodiversity depletion in WMA

Land-use and land-cover change (LULCC); also known as land change is a general term for the human modification of Earth's terrestrial surface Struhsaker, (1998). Environmental degradation have generated much debate among academicians, developers, and conservation practitioners. While some scholars have argued that alienation of local rural people from nature is the major factor that threatens survival of environment (Pimbert and Pretty 1997 & Schwartzman et al 2000), others counter argue that it is the increasing human population (Struhsaker, 1998). Other threats to environment have been documented as human activities such as poaching (Gibson & Marks 1995; Cuarón 2000), charcoal production and unsustainable land use practices (e.g. Seddon et al. 2001). Macro economic policies and market failures, poverty, and unsustainable agriculture also have been documented as the main causes of environmental degradation (Barbier & Burgess 2001). Though humans have been modifying land to obtain food and other essentials for thousands of years, current rates, extents and intensities of LULCC are far greater than ever in history, driving

unprecedented changes in ecosystems and environmental processes at local, regional and global scales Foley, (2005) These changes encompass the greatest environmental concerns of human populations today, including climate change, biodiversity loss and the pollution of water, soils and air. Monitoring and mediating the negative consequences of LULCC while sustaining the production of essential resources has therefore become a major priority of researchers and policymakers around the world Foley, (2005).

The respondents in the study are aware that numerous human activities or land use types caused habitat destruction in the study area. They listed agriculture and livestock keeping, uncontrolled tree cutting/clearing of forest as major ways to habitat destruction leading to habitat/environment alteration. It was found that tree species such Acacia/Commiphora/Lannea woodland and bushlands were cleared to open up new land for cultivation. When the soil fertility declines after a few years, the plots are abandoned and another plot is cleared.

This phenomenon has largely affected some areas at Mboliboli, Nyalu and mount Kipera leading to rapid land degradation and deforestation and causing soil erosion, famines and water scarcity and other environmental problems. This also has affected the wildlife population and the WMA will in the longrun lose its potentiality to become a WMA.

The study found that water sources are not enough to cater for wild animals, livestock and human beings in the study area. Sources of water include the small and greater Ruaha Rivers, River Tungamalenga, Idodi and Mdweka. They also use shallow wells such as Mahove, Balali and Isanga. It is believed that irrigation practices upstream

significantly contributed to the decline in water levels downstream resulting in drying up of the river.

In 1995, most areas in the study area were covered by bushland followed by woodland, a small area of cultivated land and scattered settlement. But in 2010, the land cover pattern changed drastically with the cultivated land and forests became more dominant and the area for bush land and woodland were reduced. Grassland and bare soils were increased. The area under protection has increased leading to forests regeneration in the protected areas while outside the PAs cultivation is intensively done.

Although, crop yields are used to infer changing soil conditions and therefore land degradation, the most direct way that changes in vegetation cover affect the local people is through changes in the supply of various forest products, mainly fuelwood and building poles. According to the respondents shortage of trees can mean a long distance to source areas, short supply of materials in the source areas, long period spent collecting right species, right size for a particular purpose and scarcity of dry fuelwood Kikula, (1997). In studies done in other areas it has been shown that generally there is correlation between perception in shortage of fuelwood with sex, education, position in the village government, age, number of children and occupation Kikula, (1997). The different roles men and women perform in the community can influence the perception of supply of any resource Kikula, (1997). For the example in this study other people who are not livestock keepers did not know whether there is shortage of pastureland. MBOMIPA prepared village Land and Resource Use Plans that takes into account the ecological needs of wildlife species. The Government of Tanzania requires the village boundaries to be demarcated as part of its land use

planning policy. It was observed that the local villagers are eager to participate in WMA as it gives them opportunity to obtain title deed for their land. The land use pattern in the study villages is divided into residential, agriculture, livestock and conservation (WMA). In many villages rice is important for food security and cash incomes. However, the land for rice farming is not adequate in all villages visited. The reason for limited land in Idodi - Pawaga was found to be due to population pressure which has been the case since 2003 when there was influx of people from other parts of the country looking for grazing pastures and agricultural land. But also a few farmers mainly local Hehe ethnic group (especially the old generation) have big rice farms ranging from 10-20 acres per person which they also rent to other farmers from other areas for about TSh. 20,000 (12 USD) or more per acre per season.

The extent, and type of land use directly affects wildlife habitat and thereby impacts local and global biodivesity. Human alteration of landscapes from natural vegetation (e.g. wilderness) to any other use typically results in habitat loss, degradation, and fragmentation, all of which can have devastating effects on biodiversity. Land conversion is the single greatest cause of extinction of terrestrial species. (Dickman, 2008, Msuha, 2009, Kulindwa, 2003 and Mong'mg'o et al.,) An example of land conversion being a chief cause of the critically endangered status of a carnivore is the reduction in habitat for the African wilddog, *Lycaon pictus* TAWIRI, (2003). Of particular concern deforestation, where logging or burning are followed by the conversion of the land to agriculture or other land uses. Even if some forests are left standing, the resulting fragmented landscape typically fails to support many species that previously existed there.

When land is transformed from a primary forest to a farm, the loss of forest species within deforested areas is immediate and complete. Even when unaccompanied by apparent changes in land cover, similar effects are observed whenever relatively undisturbed lands are transformed to more intensive uses, including livestock grazing, selective tree harvest and even fire prevention. Foley et Al., (2005) The habitat suitability of forests and other ecosystems surrounding those under intensive use are also impacted by the fragmenting of existing habitat into smaller pieces (habitat fragmentation), which exposes forest edges to external influences and decreases core habitat area Foley et Al., (2005). Smaller habitat areas generally support fewer species (island biogeography), and for species requiring undisturbed core habitat, fragmentation can cause local and even general extinction. Research also demonstrates that species invasions by non-native plants, animals and diseases may occur more readily in areas exposed by LULCC, especially in proximity to human settlements DeFries, (2004). Other impacts include global warming, water, soil and air pollution and destruction of Stratosphere.

### 6.3.3   Status of wildlife populations in MBOMIPA

Success of a community based strategy is measured in increase in wildlife populations, retention of habitats and financial revenues from hunting and lodges. (Campbell, 2000 & Simasiku, 2008). The key wildlife species found in the MBOMIPA WMA include Buffalo, Impala, Zebra, Giraffe, Elephant, Lion, Kudu, Leopard, Crocodiles, Hartebeest, Sable, Eland, Warthog, Waterbuck. Others are Hippopotamus, Monkeys, Wild pig, Wild dog, Baboons, Jackals, Dikdik, Ostrich, Hyaena, and Cheetah. Most of these species are believed by the locals to have been

increasing with the exception of a few species such as the wild dog whose population is said to be declining. This contrasts with earlier surveys in 1999, 2000 and 2001 which showed that wildlife populations have remained stable over the years. Similar observations were made during other censuses conducted in 2006 and 2009 (TAWIRI, 2009).

In the current study a number of reasons were explained for the decreased animal species these include over hunting, human activities and livestock densities. Okello and Kiringe (2004:59–60) identified types of threats to protected areas which include loss of species due to poaching, conversion and degradation of wildlife migration and dispersal areas, over-exploitation of natural resources, land use changes, pollutants , negative tourism impacts, fencing of an entire protected area and human encroachment.

### 6.3.4   Land degradation and migration behavior

Wildlife depends on healthy habitats such as the right temperatures, fresh water, food sources and dispersal areas to raise their young. Climate change is altering key habitat elements that are critical to wildlife's survival and putting wildlife in jeopardy. Elephants for example, face a range of threats including shrinking habitat, which brings them more frequently into conflict with people. With diminished living habitat, elephants will be unable to escape any changes to their natural habitat caused by global warming, including more frequent and longer dry periods, placing further pressure on their existence. East African Community Secretariat (2012).

Success of a strategy is also recorded if there is decreased resource degradation and increased income-generation for local development. McNeely, et al., (1994) & Murphree (1995). The intensity of land use degradation in the study area puts a lot of

doubt on the possible continuity of the ecological links. This is because the human population growth in the area has led to expansion of agricultural activities, which limits wildlife habitat, and thus restricting movement outside the existing area. The common movement is that of wildlife moving from and within Ruaha National Park. In April to December each year, zebra are said to be moving from Ruaha National Park to the Community Wildlife Management Area. In December to June elephants also move in big numbers from the Community Wildlife Management Area to Ruaha National Park. Buffaloes tend to occupy this area in August to November and move back to Ruaha National Park in December. Animal movements and distribution across this area have recently (2009) been studied and it was reported during the field visit that there are ecological links between Ruaha Park and Udzungwa National Park TAWIRI, (2006). Elephant sign was detected continuously from Ruaha NP, through Idodi-Pawaga WMA, between Mtera Reservoir and the escarpment to the south eastward into the Nyang'oro Hills, on both sides of the Ruaha River. Downstream of Mtera north of the river to in Ilole FR, along the Ruaha River in the vicinity of Idodoma and Nyanzwa, east to the area around Malolo B (Kilosa District, Morogoro Region). Further east into the mountains directly north of Udzungwa NP, and south to the Dar-es-Salaam - Mbeya highway. Only one major crossing point of this highway has currently been verified and is located a few kilometers west of the village of Mtandika. Elephants can cross the Lukosi River and easily access Udzungwa NP. (TAWIRI, 2003). Many other wildlife species were detected in the more intact habitats across this corridor, including large predators (leopard and spotted hyaena, Crocuta crocuta), ungulates such as greater kudu and impala, and buffalo and giraffe in isolated locations. (TAWIRI, 2003).

### 6.3.5    Natural resource use and access mechanisms

Natural resources, other than land, used by the people of Idodi and Pawaga divisions from the local forests are bushmeat, fuelwood, building poles, honey and fruits, charcoal, timber, wild vegetables, rope, medicine, fishing, thatch grass. (Kulindwa et al., and Mungóngó et al. (2003) Wildlife is recognized as an important natural resource in both divisions because of the activities of MBOMIPA WMA. The study found that in accordance with the tradition of different ethnic groups resident in the two divisions, men control all resources, including land and income generated in a household Mungóngó et al. (2003) & Kulindwa et al., (2001.2003). Despite the woman's significant contributions to the household income generation, men remain the main decision-maker in the household Kulindwa et al., (2001.2003). Only in few households especially in polygamous cases both the partners share the decision-making process, or that the woman made the major decisions.

### 6.4    Conservation awareness and people's perceptions

"Local people's perception" in this study means awareness, concern and attitude of people living in the study area in relation to environmental changes and wildlife conservation. Most people said they participate in wildlife conservation and they don't mind having a regulated and controlled access to wildlife resources in the reserve/WMA, but urged that the government should immediately compensate the local people affected by wildlife crop damage, killed/injured by wildlife. They also emphasized on integrated indigenous resource management and knowledge in wildlife conservation. In this study local communities seemed to have changed their attitudes and perceptions towards the National Park and wildlife conservation and they said they often participated in meetings, providing information on poaching and some

participated in tree planting and problem animal control. However, a few people argued that they do not see any positive impact of WMA to a poor villager, instead WMA has led to accelerated human/wildlife conflicts because their land has been taken for conservation area (WMA) Simasiku, (2008); Msuha 2009 & Dickman (2008). They felt that if the land was still theirs it could have been utilized by communities for grazing or agriculture and therefore conflicts would be minimized. They also said law enforcement by rangers has led to hostility and resentment towards wildlife. The results are similar to which was obtained by Ruaha Ecosystem Wildlife Management Project in 1995, where they found that most respondents did not seem to benefit at all from wildlife conservation Wildlife Division, (1995). However, they said the indirect benefits include government's earning foreign exchange from tourist, protecting the environment linked to rainfall that is needed for farming. The study done by Mugisha, (2002) showed that overall attitudes, knowledge and behavior were not significantly different between CBC and non-CBC PAs, indicating that respondents at both areas were equally positive toward PAs.

## 6.5    Contribution of WMA in resolving the conflicts.

Poverty in communities is linked to a high incidence of conflicts between humans and wildlife Simasiku, (2008). According to Munyori (1992; 1992); Sindiga, (1999) and Sindiyo, (1992), human –wildlife conflicts are caused by resource utilisation in conservation areas. Factors contributing to conflict include socio-economic and political marginalisation, inadequate land tenure policies, insecurity, weakened traditional governance, vulnerability to climatic variability, and competition with wildlife Okech, (2007). Where wildlife - induced damages to human property and life are not controlled and compensated, negative local attitudes towards conservation and

wildlife resources become deep-rooted (Okello & Wishitemi 2006). This is worse when local communities do not benefit from wildlife resources. Extrapolating the results to all the rural community neighboring the PAs indicates that overall costs of the PAs are much higher than the overall benefits at CBC and non-CBC PAs Mugisha, (2002). These results are in agreement with Hackel's (1999) statement and that CBC programs do not increase benefits of PAs to local people, neither do they reduce costs of PAs to local neighboring people. Overall costs are computed on the basis that every farmer is growing all the listed crops and all of it is destroyed. Okech, (2007), reiterated that wildlife in many protected areas are threatened from human encroachment, insularisation, poaching for commercial or subsistence purposes, habitat degradation, encroachment of incompatible land uses, loss of migration and dispersal areas, and ever increasing human-wildlife conflicts.

In a chi square test the question was asked does the Idodi/Pagawa incur any Socio Economic costs in attempt to conserve wildlife within and outside the reserve? Independent variable is wildlife conservation and dependent variable is socioeconomic costs. From the chi-square analysis 83.4% of Idodi/Pagawa people agreed that they incur socio economic costs as they conserve wildlife within and outside the reserve through crops damage, 10.2% livestock predation 1.7% loss of life and 2.4% other reasons such as heavy penalties in trespassing in PAs. Thus the relationship between socio economic costs they incur in attempt to conserve wildlife was statistically significant X2 = 6. 961, df = 5, P <0.138.

### 6.5.1 Pastoral-human conflicts

The indigenous ethnic groups in the study area have fewer livestock than in the past, but other immigrant groups such as the Maasai, Barbaig and Sukuma have substantial livestock numbers. It is estimated that depending on the season and movement of pastoralists, in 2003 there were between 40,000 to 60,000 heads of cattle in the study area Mungóngó et al., (2003). Scarcity of land and water are one source of potential conflicts. Cattle rustling between the Masaai and Barbaig in the study area created antagonism between the tribes and has negative consequences on the environment. Personal Communication with local community leaders (2009). Currently the number of cattle have been greatly reduced, partly because of the drought which has killed them off, and partly because many animals have been sold in times of hunger to buy food.

Livestock keepers are reluctant to graze in good pastures in the mountain areas because of frequent theft. Thus livestock usually graze in the farms after harvesting, especially during the dry season. Also pastoralists have a tendency of grazing in the WMA due to availability of good pasture and water. This creates conflicts in resource use with wildlife and farmers. Dickman, (2008), reported that on average, people reported losing 1.2% of their livestock to predators every month in the study area, although long-term monitoring and follow-up visits suggested that the figure was around 0.26%.

### 6.5.2 Poaching in WMA

As the local community members graze their cattle in WMA, they then resort into illegal practices such as poaching. Poaching records for the years 1989 – 1993 show

Kipera village is a well-known center for poachers, however, 64% of all poachers apprehended were originating from Idodi and Pawaga divisions. Kipera village is not part of the WMA, but due to the rampant poaching incidents they are planning to include the village in the WMA. TRAFFIC (2000) estimated that 66% (ranges from 19-99%) of animal protein requirements for rural communities is derived from bush meat (illegally). This an informal economy often leads to increased human-wildlife conflict, to the detriment of wildlife conservation. Between 1970s and late 1980s, poaching in Tanzania increased tremendously and affected most of wildlife populations especially elephants (Wildlife Division, 2009). The Government instituted enforcement measures including anti-poaching operations to curb the situation. As a result poaching decreased and wildlife populations increased (Wildlife Divison, 2012). However, between 2008 and 2012, poaching increased again mostly targeting elephants.

Similar situations happened in Kenya and according to Okech, (2004) illegal killing of wildlife for bush meat also took place in Kenya and it occurred in 96% of the protected areas. The danger to biodiversity arising from human-wildlife conflicts (such as harm to people and property, and retaliatory killing of wildlife) occurred in 82% of protected areas, followed by large mammal poaching for the international commercial trade in trophies and other animal products which occurred in 80% of the protected areas. Human encroachment in terms of the density and distribution of the human population around protected areas occurred in 72% of the protected areas, while loss, conversion and degradation of wildlife migration corridors and dispersal areas occurred in 70% of the protected areas.

Among the reasons which result in high poaching in the study area are the weak anti-poaching units. Game scouts under Ruaha NP, Wildlife Division and local government authorities are few and their management is underfunded. For example in the 1980s RNP was spending about 72.4 US\$ $km^2$ per year while the adjacent Rungwa/Kizigo/Muhesi GRs spent only 2.5 US\$ $km^2$ per year for all development and recurrent expenditure (TANAPA, 1989;Wildlife division, 2009). The Local authorities and WD are also involved in controlling problem animals. With ranger force of 72 and an area of 10,200 $km^{2,}$ each ranger in Ruaha is supposed to patrol on the average 142 $km^2$. The recommended ratio is 25 $km^2$/scout. Currently the rangers from the Wildlife Division, the Park and local authorities are all working together outside the protected areas. However, the results from this study revealed that the number of poachers has been decreasing since WMA was established.

There is also a problem of illegal harvesting of forest products in the WMA, and most likely over utilization of forest products in the surrounding communities, this threatens the ecological integrity of the WMA. Local extinctions of rare species and small populations as habitats become more isolated. Because of discontinuous habitat, dispersal of both animals and plants becomes difficult, and this has more effect on amphibians and reptiles than mammals and birds. Habitat isolation also reduces plant diversity and quality and hence animal diversity will also be affected.

### 6.5.3 Crop damage in WMA

Crop damage is rampant in most villages in the study area (Mungóngó et al., 2003 & Dickman, (2008). In 2003, in most villages, it was estimated that crop damage each year by wildlife was between 5% to 15%. In Uganda over 40% of group ranch

members experience crop damages annually by wildlife (Okello & Megquier 1999; Okello and Conner, (2000) & Okello & Hadas (2000). Problem animals inflict damages to property and cause loss of income and food security Naughton-Treves, (1998). Other research findings also indicate that crop raids lead to negative attitudes. For example, in Royal Badia National Park, Nepal, Studsrød & Per Wegge, (1995) found that a community that was experiencing more elephant raids was more negative to the national park than other communities that were not experiencing a similar crop-raiding problem. However, Dickman, (2008) reported that most of the total cultivated area reported of the damaged acreage of crop is often exaggerated so that they can get compensation. Wildlife is abundant in the WMA and they move frequently to the farm areas. The principal species involved include elephant, buffalo, wild pig, and baboons. Elephants move extensively throughout farmlands and settlement areas, and are a source of human-wildlife conflicts. While communities are now appreciating the value of wildlife, the continued problem of crop damage may negate these values, especially if the benefits obtained from wildlife are small compared to damages made and also if compensation programme are not effective and efficient. Some villages of the Idodi and Pawaga Divisions in the WMA have a relatively high human population, therefore are encroaching on Ruaha National Park (RNP), and are affected by being close to RNP and its wildlife. Songorwa, (2002) & Kidegesho, 2004, 2008).

## 6.5.4 Human wildlife attack

Although not as common as attacks upon livestock, the human − wildlife attack is a serious problem in the study area, the problem animals include leopard, elephants, lion, hyena and python. Msuha, (2009).

Elephants occupy roughly more than a quarter of Tanzania's total land mass, and thus frequently come into contact with millions of rural Tanzanians. High levels of conflict with wildlife in MBOMIPA are similar to or higher than has been documented in northern Tanzania. (Dickman, 2008; REWMP, 1993). However, the reported magnitude is most of the time greater compared to reality.

Population increase, land scarcity, poverty, lack of incentive or tangible benefits and lack of awareness seem to be the major contributing factor in the conflicts in the study area. This ahs been supported by Dickman, (2008) & Perez et al., (2006). Other reasons are the limited government capacity to deal with problem animals and difficulties in scaling up efficient and effective mitigation measures Wildlife Division, (2009). Omondi in his study have shown that the deep-rooted factors that cause conflicts are local culture, society and attitudes towards protected areas, conservation authorities, and concerns over insecurity of land tenure, experiences of past evictions from areas gazetted as reserves, concerns over the threat of land alienation in the name of wildlife conservation (Rao 2002 & Perez 2006).

From literature review, it is clear that natural resources are limited or scarce, population is increasing and that there are many different stakeholders with different interests or ambitions over the land and resources in it Hadins, (1968). Six main groups of stakeholders have been recognized in the study area. They include Central government, Local government, Local communities, Non-Governmental Organizations, Commercial/industrial investors, International organizations and donor communities. Because different stakeholders have different motives, conflicts and resource over-utilization is inevitable and therefore it is important to sustainably utilize the resources through planning and monitoring by involving the stakeholders.

Impacts of conflicts some of which are direct and others are indirect include local people resentment, increased poaching and retaliation. Others include deforestation, overgrazing, soil erosion, habitat destruction, depletion and or extinction of flora and fauna (biodiversity), encroachment, land degradation, soil infertility, drought, low yield in agricultural and livestock production. The end result from environmental destruction and poverty is global warming and climate change. Indirect impacts include decline in tourist numbers as the attractions are degraded, revenue accrued from tourism decreases and thus the national economy also is reduced.

## 6.6    The WMA in enhancing socio-economic well being and poverty reduction.

### 6.6.1    Agriculture and socio-economic wellbeing

In the study area, each household usually cultivates about 2 acres or more depending on the farming technology and family labour. The capacity for irrigation is in 2003 was 325 ha for Idodi and 10,000 ha for Pawaga divisions respectively. However, area under irrigation cultivation is 275 ha and only 1,250 ha for Idodi and Pawaga, respectively. In 2003 a high proportion of farmers (80%) are using hand hoe while in 2009 only (70%) of farmers used hand hoe and a few are using oxen and power tiller (small tractors). Like in MBOMIPA, Ellis, (1993) indicated that the socio-demographic data indicate that communities neighboring PAs are typical peasant farmers in Kenya. They live a subsistence lifestyle on marginal lands and entirely depend on land resources mainly through crop cultivation and raising of livestock as dominant activities. Mugisha, (2002) also in his study also pointed out that the local communities around PAs in Uganda are characterized by having small, but diversified farms, and are themselves differentiated along family, clan, and or ethnicity lines.

Diversification of the farms and the people is considered as a coping mechanism in such a harsh socio-economic and political environment among the poor and marginalized Mugisha, (2002).

Farmers in the study area have preference to different types of farming technologies. The reasons for farmer's preference in using different farming technologies include poverty, people cannot afford to hire a tractor because currently one acre costs about 15,000/= to 20,000/= TSh compared to year 2003 when it was 12,000/= and 15,000/=. Farmers' perception is another reason, they claim hand hoe is labour intensive, less efficient and does not dig deep enough to mix the soil well, therefore not very good for agriculture. Ploughing with tractors digs too deep, which brings the sand to the surface and takes the fertile soil down which means crops cannot reach the fertile soils. Therefore oxen is preferred by many farmers because it does not dig too dip, but is hindered by its cost 8,000 - 10,000/= TSh. per acre.

Many villagers reported that in 1990s one could harvest 10 sacks or more of maize and about 20 sacks of rice per ha and in 2003 only 6 and 15 sacks, in 2009 the number of sacks has increased to some farmers who have access to fertilizers. The reasons given for decrease in production among others are unfavorable weather (e.g. as drought), pests, poor farming technology (hand hoe), labour constraints, lack of enough water for irrigation, lack of agricultural inputs which include fertilizer for most farmers, decrease in soil fertility, low capital, livestock grazing in farms and crop raiding by wild animals.

Agricultural products are marketed by private traders and periodic markets (magulio). The major complains from farmers is low prices offered by traders relative to the cost

of production. During harvesting period prices are very low in the village markets. Farmers are forced to sell most of their harvest because they need money for school fees, medical and clothing. Most of their resources are used to buy seeds, fertilizers and other farm expenses such as labour. The level of education is also presumed to affect rural poverty since lower educational attainments hinder farmers, not only in their access to information and knowledge about technology, market and credit, but also in utilising these in order to increase agricultural productivity.

Community conservation aims to provide an incentive for the sustainable management of biodiversity resources, by linking their maintenance with poverty alleviation or livelihoods benefits for the people living in their vicinity (Salafsky & Wollenberg, (2000). This has in some WMAs typically achieved through wildlife-linked enterprises, such as tourism or hunting Hughes & Flintan, (2001) & Louise et al., (2010).

### 6.6.2 Conservation and poverty

Advancing the poverty-conservation debate has, however, proved difficult in the face of little quantitative evidence on which to support conclusions (Stewart et al., 2005). Consequently, much of the current scientific thinking on the relationship between poverty and conservation is based on expert opinion rather than data from well-designed monitoring studies (Pullin et al., 2004).

The poverty levels for the villages surrounding the Idodi-Pawaga WMA is wide. Attempts on wealth ranking as per FGD using the following criteria (income, ownership of large number of farms, cattle, big shops, modern house, milling machine and area of land) shows villagers to be poor, very few appear to be better off. The

analysis done in this study focuses on the national or international standards of poverty monitoring indicators as defined in the Government's Poverty Reduction Strategy Paper Mkenda, (2004). These include; household members education, economic activities, household expenditure, consumption and income, ownership of consumers goods and assets, housing structure and materials, household access to services and facilities and food security. Christophersen et al., (2002) supports these criteria.

Poverty profile therefore looks at the relationship between income poverty and other characteristics of households and individuals. It looks at how far poverty is associated with household demographic structures and with economic activities of its members. It also looks at the extent to which the distance to and uptake of social services is related to income UNDP, (2000). Economic activities in the study area include farming, livestock keeping (mainly by Maasai, Sukuma and Barbaig), fishing, tourism, legal hunting and also illegal hunting. Others are beekeeping, shop keeping, trading, and laborers and to a lesser extent employment opportunities and other revenue generating sources for each village like charcoal burning and harvesting timber. The percentage of the rural population producing food enough for home consumption has dropped. Food security is one dimension of poverty, i.e. assessing whether a household can meet its food needs and its vulnerability to shocks. The majority of people are still living below poverty level that is 1.02 USD per day. Exchange rate 1.617 TZS (2009). The food consumption pattern is dominated by starch very little protein and fat despite the fact that they have a wide range of foods. Most villagers have two meals a day, i.e. breakfast and dinner or lunch and dinner, which is reduced to one meal during dry seasons. It has been found that household

spend the highest proportion of income on food, education and health are lowest. The proportion of household expenditure that is devoted to food is usually related to a household's income. However the trend shows a slight increase in household consumption with time.

In a baseline study done by Mungóng'o et al., (2003), all the villages visited complained about the inadequacy of socio-economic services. But in this study generally, there has been a decline in the distance to a number of important services including schools, dispensary, markets, shops and public transport with the exception of banks and police stations which are still far away from the villages. The common source of energy is still fuelwood as it was in 2003. However, the distance to firewood has increased because most of the forests resources have been depleted. There has been little change in the use of a toilet over the years, the majority still use simple pit latrine, the numbers of households with no toilets has decreased significantly as a result of environmental/ health campaigns and also the level of literacy. In 2003 health services were very limited but currently the distance to health centres has been reduced as shown in the household survey National Bureau of Satistics (2007).

People tend to focus very much on the physical capital (by providing new technology and infrastructure), the financial capital (by providing credit) and the human capital (by providing skills and training) but very often people's access to natural capital and the key role of the social capital of households is not considered as an important requirement for development Nibuye, (2010); OECD. (2005) & Roe, et al., (2002). Poor people in rural areas may have only their labour capacity (human capital) and

they can generate financial capital through their labour, but they have very limited direct access to natural capital, low levels of education, knowledge, and a very low social status weakens their social capital base. Roe, et al., (2002). Similarly, their unfamiliarity with financial capital may leave them at a disadvantage if they find themselves involved in market transactions, even if they have products of potentially high market value. Roe, et al., (2002).

A household's access to adequate livelihood assets is affected by many factors over which household members themselves may have little control. Olenasha, (2005). These factors might include: Seasonal changes, which reduce or increase the availability of different resources at different times of the year; longer-term changes, e.g. population, environmental conditions, patterns of governance, economic conditions and technology; shocks, such as natural disasters, or episodes of disease or ill health, which may suddenly reduce households' resource base or their access to key livelihood assets. Nibuye, (2010). The number of households in the study area owning land for agriculture or grazing land has been reduced. This is because population is increasing but the land size is same. Despite the overall importance of agriculture in rural areas, however some household depend on a wider variety of income sources. Households with larger number of sources have higher average incomes. Such diversification seems to be important way of rural household to raise their incomes instead of relying only on sale of livestock or agriculture. There are also large differences between average incomes of men and women, men earning more than women. There is a number of factors that contribute to these differences which include most men are the head of the families so they need to work hard to provide for their families. But also few women are educated compared to men and income

sources vary between individuals depending on the level of literacy even among men. There has been a slight improvement on the proportion of households built with modern materials i.e. concrete, stones, cement and metal roofing.

The proportion of households owning selected consumer good (such as radio, bicycles, stove etc) has increased over the 1990s though not uniformly. Socio-economic survey (1990). There are a few exceptions to this trend. The ownership of household assets may be considered an approximate indicator of a household's wealth. National Bureau of Statistics Tanzania, (2010); Naughton-Treves, (2005); & Ministry of Planning, Economy and Empowerment, (2005).

Apart from revenue from agricultural activities the villages depend on the revenue from wildlife hunting in the WMA, animals hunted are elephant, buffalo, eland, kudu, gazelle, leopard and lion. Part of the funds accrued from the legal tourist or resident hunting is returned back to WMA and is used for building schools, dispensaries and payment of fees for orphans and poor children. Generally the majority of the respondents acknowledged that the country is getting socio-economic benefits from wildlife conservation which includes economic benefit such as foreign exchange from tourism, recreational areas and ecological benefits of wildlife conservation - non-use values of wildlife (aesthetic). Benefits at individual level were not recognized by the locals. The situation in Amboseli in Kenya is similar to MBOMIPA, despite being one of the most cited examples of protected area retuning benefits to local communities, the goals of the Amboseli Park agreement are still largely unrealized. Kiss, (1990). The piping system has not been fully functional for more than ten years. Compensation was terminated by government financial constraints in the early 1980s. The dispensary built for communities is well-utilised, but the school is not. Tourism

development on Maasai lands has been minor because government commitments have not been honored, the masai still use springs in the park to water livestock. To date , however, the Masai have received few of the benefits promised in the plan and have done little to modify their use of the park. Despite all the drawback, community-based conservation activities, have promoted dialogue with communities, which has been appreciated by most PA staffs. In addition CBC programs promoted regulated access to PA resources for some communities. The communication avenues between the PA managers and the local communities is a step toward positively changing community attitudes who have always felt isolated and neglected in the PA management programs (Abbot et al 2001; Mutebi per.com 2000).

In a chi square analysis a question was asked has the designation of the WMA had any Impact on Idodi/Pawaga community? Independent variable is wildlife conservation and dependent variable is socioeconomic benefits. From the chi-square analysis 5.4% of Idodi/Pagawa people agreed that they benefit from wildlife conservation within and outside the reserve, 89.2% said they don't benefit and 5.4% said they don't know. Thus the allegations that there is no significant socio economic benefits accrued from designation of the WMA to conserve wildlife was statistically significant $X2 = 67.571$, $df = 5$, $P < 0.000$.

## 6.7 The WMA management and decision making process and local democratic culture

According to the WMA Guidelines (2002) and Regulations (2012), several institutions are mentioned as the main players in the management of WMAs. At the local level, these include the Authorized Association, the Village Council, the Village

Assembly, the District Council and the District Natural Resources Advisory Board. At the national level they include the Ministry of Natural Resources and Tourism, Wildlife Division, TANAPA, NCAA, TAWIRI and Non-Governmental Organizations (NGOs).

The institutional set up put in place to manage wildlife resources is very well organized, and the level of awareness for some issues seems to be high to some individuals. If given the necessary financial and technical support these communities can manage wildlife resources reasonably well. This was also pointed out in the baseline study done in MBOMIPA Mungóngó et al., (2003); and also a baseline study done in Burunge WMA Kulindwa et al., (.2003).

Policies are usually decided upon at different levels of government, but they affect how villages and households are able to take decisions or make use of the livelihood assets at their disposal Ghai, (1994). For example, policies to protect the environment by controlling natural resource use (e.g. in PAs) may make it more difficult for poor people to gain access to resources they normally use to support their livelihoods Ghai, (1994). Therefore the process by which policies are formed may be as important as the policies themselves. Groups of people who are not consulted about policy, or are not represented in the mechanisms that lead to policy formulation, will have no way of influencing what policies are decided upon and therefore may be affected positively or negatively. Outlined below are the comparative analysis of rights, responsibilities and linkages between each institution and stakeholders which are important so as to ensure smooth implementation of WMAs:-

The institutions such as the V.C. and AA they have been given responsibilities which need vast experience, capacity and skills to manage the ecological, financial, human

resources and physical resources. From literature reviews and field observation it is evident that just like in other WMAs in and outside the country the AA is generally weak in human capital to be able to manage and perform effectively and efficiently its functions. Walsh, (2000). The studies shows that there is a obvious gap in skills such as, how to form community-private sector partnerships, access to market information and making decisions based on such information how to negotiate and enter into joint ventures, good entrepreneurship and accessing capital to finance community wildlife enterprises.

The District Game Officer (DGO) is a primary facilitator for the implementation of the WMA strategy. The facilitation responsibilities and also conducting problem animal control in collaboration with the relevant AAs require enough financial, human resources and equipment. In this study local government institutions were analyzed in each of the visited villages to see their effectiveness. Generally, there are weaknesses in governance in all the villages. Leaders elected or chosen to lead the various institutions, including the village government, are not trained to do their duties efficiently.

Village government income and expenditure varies from one village to another depending on the various sources of income, immediate needs, vision and stand of the committee and village government. The most common income are district councils subvention, taxes, penalties, income from wildlife conservation and also small money from local individual contribution to development activities. Expenditure on the other hand includes allowances for village game scouts on patrol, stationeries, office repairs etc. however, there are some problems with proper accounting of revenue, and also in transparency.

The framework for wildlife conservation in MBOMIPA WMA is in place and game scouts from member villages do patrols to combat illegal use of natural resources on rotational basis. However, major challenges include the low cash allowances to the scouts and poor working facilities. These include but not limited to lack of transport, communication, uniform and food. These hinder the performance of wildlife protection against poaching. It was also found that the committee responsible for managing natural resources is less active in its responsibilities probably because the members are not well motivated or they are not sure of what they need to do. Since conservation efforts undertaken at the initiative of local communities and grassroot organizations with varying degrees of financial support of Central Government, local and foreign donors Mung'ong'o (1996). Kellert et al. (2000) in their study of five case studies from Nepal, Kenya, Alaska, and Washington found that one of the weaknesses of CBC programs especially in the developing countries was failure to empower local people and their institutions.

Principles of good governance are not imparted to them and their responsibilities are not properly understood. In a study done in Selous Game Reserve, discussions with Sogea Mbele residents suggested that Village Government is important to them, however, analysis of how village government income is spent suggests that little goes into local investments Ashley (2002).

## 6.8    Summary findings

### 6.8.1   Nature and extent of human wildlife conflicts

Scarcity of land, water and cattle raiding are a source of conflicts amongst the indigenous ethnic groups who have fewer cattle compared to immigrant groups such

as the Maasai, Barbaig and Sukuma. Pastoralists have a tendency of grazing in the WMA due to availability of pasture and water. This creates conflicts in resource use with wildlife. However it was reported that currently the numbers have been greatly reduced partly because of the drought which has killed them off, and partly because many animals have been sold in times of hunger to buy food.

The study established that there are two types of poaching in the study area. 80% of poachers are for subsistence who is interested in meat for pot, fish and honey. They are mainly set out to trap smaller animals such as rodents, birds, antelope, porcupines, bush pigs and warthogs while commercial poaching is done for large profits gained by the illegal sale or trade of animal parts, meat etc.

Elephants, monkeys and bushpigs were the main species cited as crop raiders. Elephants occupy roughly more than a quarter of Tanzania's total land mass, and thus frequently come into contact with millions of rural Tanzanians. Crops heavily raided in the study area include maize, rice and sweet potatoes, groundnuts and pumpkins.

Human attack is a biggest problem especially in Idodi and Pawaga Divisions which are in close proximity to RNP. The study shows that since 1990 to 2004, lions have killed more than 560 people in Tanzania and injured at least another 308 were injured. (Packer et al. 2005). Animals involved include leopard, elephants, lion, hyena and python. Livestock depredation is also a common problem. In 2008 reports indicated that people were losing 1.2% of their livestock to predators every month.

Between 1975 and 1995, more than 350 people were killed in Liwale, Kilwa and Rufiji Tanzania while at least 80 people were injured **(Figure 5.9).** According to Kidegesho (1995), the annual rate of attacks has been increasing markedly over time. According to wildlife management regulations in Tanzania animals that threaten

human life and destroy property (crops, livestock), are referred to as "problem animals and may be shot therefore leading to decline in wildlife numbers.

### 6.8.2 How has the WMA contributed to local household's wellbeing and poverty reduction?

The study established that population trend in the study villages shows an increase from 23,656 in 2002 census to 27,068 in 2012. Likewise the average household number has decreased from 5.9 in 1991 to 3 in 2009. Currently on average the household size range between 3 and 5 people, with an average of 4 people per household. It was found that in the WMA most about 59.7% of households are poor, a few about 30% middle class and very few 9.4% who are well off.

The study established that in 2009, 39.9% of households were reasonably close to primary health care facilities compared to 25.5% in 1999. The average distance to a dispensary appears to have shortened slightly to 2kms while hospitals are still far an average of 40 kilometers. Water sources are not enough to cater for human, livestock and wildlife therefore there is competition during dry season. The distances from the villages to social services vary greatly from one village to another. For example in 2009, over 50.3% of household were reported to walk one to two kilometers to obtain water compared to 3.6% in 2001 and 6.1% in 1992. In other villages about 16.5% go up to 6+kms to fetch water in 2009 and in 1992 and 2001 it was 48.9% and 43.8% respectively.

### 6.8.3 To what extent has the WMA contributed to wildlife management/ environmental conservation?

Deforestation, encroachment, poor irrigation system, poor agricultural and livestock practices, unplanned charcoal making, timber cutting are visible in some part of the

study area. The majority of household interviewees (71.6%) acknowledged the importance of wildlife as inputs into other productive sector. They also acknowledged that soil and environmental conservation is a very important aspect that can help in the survivals of rivers. This shows that through WMA local community have increased their knowledge and awareness on the importance of wildlife conservation.

Study results indicated that there are still many animals in the study area. Over 500 bird species and 57 mammals in the WMA. Some species are endangered e.g. wild dogs, elephants, dikdik, kudu, ostrich and eland. Other species such as gazelles, hippos, fish and crocodiles are threatened due to illegal hunting/fishing and climate change.

Some species such as elephants migrate and they follow special routes and the migration takes place during the dry season.

The study also established that the type of vegetation varies greatly in the study area. The dominant plant species are Mikungugu, Mibuyu, Milama and Mihangu. They also include Acacia spp., Commiphora spp., and Combretum spp., Miyote, Mikochi, Mninga and Ilapula. Threatened plant species in the study area include Mibuyu estimated at 28.6% of total area, Mikungungu 42.9%,.Milama 14.3% and Mihangu 14.2%.

### 6.8.4   Contribution of WMA towards local people's socio-economic well being and poverty reduction

The study established that local forest is depended upon by the local people for woodfuel, charcoal, building poles, timber and/or thatch grass, beekeeping, fishing or

mining. Majority of people (70%) acknowledged that there is adequate supply of pastures and they preferred to have regulated and controlled access to wildlife resources from the reserve/WMA. About 66.3% of the respondents are farmers while 22.7% are doing farming and small scale livestock keeping except for Wasukuma and Maasai who keep cattle but they are nomadic.

The study established that the main economic activities include farming about 66.3% and 22.7% are keeping livestock at the same time doing farming. Most farmers about 73.8% use hand hoe and depend on rain fed agriculture, although the irrigation potential of the area is vast. In Idodi 325 ha and 10,000 ha in Pawaga divisions can be used for irrigation. However, area under irrigation cultivation is only 275 ha and 1,250 ha for Idodi and Pawaga, respectively. Major crops grown include maize and rice and 56.1% of households produce enough food for their family, the rest 43.9% do not. Villages/household indicated that there is decrease in farm productivity which is associated with drought, and lack of agricultural inputs due to low capital including land.

The study established that Tourist hunting is one of the benefits accrued from wildlife conservation. Animals hunted include elephant, buffalo, eland, kudu, gazelle, leopard and lion. Part of the revenue accrued from the legal tourist hunting about USD 54,723 has been returned back to WMA in 2012. Some of the funds are used for building schools, paying school fees for orphans and poor children. Some funds about 39.8% are used in village development schemes like building dispensaries. Most of the respondents (77.2%) agreed that WMA are of value and a useful approach towards wildlife conservation.

Food security is one dimension of poverty i.e. assessing whether a household can meet its food needs and its vulnerability to shocks. The trend in household food consumption by category has been increasing since 1991. The study established that it has been found that rural household spend the highest proportion (39.05%) of income on food, the expenditure on education and health is lowest (1.07%). About 60.6%) are still living below poverty level that is 1.02 USD per day.

The results from the study show that there has been little change in the use of a toilet over the years from 1991 through to 2010. Most of the respondents (88.3%) are still using simple pit latrine compared to 90.3% in 1991. However the number of household with no toilets is decreasing from about 8.7% to 5.4%. The distances to important social services such as markets has decreased from 5.3 in 1992 to 2.7 kms in 2009 while that for firewood has been increasing. From 3.2 to 5.1 for the years 1992 and 2009 respectively,

A deliberate move have been done to ensure the life standards of the rural people is improving including giving them subsidized farm inputs such as fertilizers

### 6.8.5   Has WMA framework enhanced local democratic culture in natural resource management?

The income sources for village governments depend on development levy (10% of the collected), cess from petty trade in the villages and fines for by-laws violators. Wildlife quota and other natural resources income range from 40% to over 80%.

In 2007 for example villages received on average about USD 2800.00 each. Currently they get up to USD 4500.00 million per village from wildlife alone. Village expenditure varies from one village to another depending on the various sources of income, immediate needs, vision and standing of the committee and village government. Expenditure is on allowances for village game scouts on patrol, stationeries and office repairs to mention a few.

The study established that Local communities do not often participate in the management of the reserve neither do they participate in decision making, only a few (38%) participate through meetings and many of them (91%) participate in providing information on poaching. They however, acknowledge that WMA has been fairly effective in enhancing awareness on wildlife management, participation and positive attitude and perception on wildlife conservation.

Generally, there are weaknesses in the local government institutions' governance in all the villages. The main weaknesses are with regard to accountability, transparency and sustainability. This is a result of lack of knowledge, skills and capacity. **7**

# CHAPTER SEVEN

# CONCLUSIONS AND RECOMMENDATIONS

## 7.1    Overview

This chapter presents the conclusions based on the main research specific objectives. It raises and presents a number of recommendations that could aid interventions and future research.

The study has been carried out after more than twenty years of CBC activities in Tanzania and results indicate that WMA as an approach to CBC has not performed as expected. This does not mean that the WMA approach should be abandoned, the results are influenced by the prevailing social and economic conditions at the time of conducting this research. Such conditions could improve for the better in the future, to enable WMA to perform and achieve the desired results. Attitudes and behavior changes among people can take a relatively long time thus it may be difficult to detect widespread changes in the population.

## 7.2    Conclusions

From this study the following conclusions were arrived at:-

1.  Population dynamics affects the degree and rate of use of natural resources. This study reveals that availability of natural resources is a determinant factor for population size and density, their migratory and settlement patterns in the study area. Therefore any failure to take into account of population dynamics can lead to failure in conservation initiatives and thus vulnerability of people to poverty

and natural disasters like drought or flooding, encroaching and destruction of forests, watersheds and the wetlands are a consequence.

2. Currently, it seems local communities are not fully aware of conservation issues, benefits accrued from wildlife conservation and the sharing mechanisms. Very few people participate in wildlife conservation. Land tenure regimes, socio-political institutions and their relationships in resource use are not well understood by many stakeholders leading to raised expectations, which create negative attitudes in the long run if they are not fulfilled. Neighboring communities still feel that the PAs are a liability.

3. The success of the WMA understudy is largely based on the land use and management plans which should be implemented or adhered to optimize conservation measures, benefits and livelihood improvements.

4. The fact that some local community members do not recognize the intrinsic value of wildlife to the rural people, nationally and internationally in itself is a problem in the WMA. This may be caused by the poor working skills and lack of incentive to encourage the locals to avoid poor land use practices, poaching and actively engage in conservation measures.

5. Human–wildlife conflict creates  negative impacts on local communities in terms of loss of life or injury to humans, and animals, competition for scarce resources to loss and degradation of habitat.

6. Even after all these years, contribution of WMA is not at household level, which is something that the local communities desire. The policy, institutions and processes are not supportive in achieving an adequate livelihood to local communities i.e., to have adequate access to social, physical, financial, natural

and human capital assets (like land, infrastructure, water, credit, market or social support).

7. Poverty levels are strongly correlated with education and therefore limited participation in planned conservation measures. Income levels at the Village Government, community and household levels are very low and most people are poor as they cannot afford to even have three meals per day.

8. The implementation of the WMA has helped to boost the villages' incomes from MBOMIPA hunting quotas but little is coming from other type resource utilization such as live animal capture, photographic, cultural and ecotourism but can be improved through encouragement of local community diversification of activities instead of relying from hunting alone.

9. Findings in this research indicate that law enforcement is a factor that influences people's behavior. If there are high chances of being detected, members will choose to obey rather than violate the laws.

10. Decentralization to community structures is not effective without capacity building. When local authorities or local governments have wider mandates it becomes a disincentive for conservation. Principles of good governance, accountability and transparency are not imparted to the WMA leaders or their responsibilities are not well explained to enable them to do their duties efficiently and effectively.

## 11. Contribution to knowledge

This study has contributed to knowledge on the current status of types, distribution, and availability of wildlife resources in the study area. The study also has unveiled the magnitude of tensions of land use conflicts and stakeholders motives caused by access

to natural capital resources and inadequate incentive packages that accrue from WMA. The conflicts are exacerbated by People's perception on WD conservation after WMA establishment that is the effects WMA has on other land uses (e.g., pastoralists/Agricultural). The study reveals how the other land use practices on the other hand have impacts on environment and natural resource and the Local livelihood systems, decisions and dependency on natural resources.

## 7.4 Recommendations

1. Conflict management strategies therefore need to go beyond translocation of people for PAs or establishment of WMAs, regulation of population size and preservation of endangered species or habitat. Management approaches that attempt to use scientific research for better management outcomes should be encouraged, such as peoples' behaviour modification and reducing interaction between wildlife and human. As human-wildlife conflicts inflict direct, indirect and opportunity costs, the mitigation of human-wildlife conflict is an important issue in the management of biodiversity and protected areas.

2. The WMA strategy should ensure that sustainable wildlife conservation is successful as it reduces local people's vulnerability to natural disasters like drought or flooding by protecting watersheds, wetlands and local microclimates. Land use plans and management plans so far developed in the WMA should be adhered to so as to reduce conflicts among stakeholders and also to stop land degradation and encroachment.

3. Local communities have the power to influence population dynamics, therefore the Government should advocate for effective campaigns to ensure

population control and have healthier individuals who are capable of managing the local natural resources.

4. There is a need to design and implement education programs that are relevant to conservation problems and effective in influencing people's attitudes and behavior. Education programs should emphasize on conservation and ensure local communities participate fully in wildlife conservation in and around the PA network. Through awareness, education and best practices a range of strategies to prevent human wildlife conflicts such as crop damage by elephants will be attained.

5. There is a need to strengthen PAs' management to ensure that there is effective surveillance and high levels of detecting illegal activities. Ensure the laws/by-laws are enforceable by improving the working conditions of the game scouts (i.e. working gear and financial) and incentive to local people such as improving modality for benefit sharing, attractive compensation schemes for crop damage, livestock predation and human killed/injured.

6. Diversification and integrating conservation with rural development activities will contribute to poverty reduction efforts while sustainably managing the country's biodiversity resources. In addressing this issue, accountability, transparency and sustainability of programmes is essential and elected leaders at various levels should be trained in principles of good governance, accountability and transparency so as to enable them perform tasks expected of them.

7. More economic opportunities must be identified. Improved agricultural activities (including irrigated agriculture), other alternative eco-friendly activities and value addition as well as proper market opportunities and good

roads are needed to spur development and ease pressure on the WMA and minimize over dependence on the local natural resources.

8. Monitoring and evaluation of WMA activities is an essential part of the implementation.

9. There is a need to design policy interventions that focus on activities that address individual values, which have linkages with people's livelihoods. Such activities or conservation themes would be meaningful and valuable to the people on an individual basis, and they will serve as incentives to promote pro-environmental behavior.

10. Collaboration with external private or NGO partners is essential as it enhances the local leaders capacity to harness knowledge, financial resources and market linkages as well as optimizes businesses practices for effective management.

## 11. RECOMMENDATIONS FOR FURTHER STUDIES

- Cost benefits analysis and comparative advantages of WMA vs. other land uses in the study area.

- Studies to explore other best practices of benefits sharing mechanisms

- Continue researching for methods for resolving human wildlife conflicts such as crop raiding (using of chili, bee colonies etc.)

- Studies on compartible income generating activities other than natural resources under these WMAs new approach.

- Inventory of wildlife species specifically in WMA

- Socio-political institutions should be analyzed at the micro level in order to get a better understanding of their relation to resource use decision-making process.

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# APPENDICIES

## APPENDIX I: ADVANTAGES AND DISADVANTAGES OF CONSERVATION MODELS

| Model | Boundaries | Participatory management/utilization | Ownership of resources | Institutions stakeholders | Tangible benefits | Policies, Laws & regulation | Ecosystem approach |
|---|---|---|---|---|---|---|---|
| Traditional Preservation and Protectionism model | Well defined conservation boundaries Main focus was on specific endangered species and area | Collective management mechanisms to control and regulate resource use is through chiefs order | People were not evicted from their homeland The people are the custodians of the resources | Rational system/institutional | Does not march with current development | Chief controls the resources | Managed at micro |
| Yellowstone model Integration between preservation and protection | Well defined conservation boundaries | Utilization of resources was according to the policy document and legal instruments achieved limited success, mainly because participation has not been enough to stimulate population to support conservation | Local community delineated from the resources | Conflicts among PAs management and local community, | Benefits are through the government/development activities | Supervised and protected by the armed Game wardens | Managed within specific boundaries |
| Post-colonial Integration between preservation and protection | Common/specific terrestrial habitats identified and protected Well defined conservation boundaries | Achieved limited success, mainly because participation has not been enough to stimulate population to support conservation | Inherited from colonial system where the government is the custodian Local community delineated from the resources | Conflicts among PAs management and local community, | 25% Benefits accrued from wildlife to districts/villages | Conventions were adopted widely for the continued management of PAs Formal laws and regulations supervised and protected by the armed Game wardens | Individual PA approach |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Community Based Wildlife Conservation Practices Carrot and stick | The resources are now utilized sustainably due to the planning | Local communities are allowed to participate in the planning process and decision making | Government | Stakeholders involved Institutions in place but efficiency and effectiveness in question Skills to manage the reesources/funds Accountability issues Good governance issues | Benefits accrued from wildlife are shared amongst relevant stakeholders, therefore poverty reduction. | Wildlife laws/regulations bylaws | Managed at its own boundaries |
| Intergrated planning wildlife conservation model Carrot and stick | Ecosystem approach | Stakeholders participation | Government | Well Skilled staff to manage the village institution Remunerated game officers Accountability control in place Avoid conflict of interest Board /staff members Entrepreneurial skills emphasis (beekeeping, fish farming, carbon credit selling) More inclined to imparting awareness on different issues | Benefits to reach individual level not only leaders | Wildlife laws/regulations Bylaws and any relevant laws such as land laws, environmental acts (IA) Capital growth assets are essential | Ecosystem approach Research oriented Information dissemination |

## APPENDIX II: TWELVE BASIC STEPS IN THE FORMATION OF A WMA

1. Village Assembly agrees to form WMA based on Village Council recommendations.

2. Villages form a CBO and register it at Ministry of Home Affairs

3. CBO prepares a Strategic Plan

4. Villages prepare Land Use Plans, which must be surveyed and registered

5. Land use plans are subjected to EIA

6. Villages prepare by-laws to support the land use plans

7. CBO prepares a Resource Management Zone Plan

8. CBO applies to Director of Wildlife for AA status

9. CBO/AA applies for user rights

10. CBO/AA applies to the Director for a hunting block*

11. CBO/AA enters into investment agreements

12. Investments in WMAs are subjected to EIA

**APPENDIX III:  ANALYTICAL FRAMEWORK**

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| 1. | To assess the extent to which the WMA co-management strategy has contributed towards minimizing human wildlife conflicts, land degradation and wildlife conservation in the study area. | - What types of human wildlife conflicts<br>- Human – PAs authorities<br>- Commercial/industrial pressures<br>- Diseases<br><br>- stakeholders interests/motives | - Secondary data and field survey both from different stakeholders, observation, group discussion<br><br>-Local Communities & Local government<br>- village leaders/CBO/NGOS | Types of conflicts/competitions/pressures<br><br>Stakeholders involved | literature review Structured and unstructured interview Participatory rural appraisal | Mean, percentages, Frequency of animal attack or crop destruction chi- square, correlation matrix, standard deviation |
| 2 | To establish the extent to which WMA has contributed towards local people's socio-economic well-being and poverty reduction | - Land tenure issues<br>- Lack of optimum incentive/benefits<br>- Demographic changes<br>- livestock increase<br>- land scarcity<br>-Inappropriate policies and legal institutions<br>-spatial factors<br>- Fencing<br>Compensation<br><br>- Community-level organisations? | Land Offices<br><br>Local Communities & Local government<br><br>Existing laws and regulation<br>Local Communities & Local government, | Causes of conflict<br><br>Ways to used reduce conflicts<br>What should be | | |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| | | - Household-level decisions?<br>- Social division of decisions and labour?<br>-Primary source of livelihoods?<br>- Secondary or supplementary activities?<br>- Major livelihood strategies?<br>- Major sources of income?<br>- Major sources of subsistence?<br>- Major sources of employment?<br>- Reliance on external markets?<br><br>- Inter-household differentiation?<br>- Intra-household differentiation?<br>- Seasonal variation?<br>- Irregular changes?<br>- Sources of stress?<br>- Major external influences? | other stakeholders & from secondary information | done to reduce conflicts<br><br><br><br>Livelihood differentiation and variability<br><br>Local livelihood systems<br><br><br>Livelihood dependence on natural resources<br>Livelihood decisions | | - Frequency and percentages for Socio-economic characteristics e.g. age structure, sex, education level, income, household size etc.<br><br>- Chi-square for testing hypothesis on income expenditure with education level |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| 3. | To establish stakeholders interests, perception in wildlife conservation and effects on biodiversity depletion and land degradation in WMA and outside WMA. | -What is the ecosystem?<br>- What are the component species?<br>- Where resources are available?<br>- When are resources available?<br><br>- What is the state of natural resources?<br>- Which resources are plentiful?<br>- Which resources are scarce?<br>- Which resources are degraded?<br>- Which resources are rare or endangered?<br>- Which resources have commercial value?<br>- What are their effects to the environment and biodiversity depletion?<br><br>- External managers?<br>- Community-level decisions?<br>- Household-level decisions?<br>- Local management strategies?<br>- Social division of decisions and labour?<br>- What are they? | | Type and distribution of natural resources<br><br>Status and availability of natural resources<br><br><br><br>Management and allocation of natural resources<br><br><br><br>Activities | | Mean, percentages, Frequency , chi-square, correlation matrix, standard deviation |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| | | - How do they degrade natural resources?<br>- Who carries them out?<br>- When are they carried out?<br><br>- What are they?<br>- How do they degrade natural resources?<br>- Who carries them out?<br>- When are they carried out?<br><br>- What are they?<br>- How do they degrade natural resources?<br>- Who carries them out?<br>- When are they carried out?<br><br>- What are they?<br>- How do they degrade natural resources?<br>- Who carries them out?<br>- When are they carried out? | | which over-exploit natural resources<br><br><br><br>Activities which convert habitats into other uses<br><br><br><br>Destructive harvesting and land use practices<br><br><br><br>Activities which pollute the natural resource base | | |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| 4. | To find out the strengths and weaknesses of a community wildlife conservation model – WMA in the study area. | -How different groups use resources?<br>- How different groups manage resources?<br>- How different groups benefit from resources?<br>- Who has high dependence, and how?<br>- Who has low dependence, and how?<br><br>- How use and dependence varies over seasons?<br>- Other regular sources of change?<br>- Irregular sources of change?<br>- External sources of change?<br><br>- What are they?<br>- How do they degrade natural resources?<br>- Who carries them out?<br>- When are they carried out?<br><br>- What are they?<br>- How do they degrade natural resources?<br>- Who carries them out?<br>- When are they carried out? | | Socio-economic variation<br><br><br><br><br><br><br><br>Time and change<br><br>ANALYSIS OF<br><br><br><br>Market failures<br><br><br><br><br><br>Policy failures | | Percentages<br>- (%) income from different land-uses<br>- (%) Wildlife income distribution, Projection<br>- (%) Communities response on benefits of collective WMA benefits and the non-use values - - (%) Communities response on social costs of crop/livestock lost, human injuries/death, WMA management also using prevailing market prices<br><br><br>- Illegal hunting, deforestation<br><br><br>-Agriculture, livestock keeping, logging and timber for building purposes, fuelwood extraction |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| | | - What are they? <br> -How do they encourage activities? <br><br> - Do incentives meet community goals? <br> - Are incentives based on community knowledge? <br> - Do incentives use community organisations? <br> - Do incentives raise basic prices? <br> - Do incentives decrease local opportunities? <br> - Do incentives marginalise particular groups? <br> - Are incentives consistent with wider goals? <br><br> - Do incentives support conservation and development goals? <br><br> - Are incentives easy to implement and maintain? <br> - Are incentives cheap to implement and maintain? <br><br> - Are the incentives & benefit sharing system effective? | | Livelihood circumstances <br><br><br> Perverse incentives encourage degradation <br><br> Broader community goals and existing local organisation <br><br> Impacts of incentive measures | | - Agriculture <br><br><br> - correlation between type incentive with conservation |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| | | - Do incentives take account of socio-economic heterogeneity?<br>- What are the impacts of incentives on different groups?<br>- Are incentives responsive to change?<br>- Non-economic community-level factors?<br><br>- Other groups and activities causing natural resource degradation?<br>- National and global forces and policies?<br><br>- Direct incentives?<br>- Indirect incentives?<br>- Property rights?<br>- Livelihood incentives?<br>- What market measures?<br>- What fiscal measures?<br>- What financial measures?<br>- What disincentives?<br>- What incentives choices available? | | Political acceptability<br><br>Simplicity<br><br><br><br>Differentiation and change<br><br><br><br>Additional supportive measures<br><br><br>Choice of incentive measures | | |
| 5. | To ascertain the contribution of WMA | - Which institutions deal with wildlife management area? | | Institutions and local | | - Percentages communities response |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|-----|-----------|------------------|-------------|---------------|---------------------------|---------------------|
| | management and decision making and decision making framework in enhancing a local democratic culture in natural resource management on village land | - Is there sufficient capacity within institutions to manage and regulate policy implementation <br> - If not how can these Institutions be strengthened? <br> - Strengths of CBWM? <br> - Weaknesses of CBWM? <br> - or the models are not fully implemented? | | Institutional capacity (human and financial resources, equipment), | | on the success and failure of the CBWM model, local attitudes towards conservation and WMA |
| 6. | Policy strategies for planning, monitoring, management for wildlife conservation and a framework for integration of other land-use activities into wildlife conservation. | - Availability of comprehensive & supportive policy and legal & institutions framework to enhance an integrated & collaborative approach <br> - What planning & policy measures to enhance incentive mechanisms? <br> - How can sustainable management of NRs be pro-actively built into proposed programmes in different sectors e.g. agriculture, livestock etc? <br><br> How can we improve the quality of services and facilities? <br> How can we increasing community spirit within the | | Strategies for integration wildlife conservation & and other land uses. <br><br><br> Supportive policy framework for sustainable community livelihoods and reducing poverty | | |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|---|---|---|---|---|---|---|
| | | target population? How can we enhance personal qualifications and social integration How can we diversify of socio-cultural activities Can we find a way of ensuring spatial equity? Consideration of long-term needs How do we Fight against poverty Limiting pollution Enhancing natural wealth and biodiversity Improving economic production and better distribution of capital gains Strengthening employment assets Developing 'community business' Instigating and developing alternative economy initiatives Diversifying economic activities Citizens' involvement, awareness and recognition of their contribution | | Meeting human needs | | |

| S/N | OBJECTIVES | SURVEY QUESTIONS | DATA SOURCE | DATA REQUIRED | DATA COLLECTION TECHNIQUE | HOW TO ANALYSE DATA |
|-----|-----------|------------------|-------------|---------------|--------------------------|---------------------|
|     |           | Experience-sharing between actors and pooling of knowledge |  |  |  |  |

**APPENDIX IV: QUESTIONAIRES**

The overall goal of WMA is Ecological, Economical and Social values of enhanced, sustained and positively contribution to rural economy of the area through planning. Data collection methods include questionnaires, observations and group discussion for primary data and secondary data is through literature review and personal communications.

**Detailed Research Questions**

1. Why there are still land uses Conflicts despite the efforts to change the conservation approaches/models? And despite the land use plan which demarcates certain land uses zones for different uses e.g. traditional grazing area in the WMA?

2. Where did CBWM go wrong despite all the good intentions it has? Is it weakness on the model or the model is not fully implemented?

3. Is data/ information for wildlife/environment related activities is limited and/ widely dispersed – hence why limited understanding of benefit that these activities provide?

4. Are the benefits offered by the wildlife management areas benefit sharing system in Tanzania effective? If not what should be done in relation to planning, policy formulation and decision making?

5. What are the effects of WMA to other land uses in the area?

6. How can sustainable management of wildlife be pro-actively built into proposed programmes in different sectors (e.g. rural development, mining, agriculture and livestock)

7. Is there sufficient capacity within institutions and agencies to manage and regulate and be accountable for policy implementation on the use of the wildlife? If not how can these institutions be strengthened?

8. What are the contributions of wildlife management area to poverty alleviation of local communities around protected areas/study areas?

9. What other forms of land use exists in the study area and what is their contribution to local communities around protected areas/study area?

10. Is land degradation and loss of biological diversity a problem in the study area?

11. What are the people's perceptions as far as WMA is concerned?

## PART A: HOUSEHOLD GENERAL QUESTIONS
## ENUMERATOR/ RESPONDENT'S IDENTIFICATION

| 1. Date (day, month, year) | 2.Survey number | 3.Individual ID | 4.Name of interviewer |
|---|---|---|---|
|  |  |  |  |

5.      Name of Village----------------------------------------------------------------------
6.      Distance from the park/WMA--------------------------------------------------------

## PART B: HOUSEHOLD CHARACTERISTICS

7.      Name of head of household -----------------------------------------------------------
8.      Gender of head of household. Female  ☐    Male   ☐
        (a) Marital status of the head of the household
        Married                  ☐
        Divorced                 ☐
        Separated                ☐
        Widowed
        Single                   ☐
        Never married            ☐
(b) If married, in case of a male head of household how many wives do you have?
        i) One            ☐
        ii) Two           ☐
        iii) More than two ☐
(c)      How many children do you have?
(d)      What ages----------------------------------------------------------------
9.       How many of your children are in school?
         (i) In primary school-------------------
         (ii) In secondary school--------------------
         (iii) In tertiary college--------------------
         (iv) At university-----------------------
         (v) Others – specify-------------------

10. What is your main occupation/(s) in order of importance

| Occupation | Fulltime | Part-time |
|---|---|---|
| Pastoral |  |  |
| Farming |  |  |
| Rain        fed agriculture |  |  |
| Irrigated farming |  |  |
| Employed |  |  |
| Fishing |  |  |

| Casual labourers | | |
|---|---|---|
| Trade | | |
| Other specify | | |

11. In which income group do you belong? (income in TShs per month)
    (i) < 45,000/= ☐
    (ii) 50,000/=-100,000/= ☐
    (iii) 150,000/=-300,000/= ☐
    (iv) 350,000/=-500,000/= ☐
    (v) Above 500,000/= ☐

12. For how long have you and your family/household been living in this place?
From year ( ) to date
13. Where were you settled previously before migrating to this place?
    14. If you settled here after moving from another place, why did you migrate to this place?
    (i) Drought ☐
    (ii) Poor pastures ☐
    (iii) Raiding and theft land acquisition (to acquire new land) ☐
    (iv) A combination of all of these ☐
    (v) Any other reason (specify) ☐

| 14.Household Location | 15.Household No. | 16. Household composition | 17. Sex | 18. Age | 19. Education | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | None | STD VII | FORM IV | College | Other |
| | | | | | | | | | |
| | | | | | | | | | |

## PART C: LAND TENURE SYSTEM

20. Do you own any land?  Yes ☐ o ☐
(a) If no what type of arrangement do you have in accessing land? and make use of it
    (i) Communal land ☐
    (ii) Scheme land ☐
    (iii) Leased land ☐
    (iv) Given by a friend ☐
    (v) Inherited from a relative ☐
    (vi) Others please specify-------------------------------------------------------------

(b) If your answer in number 19 is yes, how did you obtain it?
    Purchase ☐
    Inherit ☐
    Just occupied common land ☐
    Others specify----------------------------------------------------------------------
21. Do you own any other piece of land apart from the one you have here?
    Yes ☐ No ☐

i) If yes where? -------------------------------------------------------------------------

ii) If yes how far is it? ----------------------------------------------------------------------

iii) Do you encounter difficulties in accessing the land you own?

If yes or no provide reasons------------------------------------------------------------------

iv) If you encounter difficulties how do you solve/resolve them?--------------------

## PART D:  PEOPLE'S LIVELIHOOD

22. Primary source of livelihoods?

     (a) Livestock Production

       (i) How many animals do you have in the following categories

| S/N | Types of Livestock | Number of livestock |
|-----|--------------------|---------------------|
| 1. | Cattle | |
| 2. | Goats | |
| 3. | Donkeys | |
| 4. | Camels | |
| 5. | Horses | |
| 6. | Sheep | |
| 7. | Others specify | |

       (ii) Do you take care of someone else's animals? Yes ☐ No ☐

        If yes how many by category as:

          Cattle---------------------------

          Goats --------------------------

          Donkeys-----------------------

          Carmel's-----------------------

          Horses------------------------

          Sheep-------------------------

          Others specify-----------------

(b) Do you experience inadequate pastures for your animals?  No ☐      Yes ☐

(c) If yes for how long?

          Throughout the year ☐

          6 months ☐

          3 Months ☐

          Less than 3 months ☐

          In a year ☐

(d) How do you secure fodder for your livestock?

          (Tick all applicable)

          Graze on common land ☐

          Graze along the roads ☐

          Graze in fallow farms ☐

          Sell some animals ☐

          Buy fodder ☐

          Other (please specify) ☐

    (e) If yes which times/periods do you move from where you are and where to?

| Time | Season | Location/area | Land |
|------|--------|---------------|------|

| | | | ownership |
|---|---|---|---|
| | | | |
| | | | |

(f) What hindrances do you face/encounter in shifting your animals from one place to another?

i).----------------------------------------------------------------------------------------

ii).---------------------------------------------------------------------------------------

iii).--------------------------------------------------------------------------------------

22. What water source is available/accessible for your animals?

(i) Form tap ☐

(ii) From common owned bore hole ☐

(iii) From neighbours bore hole ☐

(iv) From personal owned borehole ☐

23. Do you experience any problem in watering your animals? Yes ☐ o ☐

i) If yes (please specify) -------------------------------------------------------------------

ii) How do you solve them? -----------------------------------------------------------------

(a) Do you ever sell your animals? Yes ☐ No. ☐

(b) If yes, how often?

Regularly ☐

Rarely ☐

Do not sell at all ☐

When need arises ☐

Only during drought ☐

Other (please specify) ☐

24. When did you last sell your livestock? Please specify in the space provided.

| Animal | How many | How much did you earn | When are you expecting to sell again |
|---|---|---|---|
| | | | |

25. For what reason did you sell the livestock? Write answers below in a provided space------------------------------------------------------------------------

26. How do you use animal wastes?

(i) Use in own land ☐

(ii) Give to neighbors for their cultivated land ☐

(iii) Leave it scattered anywhere ☐

(iv) Sell ☐

(v) Other specify--------------------------------------------------------------------

27. Have you ever lost any of your animals Yes ☐ No ☐

(i) If yes which animal?

| Animal | Numbers | When |
|---|---|---|
| Cattle | | |

| Goats | | |
|---|---|---|
| Sheep | | |
| Camels | | |
| Donkeys | | |
| Horses | | |
| Other please specify | | |

(ii) What were the causes of losses?

Raiding /theft ☐

Diseases ☐

Drought

Lack of pastures ☐

Others specify ☐

Killed as a result of conflict ☐

## CROP PRODUCTION

28. What farming do you practice?

Rain fed ☐

Irrigation ☐

Shift cultivation ☐

A combination of (specify) ☐

29. For how long have you been farming (specify please)----------------------------
30. Which crops do you grow? (specify please in the table )

| Crop type | Cash crop | Subsistence crop |
|---|---|---|
| | | |
| | | |

31. Do you usually produce enough food for all your family/household needs?

Yes ☐ No ☐

(i) If no, what causes food shortage?

Farm/crop destruction ☐

by wild animals ☐

By livestock ☐

Thefts ☐

Floods ☐

Drought ☐

Poor soils ☐

Lack of irrigation services ☐

Other specify please-------------------------------------------------------------------

32. When are crop yields low? ------------------------------------------------------------

33. What do you do to obtain your food?

(i)   Depend on relief food   ☐

(ii)  Depend on gifts/help from friends/relatives   ☐

(iii) Buy from market   ☐

(iv) Exchange animals with grain   ☐

(v)  Turn to fishing   ☐

(vi) Others please specify   ☐

34.  How many acres do you cultivate?

(i)   Less than one----------------------------------

(ii)  One----------------------------------

(iii) Two----------------------------------

(iv) Two and above specify More than two) ----------------------------------

35. Do you experience labour force problems? Yes  ☐ No ☐

(a) If yes give reasons why it is so
(i) ----------------------------------------------------------------------------------------
(ii) ----------------------------------------------------------------------------------------
(iii) ----------------------------------------------------------------------------------------

(b) How do you solve your labour problems?
(i) --------------------------------------------------------------------------
(ii) --------------------------------------------------------------------------
(iii) --------------------------------------------------------------------------

36. What are the main limitations you are encountering in farming in this area? (Tick the appropriate ones)

(i)  Raiding by Outsiders   ☐

(ii) Grazing in by livestock keepers   ☐

(iii)Lack of water for irrigation   ☐

(iv)Poor soils due to erosion   ☐

(v) Low rainfall   ☐

(vi)Other specify----------------------------------------------------------------------

37. Are there other people who farm in this area but have other homes in other regions or district?  Yes  ☐   No.  ☐

If yes specify where they live
(i)--------------------------------------------------------------------
(ii) --------------------------------------------------------------------------
(iii)--------------------------------------------------------------------------

38. Is fishing an alternative source of income and food for you and your household?

Yes ☐    No. ☐

(a) Are there people who have abandoned farming and livestock keeping for fishing? Yes ☐    No ☐
If yes Suggest reasons why?-----------------------------------------------------------

39. What activities you think threaten the rivers' survival (Ruaha)-------------------

40. Do you think soil conservation is very important for the rivers' survival?

Yes ☐    No ☐

41. What steps would you like to be taken in order to save the river and its benefits?

## PART F: SOCIAL/ ECONOMIC BENEFITS

42. Impacts of the socio-economic and ecological benefits on wildlife conservation.
    (a) Are there any socioeconomic benefits you or the Idodi/Pawaga community get from wildlife conserved within and outside PAS (tick one) Yes ☐ No ☐

    I don't know    ☐

    (b) If yes which of the following socioeconomic benefits of wildlife conservation accrue to Idodi/Pawaga Community boarding the WMA?
        Economic (monetary; access to forest reserve resources)       ☐
        Cultural (cultural heritage, access to sacred sites etc)        ☐
        Recreational (tourism, sight seeing, photography)              ☐
        Aesthetic (beauty)                                            ☐
        Any other (specify) -------------------------------------------------------------

43. From the socioeconomic benefits outlined above, do ecological benefits of wildlife conservation e.g., non-use values of wildlife) accrue to Idodi Community?  (tick one) Yes   ☐       No. ☐       I don't know   ☐

44 Does the Idodi /Pawaga incur any socioeconomic costs in an attempt to conserve wildlife within and outside the reserve? (Yes   ☐  No ☐ I   don't know    ☐
    a) If yes, which of the following costs /disadvantages are incurred?
        (i) Loss of crops /crop damage       ☐
        (ii) Loss of human life/injury        ☐
        (iii) Livestock depredation    ☐
        (iv) Heavy fines/penalties for trespassing    ☐
        (v)   Loss of rights of traditional forest resources    ☐

        (vi)  Loss of direct access to benefits from tourism /ecotourism activities    ☐

        (vii)  Any other (specify)---------------------------------------------

45. In your view which of the following would minimize the above costs (tick appropriately)
   (i)  Regulated and controlled access to WD resources in the reserve/WMA.  ☐
   (ii) Compensation for WD damages/death/injury  ☐
   (iii) Benefits revenue sharing  ☐
   (iv) Increased local participation in wild life conservation within and outside the reserve  ☐
   (v) Integration of indigenous resource management systems in the wild life conservations.  ☐

46. In your opinion has the change in wildlife division approach to conservation to WMA had any significant impact on the following:- (tick one)

| Activity | Response | | |
|---|---|---|---|
| | Yes | No | Do not know |
| a) The Idodi/Pawaga people's participation in WD conservation | | | |
| b) Integration of the Idodi/Pawaga people's IRMS in WD Conservation | | | |
| c) Change in Idodi people's attitudes and perceptions towards the NPS and its WD | | | |
| d) Access to socio-economic benefits accruing from within and outside the reserve | | | |

47. Are there any socio-economic costs incurred by Idodi/Pawaga people in their efforts to conserve WD within and outside the reserve?  (Tick one)
   i) Yes      ☐
   ii) No      ☐
   iii) I don't know     ☐
   (a) If yes which of the following best describes the socio-economic costs incurred by Idodi/Pawaga communities (Tick appropriately)
   (i) Crop destruction/damage
   (ii) Livestock predation
   (iii) Human injury/death
   (vii) Any other (specify please)----------------------------------------------------

48. How do poor people living in or around the area benefit? Is there an indication of how this money going to the government is to be reinvested into the economy?

49. How much does the wildlife contribute to country's economic growth?
   (a) What percentage is this in terms of GDP?
   (b) Does this take into account informal markets or illegal trade and how large are they?

50. How can Environment and natural resources (ENR) be better utilised to enhance pro-poor growth?

51. Is the importance of wildlife as inputs into other productive sectors understood and appreciated? - pristine environment to attract tourists.

## PART G:  PEOPLES PERCEPTIONS AND ATTITUDES

52. Stakeholders interests, perceptions and effects on biodiversity depletion and land degradation (conservation issues)

53. Why should wildlife be protected?
    (i) Ethical values-natural heritage    ☐
    (ii) Tourism revenue      ☐
    (iii) Material benefits-animal products     ☐
    (iv) Other: specify------------------------------------------------------------------------

54. Do you consider wildlife conservation necessary? Why?
    (i) Mankind                  ☐
    (ii) Kenya                   ☐
    (iii) Tanzania               ☐
    (iv) People of MBOMIPA       ☐
    (v) You?                     ☐

55. Have you benefited from tourism?  Yes       ☐ No.          ☐
If yes, how? ---------------------------------------------------------------------------

56. Do you consider WMA being of value?
    (i) Mankind      ☐
    (ii) TZ          ☐
    (iii) People     ☐
    (iv) You?        ☐

57. Have you benefited from the presence of rangers? Yes       No ☐      ☐
(a) Have you benefited from wildlife /park protection? Yes       No ☐      ☐
If yes, how? ---------------------------------------------------------------------------

## PART H: COMMUNITY PARTICIPATION IN WILDLIFE CONSERVATION

58. Are you aware that MBOMIPA is under the management of village?  (Tick one) aware    ☐       not aware   ☐ do not know     ☐

59. If aware, which of the statement below best describes your opinion towards the designation of the WMA?  (tick appropriately)

| | |
|---|---|
| It is a useful approach to wildlife conservation | |
| It is not useful as wildlife conservation | |
| Designation has led to loss of rights and access of traditional wildlife resources | |
| Has marginalized the Idodi community's participation in wildlife conservation | |
| Has marginalized and reduced the importance and negated the Idodi culture and its role in wildlife conservation | |
| Any other (specify please) | |

60. Was the Local community (LC) particularly the Idodi/ Pawaga communities consulted before the designation of the WMA (tick one)

Yes ☐     No ☐     Don't Know   ☐

61. How do you rate your relationship with management of WMA (tick one)

Very good ☐  Good   ☐  Relatively Good ☐ Bad ☐ Do not know    ☐

| Aspect in which you Participate | Response | How often you Participate | Ways in which you Participate |
|---|---|---|---|
| Management of reserve | Yes/No | Often Not often rarely | |
| Decision making | Yes/No | Often Not often rarely | |
| Integration of indigenous wildlife resource management systems in conservation | Yes/No | Often Not often rarely | |
| Wildlife conservation | Yes/No | Often Not often rarely | |
| Access to benefits/revenue sharing | Yes/No | Often Not often rarely | |
| Any other (specify) | Yes/No | Often Not often rarely | |

62. Has the designation of the WMA had any impact on Idodi/Pawaga community (tick one) Yes        No        don't know

(a) If yes, which of the following impacts ☐had (tick appropriate)☐

(i) Minimized local people's involvement      ☐

(ii) Has led to accelerated human/wildlife conflicts   ☐

(iii) Law enforcement by rangers has led to hostility and resentment towards wildlife conservation

(iv) Designation has led to better conservation of WD resources ☐

(v) Has enhanced illegal harvesting of forest products from NPS ☐

(vi) Has marginalized local systems of resources management and its importance in conservation ☐

(viii) Others (please specify)--------------------------------------------------

63. Are you aware of the following firms/terms?

CBC     Not aware ☐    Aware ☐

Community conservation   Not aware ☐ Aware ☐

64. How does the management of the WMA meet with the local people to discuss issues on the management of the WMA and Conservation of its wildlife (tick one).

(i) Quite often ☐

(ii) Often ☐

(iii) Rarely ☐

(iv) Do not know ☐

(a) Have the meetings that you mentioned above been important in enhancing your awareness about wildlife conservations?

(i) Very important ☐

(ii) Important ☐

(iii) Not important ☐

(iv) Do not know ☐

65. How would you rate the effectiveness of the community Wildlife conservation in enhancing the following: - (use the table below?)

| Aspect | Very effective | Effective | Fairly effective | Not effective | Do not know |
|---|---|---|---|---|---|
| Community conservation | | | | | |
| Participation in WD conservation | | | | | |
| Integration of indigenous knowledge | | | | | |
| Conservation education | | | | | |
| Awareness about WD | | | | | |
| Positive attitudes and perceptions on WD conservation | | | | | |
| Good relationship between Local | | | | | |

| Communities and management of Reserve | | | | | |
|---|---|---|---|---|---|
| Any other ( Specify) | | | | | |

## PART I: QUESTIONNAIRE FOR WD OFFICERS, DISTRICT OFFICERS AND VILLAGE LEADERS.

66. How would you rate the attitudes and perceptions of Idodi/ Pawaga people towards MBOMIPA and TANAPA?

      (i) Positive ☐

      (ii) Negative ☐

      (iii) Fairly negative

      (vi)  I do not know ☐

67. What is your opinion on the relationship between Idodi and management of WMA and Ruaha NP?  Tick one)

      (i) Very good     ☐

      (ii) Very good    ☐

      (iii) Fairly good   ☐

      (iv) Bad, good    ☐

      (v) I don't know  ☐

68. Do you involve the Idodi/Pawaga people in the management of WMA (tick one).

      Yes ☐    No ☐    I don't know ☐

    (a)  If yes how often do you involve them and how?

      (i) Often ☐

      (ii) Not often ☐

      (iii) Rarely ☐

      (iv) Do not involve them at all ☐

      (v) Do not know ☐

    (b)  If not give reasons for not involving them-------------------------------------

69. In which of the following activities do you involve the Idodi people (tick appropriate)

      (i) Planning and management of reserve    ☐

      (ii) Conservation of wildlife within and outside the reserve ☐

      (iii) Decision making process ☐

      (iv)  Design and implementation, monitoring and evaluation of WD conservation projects and activities   ☐

      (v) Any, specify---------------------------------------------------------------------

## PART J: LAND USE CONFLICTS

70. Nature and magnitude of the land use competition & conflicts

(a) Are there any land use conflicts experienced by the Idodi/Pawaga people living in the environs of WMA? (Tick one please) Yes ☐ No ☐ Do not know ☐

(b) If yes, state the conflicts experienced and their causes and solutions (fill in the table below)
(i) Types of conflicts
Conflicts caused by wildlife

| Animal | Crop destruction crop trampling | Livestock predators human injury/death | Disease transmission | Compete for water /grazing area | Others specify |
|--------|--------------------------------|---------------------------------------|---------------------|-------------------------------|----------------|
|        |                                |                                       |                     |                               |                |
|        |                                |                                       |                     |                               |                |
|        |                                |                                       |                     |                               |                |

71. What is the most important cause of wildlife/human conflict? Nature of Land Use-Conflict?

72. In your opinion what are the causes of wildlife conflicts with human beings in MBOMIPA?

| Causal factors | 1960s | Degree of causation/ extent | | | | 1980s | Degree of causation/ extent | | | | 2000s | Degree of causation/ extent | | | |
|----------------|-------|---|---|---|---|-------|---|---|---|---|-------|---|---|---|---|
|                | Yes/no/do not know | 1 | 2 | 3 | 4 | Yes/no/do not know | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | |
| Increase in human population/ population growth | | | | | | | | | | | | | | | |
| Individualization of land | | | | | | | | | | | | | | | |
| Changing land uses | | | | | | | | | | | | | | | |
| Agricultural expansion | | | | | | | | | | | | | | | |
| Increased livestock activities | | | | | | | | | | | | | | | |
| Changing | | | | | | | | | | | | | | | |

| livestock grazing system | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Increases in a number of wildlife | | | | | | | | | | | | | | | | | | |
| Lack of incentives | | | | | | | | | | | | | | | | | | |
| Poaching | | | | | | | | | | | | | | | | | | |
| Hunting | | | | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | | | | |

**Key**

**1:-**Insignificant          **2:-**Less Significant

**3:** Significant  **4:** Very significant

(ii)Frequency of conflicts

| Problems | Month | 1year | 2nd - 5year | 5-10 years | >10 years |
|---|---|---|---|---|---|
| 1. Wildlife –human conflict | | | | | |
| Crop destruction | | | | | |
| Crop trampling | | | | | |
| Livestock depredation | | | | | |
| Human deaths | | | | | |
| Bodily injuries | | | | | |
| Disease transmission | | | | | |
| Depletion of water sources. | | | | | |
| competing for water Grazing | | | | | |
| 2. Livestock | | | | | |
| 3. Agriculture | | | | | |
| 4. Mining | | | | | |

(iv)Extent of Land Use Conflict

| Proble m area | Speci fic condi tion | Areas close the park | Migra tory routes | Water source s | Foreste d lands | Pastor al lands | Season s: dry, wet or both | Nigh t/da y/bo th |
|---|---|---|---|---|---|---|---|---|
| Crop destruct ion | | | | | | | | |
| Crop trampli ng | | | | | | | | |
| Livesto ck predicat ion | | | | | | | | |
| Compet ition for water and grazing | | | | | | | | |
| Human deaths | | | | | | | | |
| Human bodily injuries | | | | | | | | |
| Disease transmi ssion | | | | | | | | |
| Any other | | | | | | | | |

**Key**
**1:-**Insignificant          **2:-**Less Significant
**3:** Significant          **4:** Very significant

73. Which specific areas and under what circumstances/conditions is the wildlife/human conflict more serious/severely manifested (table above).

--------------------------------------------------------------------------------------------

74. Are the problems with wildlife now getting less serious after the establishment of WMA? Yes ☐          No          ☐

    (a) If yes, do you think the situation will improve or get worse over the next 10 years?

    (b) Effects of Conflicts on Wildlife

What have you done to control and prevent wildlife/human conflicting problems?

    (c) Effects of Conflicts on Human Beings

75. How much damage /loss  has been incurred in this area and to you by wildlife per year (provide answers table to the table below)

(a) Loss of property

| Problems | Loss | The whole area | | | Personal loss | | | |
|---|---|---|---|---|---|---|---|---|
| | Area | no | quantity | value | area | No. | quantity | Value |
| Crop destruction | | | | | | | | |
| Crop trampling | | | | | | | | |
| Livestock depredations | | | | | | | | |
| Competition for water | | | | | | | | |
| Competition for grazing | | | | | | | | |
| Human deaths | | | | | | | | |
| Human bodily injury | | | | | | | | |
| Disease transmission | | | | | | | | |
| Any other | | | | | | | | |

(b) Resolving Conflicts

76. Institutional capacity to manage, regulate and be accountable for use of the wildlife resources. Institutions and local

(a) Institutional capacity (human and financial resources, equipment),

(b) Which institutions deal with wildlife management area?

(c) Is there sufficient capacity within institutions to manage and regulate policy implementation? If not how can these Institutions be strengthened? Strengths of CBWM? Weaknesses of CBWM or the models are not fully implemented?

| Actions | PROBLEMS | | | | | |
|---|---|---|---|---|---|---|
| | Crop destruction | Crop trampling | Livestock depredation | Human deaths/injuries | Disease transmission | Competition for grazing and water sources |
| Fencing of farms | | | | | | |
| Scaring of wildlife | | | | | | |
| Killing wildlife | | | | | | |
| Report to wildlife authorities | | | | | | |
| Other | | | | | | |

**KEY:-**
1. Not Effective
2. Less Effective
3. Effective
4. Very Effective

77. Have the control measure helped?
      (a) If no, what do you intend to do to the problem animals?
          (i) Increase fencing ☐
          (ii) Continue scaring
          (iii) Continue reporting to WD Authorities ☐
          (iv) Kill the wildlife ☐
          (v) I do not know ☐
          (vi) Any other? ☐
78. What would you like to see the authorities do?

79. How much time do you spend scaring wild animals?
      (a) Do you employ someone to safeguard the property from wildlife?
      Yes ☐    No ☐
If yes; what property does he/she safeguard the property?

80. How much do you pay/him/her per (a) what? Month/weeks/day/year?
(b) What periods/times do you engage him?
81. (a) What would you recommend to be done in this area to resolve conflicts in order of importance?
    i.    Open up park area for farming and grazing ☐
    ii.    Let land owners protect wildlife ☐
    iii.    Fence the park completely ☐
    iv.    Shoot animals that are causing damage ☐
    v.    Institute more effective game control methods
    vi.    Fence all areas and protect homes to protect us from game ☐
    vii.    Restrict land uses in the area to allow WD ☐
    viii.    Give local residents economic benefits from tourism ☐
    ix.    Any other Specify ----------------------------------------------------------------

(b) Who should do it?
i) Government ☐
ii) L. C
iii) Gov & Local Council ☐
iv) District Council ☐
v) Any other, specify-------------------------------------------------------------------

82. What do you think will happen in the area if, wildlife/human conflicts are not resolved?
    i.    Wildlife will be displaced ☐
    ii.    People will loose more lives ☐
    iii.    People will loose more crops and stocks ☐
    iv.    I do not know

v.    Any other specify ----------------------------------------------------------------

(a) Does WMA revenue benefit the Local Community?  Yes ☐ No ☐
If yes how?
    i.    Provide social infrastructure    ☐
    ii.   Direct payment to farmers/livestock keepers?   ☐
    iii.  Employment    ☐
    iv.   Any other-----------------------------------------------------------------------

    (b) Compensation Scheme

Have you heard of wildlife compensation scheme? Yes    ☐ No    ☐
Have you made any claims? Yes    ☐ No    ☐
If yes, have you received any compensation Yes    N☐    ☐
If yes how long did it take to receive your compensation?
 0-1 year  ☐ 1-3 years  ☐ 1-5 years ?    ☐

    (a) Do you think you received /you were paid adequate compensation for the loss
    you incurred? Yes    ☐ No    ☐
If no how would you have liked it?
(b) Do you think compensation scheme is a good idea?
Yes    ☐    No    ☐

83. Have you experienced wildlife damages but not forwarded your claim
Yes    ☐    No    ☐
If Yes, Why?
-----------------------------------------------------------------------------------------------
If No, what would you suggest should be done about it?
-----------------------------------------------------------------------------------------------
a) Do you know anything about education on conservation Yes    ☐p    ☐
b) If yes source of your information
i) Teachers    ☐
ii) Radio    ☐
iii) News papers    ☐
iv) TV    ☐
v) Others specify:---------------------------------------------------------------
Is there any member working with the park? Yes    ☐    No    ☐


**PART K: QUESTIONNAIRE FOR WILDLIFE DEPARTMENT STAFF**
    84. Which of the following measures  has the management of the reserve taken to
    minimize the human/ wildlife conflict? (tick appropriately).
      i.    Compensation    ☐
      ii.   Benefits/revenue sharing
      iii.  Fencing    ☐
      iv.   Intensifying patrols
      v.    Working in partnership with local communities    ☐
      vi.   Integration of Idodi/Pawaga people's IRMS in the wildlife conservation    ☐
      vii.  Allowing the Idodi/Pawaga people to access NP's wildlife resources    ☐

viii.   Enhancing the Idodi/Pawaga people's participation in planning, management, design and implementation of WD conservation projects and activities.   ☐

ix.   Any other (specify please) -----------------------------------------------

(a) Are there any problems posed to the WMA management by the Idodi/Pawaga people and other communities living in its environs? (Tick one)

Yes   ☐   No   ☐   I don't know   ☐

If yes, which of the following problems/ threats do they pose? (tick as appropriately)

i.   Encroachment   ☐

ii.   Illegal harvesting of forest products such as vegetables etc.   ☐

iii.   grazing of livestock   ☐

iv.   Cutting trees and grasses   ☐

v.   Burning

vi.   Clearing of forests for settlement and farming

vii.   Any other (specify please)----------------------------------------------   ☐

viii.   In your opinion, how can the above problems be minimized?

ix.   ---------------------------------------------------------------------------------------

85. Which of the following impacts as partnership approach (tick appropriately)

| Impact | Positive | Negative | Do not know |
|---|---|---|---|
| Led to community participation | | | |
| Led to integration of indigenous resource management systems in WD conservation | | | |
| Brought economic and social benefits (specify | | | |
| Minimized human-wildlife conflicts | | | |
| Any other (specify) | | | |

86. State your own opinion on the following organization in enhancing community participation in WD conservation around the WMA (use the table below)

| Name of institution | Community participation | | |
|---|---|---|---|
| | Effective | Not effective | Don't know |
| TANAPA | | | |
| WD | | | |
| Forest Dept. | | | |
| Local Government | | | |
| District Development committee | | | |

| Conservation bodies | | | |
|---|---|---|---|
| Local groups | | | |

## PART L: LAND USE /ENVIRONMENTAL CHANGES

87. What were the land use/environmental conditions in this place 50 years ago?

## LAND USE & ENVIRONMENTAL CONDITIONS

(i) Vegetation

| ENVIRONMENTAL LAND USE CONDITION | LAND USE CHANGES | | |
|---|---|---|---|
| | 1960s | 1980s | 2000s |
| Forest/trees | | | |
| Bush land | | | |
| Sparsely treed | | | |
| Virgin Land | | | |
| Grazing and Pastures | | | |
| Crops Cultivation | | | |

Soil Conservation

(a) Do you practice soil conservation in your area/land?  Yes　　☐ No. ☐

88. If the answer is yes which methods do you use/prefer ? (Tick &  Prioritise using numbers)

| Methods | Preferred because | | | | | | |
|---|---|---|---|---|---|---|---|
| | Priority | Does not cause soil degradation | Effectiveness | Forced to use | Easy to use | Does not use much labor | Other reasons specify |
| Terracing | | | | | | | |
| Cutoff drains | | | | | | | |
| Stone bands | | | | | | | |
| Trash lines | | | | | | | |
| Semicircular hoops | | | | | | | |
| Use of gabions | | | | | | | |
| Re-seeding with grass | | | | | | | |
| Planting trees | | | | | | | |
| Rotational grazing | | | | | | | |
| Fallowing | | | | | | | |

| Shifting cultivation | | | | | | | |
|---|---|---|---|---|---|---|---|
| Use of organic manure | | | | | | | |
| Use of artificial fertilizers | | | | | | | |
| Any other specify | | | | | | | |

1. Most Preffered    2. Preffered   3. Less preffered      4. Not preffered

89. Where did you obtain information about the methods you use?
- i. Designed with the farm ☐
- ii. Traditionally practiced in the area ☐
- iii. Learnt from a neighbor ☐
- iv. Learnt from another region/district/ward ☐
- v. Taught by an extension officer ☐
- vi. Other specify please ☐

90. Where do you obtain labour for soil conservation purposes in your area/land?    ☐
- i. Use family labour ☐
- ii. Hired labour ☐
- iii. Self help schemes ☐
- iv. Government support
- v. Contacted equipments and supplies ☐
- vi. Food for work ☐

91. How do you meet the costs of soil conservation/ in your land/area/(tick all you find appropriate)

| Means | Tick Appropriately |
|---|---|
| Makes no payment | |
| Use income from farm sales | |
| Use income from farm earnings | |
| Obtain credit/loan | |
| Sponsored/support from government | |
| Support from NGOs/FBOs/CBOs | |
| Others specify | |

92. What factors do hinder progress in soil conservation (tick all you find appropriate)

| | |
|---|---|
| Family's high living costs | |
| Land communally owned | |
| Land privately owned | |
| Soil conservation is too expensive | |
| Lack of labour for involvement in soil conservation | |

| | |
|---|---|
| The conservation measures propagated are not effective | |
| Keeping of livestock in a very small piece of land | |
| Livestock destroy the soil conservation structures | |
| There is a lot of insecurity in this area | |
| Harsh climate-errodable | |
| Soils are very errodable | |
| The soils are unproductive | |
| Others specify | |

93. Why do you practice soil conservation? (Tick all you find appropriate)

| | |
|---|---|
| Land is spoilt beyond repair | |
| Raiding problems | |
| Lack of money/funds to spend on conservation | |
| Lack of labour to assist/carry out conservation activities | |
| Labour is very expensive | |
| Land is owned by somebody else | |
| Don not own land | |
| Land is commonly owned | |
| Others specify | |

94. How do you use your farm refuse?

| Uses | |
|---|---|
| Sell | |
| Use for fuel | |
| Feed livestock | |
| Burn in the farm | |
| Decompose for farm use formulate trash times with it | |
| Make boundary with it | |
| Other specify | |

95. In your own opinion, do people living away from this area practice soils conservation in their lands/plots/farms?


**PART E: EXTENSION**

96. Do you know if there is an environmental/wildlife agricultural/soil conservation/extension officer in this area?

Yes ☐      No           ☐

If yes, where is he/she stationed? ----------------------------------------------------------

(a) Have you ever been visited by the extension officer/agricultural extension agent?
For the last past months?---------------------------------------------------------------

97. If your answer is yes, how many times per month is he/she scheduled to come over/visit your farming/livestock activities?--------------------------------------------

98. What discussion do you have during the visit?

| Crop Husbandry | |
|---|---|
| Animal | |
| Range management | |
| Soil conservation | |
| Agroforestry | |
| Others specify please | |

99. According to your experience are the methods recommended by extension officers commonly applicable and how effective are they?
------------------------------------------------------------------------------------------
If no, what reasons does he give?
 100. Do you have any other information regarding conflict on land use and would like to share them with us?
Governance, institutions, environment and natural resources
Suggest policy strategies for planning, monitoring, management for wildlife conservation and a framework for integration of other land-use activities into wildlife conservation.
Strategies for integration wildlife conservation & and other land uses.
Supportive policy framework for sustainable community livelihoods and reducing poverty

 (a) What access to natural resources do the more marginalised groups and those living in the vicinity have?
(b)　How far is community ownership of natural resources the norm and/or encouraged?
101.　Are competing claims for resources between user types and groups a major issue? What plans are there to tackle this issue?
 102. How is the issue of who collects and benefits from the revenues from natural resource use resolved (such as from fisheries/wildlife agreements or forestry concessions)?
103. How can the management/use of wildlife resources be improved to enhance output from these sectors?

104. Are the country's growth targets vulnerable to environment-related shocks such as flooding, drought and climate change? What activities need to be carried out to improve this situation?
(a) What are the capacities of institutions and agencies at national and sub-national levels to manage, regulate and be accountable for use of ENR?
(a) How can these institutions be strengthened?

(b) What mechanisms or institutional arrangements exist for paying for environmental services (such as carbon sequestration and watershed protection)?

(a) Where is there potential for such schemes?

105. Are the issues of illegal resource use and corruption within the natural resource sectors (such as in forestry and minerals) openly debated?

How are they being tackled?

**THANK YOU SO MUCH FOR TAKING PART IN THIS EXERCISE**

**APPENDIX V: RESOURCE MANAGEMENT ZONE PLAN**

**Zone 1 - Lunda Zone**

This part of the WMA is in the villages of Pawaga Division and Malinzanga and Mafuluto of Idodi Division.

This zone is established as a photographic tourism zone in which tourist facilities will be established and improved. The physical environment will be managed in order to restore previous known conditions for the purpose of improving the natural resources and to facilitate improved and increased tourism.

During the preparation of the RMZP and until revenues from photographic tourism are available, the resident hunting managed by MBOMIPA may continue if MBOMIPA so chooses. Once this zone plan is operational this zone will be subjected to the uses described below.

**Zone 2 – Tungamalenga**

This zone is an area of 73 km2 on either side of the Tungamalenga–Ruaha National Park road, consisting of land in the WMA within Mapogoro, Tungamalenga and Makifu village lands.

As tourist accommodation already exists in Tungamalenga village and this part of the WMA(Tandala tented camp) this area is zoned as an intensive tourism development zone in order to enable the optimum operation of the tourist accommodation within this part of the WMA and Tungamalenga village to the economic advantage of Tungamalenga village MBOMIPA and the lodge owners.

**Zone 3– Mkupule- Kinyangesi Zone.**

This is an area west of zone 3 and extends westwards to the western end of P-I proposed WMA at the Mbeya/Iringa regional boundary. About 80–90% of this zone is dominated by Miombo and transitional miombo woodland both of which are infested by tsetse fly to varying degrees. The remaining 10-20% is Commiphora Combretum and Acacia woodland/bushland.

As a result of tsetse fly infestation, comfortable photographic tourism is precluded; consequently this block will be subjected to consumptive utilization.

**Zone 4- Ruaha-Kinyangesi Photographic Zone**

Section 16 (1) (h) of the WCA (1974) prohibits hunting and other wildlife consumptive uses within 1 km of a national park.

The Great Ruaha River for a long stretch forms the northern boundary of the south western part of Pawaga-Idodi WMA; consequently the 1 km strip of zone 3 bordering Ruaha National Park. is established as a non-hunting zone for photographic tourism.

# APPENDIX VI: ANIMAL SPECIES



African wild dog



Giraffe



Impala



Cheetah

Hippopotamus



Zebra



Striped hyaena



Warthog

Buffalo



Spotted hyaena



Crocodile



Serval

**(Source: Dickman, 2008)**

## APPENDIX VII: VEGETATION UNITS OF LMGCA

| Primary Physiognomic Categories | Vegetation Categories | Specifications and Definitions |
|---|---|---|
| Riparian vegetation | Moist riparian forest, closed | Narrow belt along rivers, evergreen trees 20-30m tall, crown cover less than 80%, branched trees. Riparian forest is remarkable in Pawaga sections dominated by Acacia and Ficus species. Plenty of wildlife including amphibians and primates |
| | Riparian open woodland | Less conspicuous dominated by tall Hyphae trees. In seasonal water courses Newtonia and Acacia albida occur. |
| | Phragmites bushes | These form dense cover along streams, stream banks and stream beds where there is soil deposit and silting. Assists protection against soil erosion and is refuge for wildlife and birds' nestings. Reeds useful for housing |
| Woodland Vegetation | High altitude Brachystegia woodland | The Brachystegia woodland represents the climatic climax vegetation on higher altitudes in the mountain ranges at the top and on the flanking, escarpments. Crown cover 50%. Usually evergreen, e.g. *Afzelia, Brachystegia*, except *Pterocarpus angolensis* which is deciduos. Burning and fire-protection experiments in Zambia suggest that some woodland is secondary and some represents an ecotone between dry evergreen and climax miombo woodlands (White, 1983). Some miombo species e.g *Brachystegia microphylla* are confined to rocky hills. They serve as catchment areas. |
| | Low altitude Brachystegia woodland | These occur on drained deep sandy soils, at the base of hills. Trees 10-20 (or more). The climax here may have been dry evergreen forest. Nearly all Brachystegia woodland is this zone have been subjected to heavy exploitation for timber, plus fuelwood and shifting cultivation and fire. Such degraded areas have many remnant trees of *Xeroderris stuhlmannii*, and rejuvenating vegetation is characterized by *Terminalia sericea*. This is the worst affected man made habitat, predominantly edaphic. |
| | Acacia Combretum bushland/woodland | On valley floor and level areas or Mbuga with clustered bushes of Combretum. On gravel soils *Combretum apiculatum* dominate, with scattered Sclerocarya, |

| | | Strychnos and Markhamia. Also scattered Adansonia, very conspicuous as big trees. |
|---|---|---|
| Bushland | (1) Steep Escarpment Acacia-Commiphora bushland | Deciduous trees and bushy shrubs on hill slopes and steep escarpment below Brachystegia woodland. Easily distinguishable Sterculia (white stems), Commiphora and *Euphorbia candelabrum*, *Euphorbia matabelensis* and especially *Commiphora stolonifera*. |
| | (2) Acacia-Commiphora in low lying areas | Characteristic species of the Somalia-Maasai regional center of endemism in the rift valley bottom, the dominant genus is Commiphora. |
| Scrubland and bushland | Acacia dominants | *Acacia nigrescens* with *Terminalia spinosa* on heavy clay soils which local people call impeded drainage on clay soils. Soils become impassable in wet season. *Acacia kirkii* forming thick bushland in alluvial river deposited soils along river/stream banks. Also seasonally wet areas sometimes froming riverine bushland. Sometimes associated with *Acacia stuhlmanii*. *Acacia drepanolobium* dominates as scrubs on black cotton soils. |
| Thickets | Ravine shade loving spp. | Ravines developing as a result of soil erosion are covered by thick bushes along ephemeral drainage lines (locally known as "Korongo). Two Korongos were identified on the Mlowa to South Lunda road, and one along Ilolo corridor. Common species are Dalbergia arbutifolia. |

**(Source: Nahonyo, *et.al.,* 2000)**

## APPENDIX VIII: PROBLEM ANIMAL CONSOLATION REPORT 2009/2010 (TSH 100,000)

| S/n | Village | No of people | Crop damaged | Animal responsible | Acreage | People that were paid |
|-----|---------|--------------|--------------|--------------------|---------|----------------------|
| 1 | Idodi | 8 | Rice | Elephant | 7.25 | 3 |
| 2 | Idodi | 21 | Maize | Elephant/ Hippo | 14 | 1paid |
| 3 | Idodi | 2 | Tomatoes | Elephant/gazelle | 0.35 | 47 |
| 4 | Idodi | 2 | Sunflower | Elephant/Gazelle | 1.25 | |
| 5 | Idodi | 3 | Watermelon | Elephant | 2.25 | |
| 6 | Kitisi | 30 | Maize | Elephant | 14.25 | |
| 7 | Tunga malenga | 78 | Maize | Elephant | 124 | |
| 8 | Tunga malenga | 4 | Rice | Elephant | 3.6 | |
| 9 | Tunga malenga | 1 | Millet | Elephant | 0.5 | |
| 10 | Tunga malenga | 1 | Sunflower | Elephant | 2 | |
| 11 | Kinyika | 28 | Rice | Elephant | 25.35 | 7 |

**(Source: Wildlife Division, 2012)**

**APPENDIX IX: REVENUE BENEFIT SHARED AMONGST WMAS: 2006-2009.**

| WMA | Hunting Block | District | Village Number | Area (Km2) | Shared Hunting Revenue (USD 000) (1300 Tsh = 1 USD) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 2006/7 | 2007/8 | 2008/9 | Total |
| Ikona | Fort Ikoma OA | Serengeti | 5 | 242 | 13.1 | 44.2 | 27.0 | 84.3 |
| Ngarambe-Tapika | N-Tapika | Rufuji | 2 | 767 | 15.4 | 24.6 | 17.8 | 57.8 |
| Ipole | Ugunda GCA | Sikonge | 4 | 2406 | 12.3 | 18.3 | 18.6 | 49.2 |
| Endumet | Longido OA | Longido | 8 | 540 | 10.6 | 19.6 | 11.5 | 41.7 |
| Burunge | Burunge GCA | Babati | 6 | 617 | 10.4 | 17.9 | 9.8 | 38.1 |
| Songea | Mbarangandu OA | Namtumbo | 7 | 2471 | | 13.5 | 23.3 | 36.8 |
| Mbomipa | Lunda | Iringa | 21 | 777 | | 19.6 | 11.9 | 31.5 |
| Tunduru | | Tunduru | 9 | 1391 | | 12.1 | 17.6 | 29.7 |
| Liwale | Liwale OA | Liwale | 10 | 4515 | | | 16.2 | 16.2 |
| **Total:** **Average/ WMA** | | | **72** | **13726** | **61.8** **12.4** | **169.8** **21.2** | **153.8** **17.1** | **385.4** **42.8** |

**(Source: Wildlife Division, 2012)**

**APPENDIX X: REVENUE FROM HUNTING IN MBOMIPA**
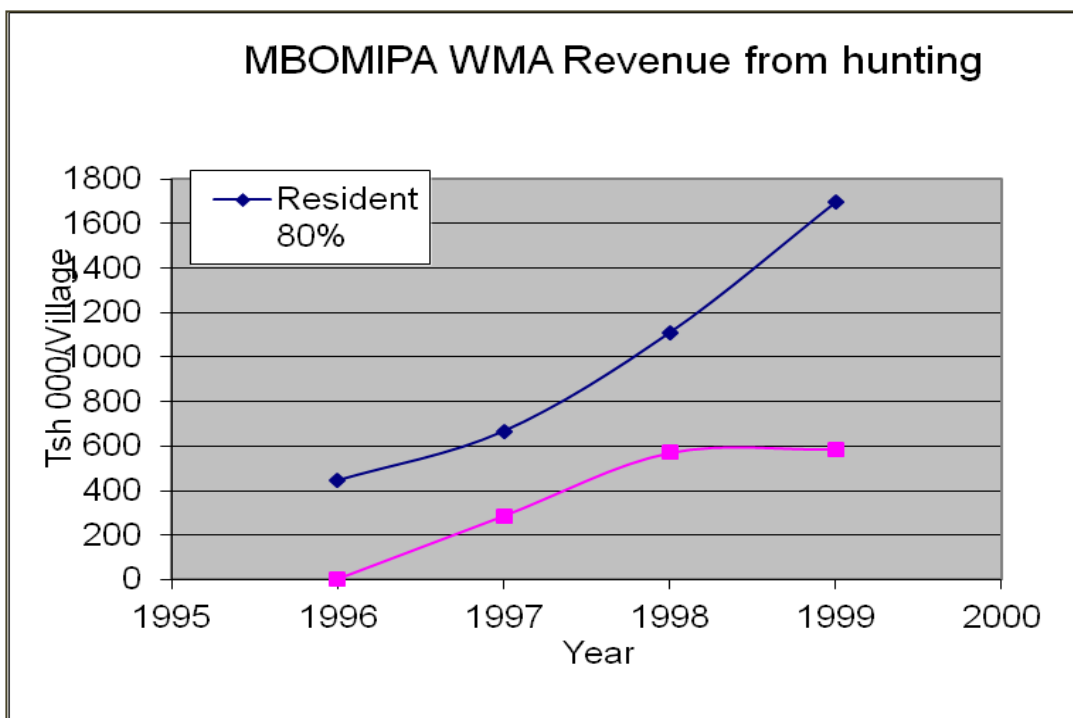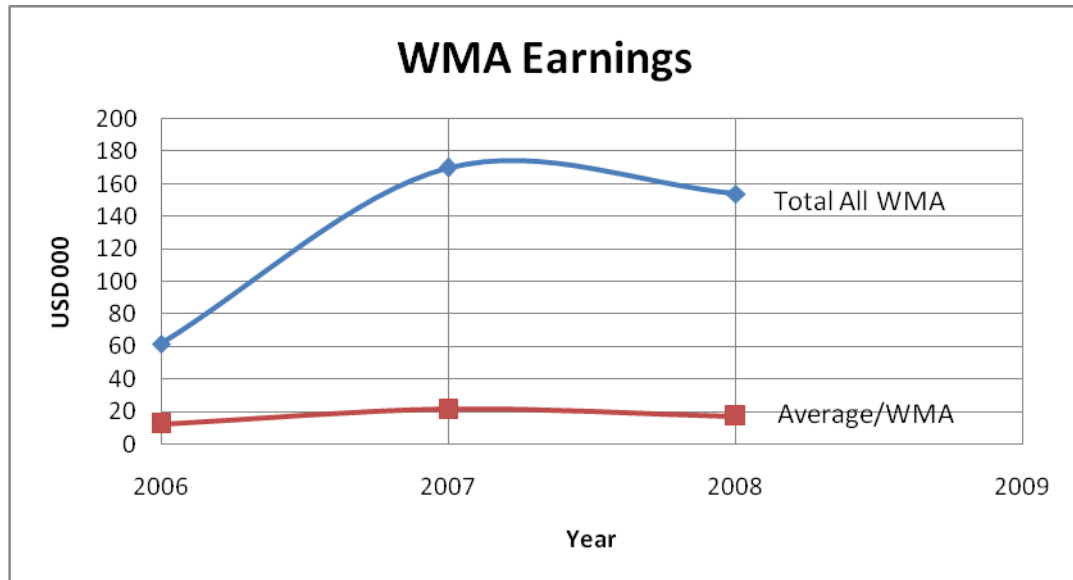




**(Source: Wildlife Division, 2012)**

## APPENDIX XI: REVENUE FROM WILDLIFE TOURIST HUNTING SHARED AMONGST LOCAL GOVERNMENT: 2004/05 - 2009.

| S/N | Local Councils | 20 04/05 | 2005/06 | 2006/07 | 2007/08 | 2009/2010 | 2009/2010 | 2010/2011 | 2011/2012 | 2012/2013 | JUMLA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Arumeru | 0 | 3,326,250.00 | 1,196,640.20 | 1,620,045.00 | 4,884,465.08 | 0 | 0 | 0 | 0 | 11,027,400.28 |
| 2 | Babati | 0 | 9,114,750.00 | 5,817,740.00 | 2,799,437.76 | 1,975,558.43 | 12,488,359.59 | 6,947,782.15 | 9,043,736.86 | 6,219,734.24 | 54,407,099.03 |
| 3 | Bariadi | 0 | 6,667,500.00 | 3,249,932.00 | 898,740.36 | 18,835,987.04 | 14,291,775.46 | 21,563,089.36 | 26,179,105.38 | 34,514,830.04 | 126,200,959.64 |
| 4 | Biharamulo | 0 | 2,283,120.00 | 3,234,706.00 | 1,625,572.80 | 2,880,067.78 | 0 | 1,831,718.99 | 2,636,527.12 | 0 | 14,491,712.69 |
| 5 | Bukombe | 0 | 1,707,500.00 | 1,140,435.00 | 436,243.32 | 6,276,752.49 | 4,420,805.01 | 2,204,145.81 | 3,080,889.95 | 0 | 19,266,771.58 |
| 6 | Bunda | 0 | 11,460,000.00 | 7,351,936.00 | 4,633,917.00 | 24,687,318.38 | 6,331,204.12 | 22,927,632.42 | 27,807,216.40 | 4,397,410.24 | 109,596,634.55 |
| 7 | Chunya | 22,004,950.00 | 25,696,870.00 | 25,570,645.00 | 12,074,211.70 | 79,694,164.49 | 16,326,905.51 | 60,893,463.60 | 73,106,328.14 | 44,779,347.03 | 360,146,885.48 |
| 8 | Handeni | 0 | 5,563,750.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,563,750.00 |
| 9 | Igunga | 0 | 4,023,750.00 | 1,896,954.00 | 792,646.56 | 0 | 0 | 1,660,664.47 | 2,432,432.61 | 3,703,447.08 | 14,509,894.72 |
| 10 | Iramba | 0 | 4,023,750.00 | 1,896,954.00 | 792,646.56 | 0 | 0 | 0 | | 3,703,447.08 | 10,416,797.64 |
| 11 | Iringa Vijijini | 0 | 4,224,380.00 | 7,623,880.00 | 2,968,468.56 | 7,618,046.65 | 5,365,497.35 | 18,931,944.75 | 23,039,742.69 | 12,075,773.56 | 81,847,733.56 |
| 12 | Kahama | 0 | 3,815,000.00 | 1,105,285.00 | 1,364,833.80 | 6,276,752.49 | 4,420,805.01 | 2,204,145.81 | 3,080,889.95 | 0 | 22,267,712.06 |
| 13 | Karagwe | 0 | 1,544,370.00 | 626,718.00 | 490,753.20 | 7,116,135.64 | 0 | 1,335,344.55 | 2,044,275.61 | 809,325.59 | 13,966,922.59 |
| 14 | Kasulu | 0 | 3,365,620.00 | 1,642,221.00 | 782,936.28 | 1,446,718.40 | 1,018,944.10 | 3,184,582.64 | 4,250,702.81 | 4,650,268.59 | 20,341,993.82 |
| 15 | Kibondo | 0 | 7,219,680.00 | 3,036,152.30 | 2,512,445.04 | 6,285,828.14 | 1,943,625.61 | 8,035,552.65 | 10,038,660.72 | 7,987,444.42 | 47,059,388.87 |
| 16 | Kigoma Vijijini | 0 | 9,802,500.00 | 2,243,898.00 | 3,629,486.88 | 0 | 0 | 0 | 0 | 0 | 15,675,884.88 |
| 17 | Kilindi | 0 | 0 | 4,694,716.00 | 2,960,466.84 | 0 | 0 | 0 | 0 | 0 | 7,655,182.84 |
| 18 | Kilombero | 12,374,540.00 | 33,723,820.00 | 36,851,543.00 | 14,738,419.27 | 41,556,352.82 | 14,808,040.93 | 37,334,919.82 | 44,997,339.77 | 31,368,494.09 | 267,753,469.69 |
| 19 | Kilosa | 0 | 1,993,430.00 | 1,964,262.00 | 467,105.76 | 2,775,506.80 | 2,280,321.95 | 2,946,011.46 | 3,966,050.48 | 2,020,339.00 | 18,413,027.45 |
| 20 | Kilwa | 0 | 20,526,650.00 | 31,862,164.00 | 13,786,397.80 | 31,366,581.35 | 27,401,629.90 | 28,556,129.18 | 34,522,884.03 | 15,368,243.41 | 203,390,679.67 |
| 21 | Kisarawe | 0 | 5,528,430.00 | 5,211,905.00 | 2,118,990.00 | 2,267,766.90 | 1,597,220.10 | 0 | 0 | 0 | 16,724,312.00 |
| 22 | Kiteto | 27,526,900.00 | 23,652,170.00 | 4,624,162.00 | 6,740,253.00 | 16,773,346.67 | 17,162,469.58 | 13,609,058.91 | 16,688,716.18 | 24,183,632.38 | 150,960,708.71 |
| 23 | Kondoa | 0 | 0 | 2,887,428.00 | 1,680,238.08 | 0 | 0 | 0 | 0 | 0 | 4,567,666.08 |
| 24 | Liwale | 0 | 43,416,280.00 | 44,190,386.00 | 16,319,521.14 | 48,764,543.67 | 32,129,175.33 | 49,894,594.51 | 59,982,975.27 | 25,033,898.21 | 319,731,374.13 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Longido | 0 | 0 | 0 | 0 | 1,780,752.78 | 56,060,439.77 | 54,531,111.30 | 59,721,443.97 | 12,603,122.16 | 184,696,869.98 |
| 26 | Manyoni | 47,869,310.00 | 22,520,219.00 | 21,792,755.00 | 18,860,475.31 | 68,132,716.82 | 71,745,135.40 | 82,262,509.49 | 98,602,906.71 | 125,320,267.08 | 557,106,294.82 |
| 27 | Masasi | 0 | 6,157,410.95 | 3,451,059.00 | 2,858,418.72 | 0 | 0 | 0 | 0 | 0 | 12,466,888.67 |
| 28 | Mbarali | 13,457,250.00 | 31,530,000.00 | 28,268,152.00 | 9,789,358.84 | 0 | 0 | 0 | 0 | 0 | 83,044,760.84 |
| 29 | Meatu | 0 | 30,123,740.00 | 27,640,191.00 | 12,159,713.10 | 42,251,342.96 | 29,772,855.79 | 62,685,277.98 | 75,244,239.98 | 27,549,934.97 | 307,427,295.78 |
| 30 | Monduli | 46,117,000.00 | 36,419,060.00 | 24,880,325.50 | 25,810,035.24 | 85,460,243.53 | 27,577,273.97 | 78,763,916.49 | 94,428,543.86 | 101,335,836.12 | 520,792,234.72 |
| 31 | Morogoro | 31,725,529.15 | 6,638,258.00 | 0 | 0 | 0 | 0 | 0 | 0 | 17,825,588.41 | 56,189,375.56 |
| 32 | Morogoro (V) | 0 | 5,494,232.00 | 13,895,605.02 | 1,215,223.56 | 5,274,084.01 | 3,832,592.24 | 5,930,701.20 | 7,527,247.21 | 0 | 43,169,685.24 |
| 33 | Mpanda | 0 | 48,206,730.00 | 19,648,787.90 | 19,186,659.80 | 59,306,569.58 | 16,022,465.42 | 65,626,539.82 | 78,753,620.51 | 62,978,721.65 | 369,730,094.68 |
| 34 | Muleba | 0 | 0 | 0 | 0 | 2,880,067.78 | 0 | 0 | 0 | 0 | 2,880,067.78 |
| 35 | Namtumbo | 0 | 0 | 11,210,525.00 | 5,228,446.32 | 17,108,526.97 | 15,595,271.03 | 21,883,922.44 | 26,561,908.88 | 42,074,080.11 | 139,662,680.75 |
| 36 | Nanyumbu | 0 | 0 | 0 | 0 | 8,740,470.94 | 7,620,786.56 | 18,016,688.70 | 11,202,254.94 | 10,796,224.53 | 56,376,425.68 |
| 37 | Ngorongoro | 27,526,900.00 | 8,538,750.00 | 12,488,658.70 | 12,096,851.04 | 51,629,225.62 | 36,363,189.38 | 69,098,241.00 | 82,895,897.26 | 10,928,131.19 | 311,565,844.18 |
| 38 | Nkasi | 0 | 5,632,500.00 | 3,991,908.10 | 4,735,739.52 | 4,898,789.03 | 3,450,285.97 | 8,458,444.20 | 10,543,235.78 | 0 | 41,710,902.60 |
| 39 | Rufiji | 0 | 21,200,290.00 | 26,858,580.00 | 9,478,629.88 | 29,316,928.02 | 22,574,444.73 | 30,148,177.18 | 36,422,443.66 | 26,309,550.35 | 202,309,043.83 |
| 40 | Serengeti | 0 | 22,590,000.00 | 8,670,123.00 | 8,245,460.73 | 41,435,733.74 | 13,152,081.01 | 42,348,525.45 | 50,979,347.13 | 3,048,231.75 | 190,469,502.81 |
| 41 | Sikonge | 0 | 11,494,615.00 | 20,230,655.00 | 9,947,911.02 | 26,828,465.42 | 33,692,075.08 | 48,182,871.61 | 57,940,624.96 | 35,968,933.26 | 244,286,151.35 |
| 42 | Simanjiro | 15,709,260.00 | 45,260,170.00 | 18,787,993.00 | 15,419,924.64 | 50,600,781.68 | 35,638,841.86 | 60,265,695.94 | 72,357,304.17 | 90,176,532.93 | 404,216,504.22 |
| 43 | Songea | 0 | 15,772,500.00 | 2,323,109.00 | 3,733,422.84 | 6,696,447.88 | 5,692,895.87 | 7,327,002.48 | 9,193,250.71 | 0 | 50,738,628.78 |
| 44 | Sumbawanga (V) | 0 | 8,947,500.00 | 2,890,149.50 | 3,266,250.48 | 11,499,262.66 | 0 | 13,462,453.27 | 16,513,792.95 | 4,239,661.80 | 60,819,070.66 |
| 45 | Tunduru | 22,730,500.00 | 34,172,490.00 | 25,409,925.00 | 11,933,334.72 | 16,022,290.69 | 11,984,543.06 | 22,143,896.12 | 26,872,097.71 | 14,227,305.97 | 185,496,383.27 |
| 46 | Ulanga | 27,230,250.00 | 45,079,004.00 | 35,171,398.00 | 15,547,205.23 | 33,471,735.18 | 8,795,253.57 | 26,355,545.59 | 31,897,247.28 | 23,108,293.53 | 246,655,932.38 |
| 47 | Urambo | 24,552,610.00 | 31,159,370.00 | 26,429,336.00 | 14,523,162.30 | 15,183,671.49 | 14,111,816.76 | 23,103,796.67 | 28,017,407.62 | 38,433,128.47 | 215,514,299.31 |
| | **JUMLA** | **22,004,950.00** | **78,091,620.00** | **58,979,822.20** | **28,641,929.62** | **890,000,000.00** | **575,669,027.02** | **1,024,656,098.01** | **1,222,573,289.24** | **867,739,179.25** | **6,403,308,899.84** |

**(Source: Wildlife Division, 2012)**

**APPENDIX XII: BENEFITS ACCRUED FROM WILDLIFE UTILIZATION IN MBOMIPA WMAS : 2007-2012**.

| YEAR | HUNTING | PHOTOGRAPHIC TOURISM | TOTAL REVENUE |
|------|---------|---------------------|---------------|
|      | USD     |                     |               |
| 2007 | 0       | 34,427              | 34,427        |
| 2008 | 16,172  | 26,679              | 42,851        |
| 2009 | 11,603  | 51,383              | 62,986        |
| 2010 | 14,208  | 91,924              | 106,132       |
| 2011 | 4,333   | 0                   | 4,333         |
| 2012 | 2,478   | 52,245              | 54,723        |

**(Source: Wildlife Division, 2012)**