

Conservation efforts and local livelihoods in Western Serengeti, Tanzania:
Experiences from Ikona Community Wildlife Management Area

by

Enock Estomihi Makupa
BA, University of Dar es Salaam, 2005
MA, University of Dar es Salaam, 2007

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of the Requirements for the Degree of

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Abstract

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Over the past three decades, there has been a global paradigm shift in biodiversity conservation approaches from exclusive protected areas (PAs) towards people-centred conservation. This has encouraged the development of community-based conservation across the world, promoting reconciliation between livelihood improvement and biodiversity conservation. However, there is a growing body of literature that demonstrates mixed outcomes of community-based conservation approaches in contributing to improved conservation and local livelihoods, especially to the communities neighbouring PAs in Africa. This dissertation examines the experience of implementing one community wildlife management area (WMA) in Tanzania, with a particular focus on the effectiveness of Ikona WMA in contributing to improved conservation and local livelihoods in Western Serengeti. Specifically, the study investigates livelihood benefits and conservation impacts attributed to Ikona WMA in the study area. It also explores the success and challenges of implementing Ikona WMA and suggests areas for improvement.

Qualitative and quantitative data were gathered through field-based research in Nyichoka and Robanda villages, which participate in Ikona WMA, and Rwamchanga village, which does not. Research methods employed in this study include interviews, focus group discussions, and household surveys. With regard to livelihood benefits attributed to Ikona WMA, results show benefits to the communities participating in WMA at the community level, especially improvement of social infrastructure, while few or no benefits were realized at the household level. In addition, findings show variation

in perceptions between and among the communities participating in Ikona WMA and the community not participating, and among conservation experts about community access to natural resources and benefits experienced at the household level in the study area.

Findings show that the communities participating in the WMA had more positive perceptions of Ikona WMA, and perceived more conservation impact than did the community not participating in the WMA. Both community members and WMA administrators perceived a decline of illegal activities, improvement of habitat, increase of wild animals, and increase of wildlife protection as the major conservation impacts attributable to Ikona WMA. Ikona WMA demonstrates some success in contributing to improved conservation and local livelihoods at the community level. However, the study reveals a number of challenges hindering effective implementation of Ikona WMA, including insufficient power over crucial decision making and ownership of wildlife resources, insufficient involvement of community members, unequal distribution of benefits at the village level, and insufficient transparency, accountability, and monitoring of village development projects. In addition, respondents identified low levels of education among community members and WMA staff members, weak collaboration with other conservation actors, and increases in both livestock and human populations as challenges to the WMA in the study area.

The study suggests that broad level participation of community members in decision making about wildlife conservation, empowerment of the local community, particularly with regard to financial resources, skills training, and true devolution of power over wildlife to the community, as well as fostering equity in benefit sharing at the village level, could help to cultivate community interest in wildlife conservation.

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Dedication

This dissertation is dedicated to my lovely wife Josephine; being married to her, and having two such lovely children in our house, never allows me to underestimate women. To our children Bravean and Cherish, for you: “Reading is important. If you know how to read then the whole world opens up to you” (President Barack Obama). And to my father Estomihi Elichilia Makupa and my mother Angelita Daudi Mongi: You are such wonderful parents and I thank you for making me what I am today and I am proud to call you “Baba na Mama Enock.” As “any fool can have a child. That doesn’t make you a father or a mother. It’s the courage to raise a child that makes you a father or a mother” (President Barack Obama).

Chapter 1

Introduction

“The management and conservation of wild animals in Third World countries must include cultural as well biological dimensions and that changes in human social systems will be necessary to sustain wildlife and environmental processes” (Marks, S.A, 1984).

1.1 Background Information

Protected areas (PAs) are the cornerstone of conservation strategies throughout the world, and presently are the most used method for biodiversity conservation (Walpole & Goodwin, 2001; Bajracharya et al., 2005; Chape et al., 2008; Dearden & Mitchell, 2009; Cantu-Salazar & Gaston, 2010). However, it has been widely reported that the establishment of PAs often entails resettling people and depriving them of access to resources upon which they have depended for generations, with little involvement of local communities in the management of PAs (West & Brechin, 1991; Songorwa, 1999). For the past three decades, it has been widely recognized that the effective management of PAs should include the cooperation and support of local communities residing in and outside the PAs (Adams & Hulme, 2001; Mugisha & Jacobson, 2004). This has encouraged development of community-based conservation approaches that aim to link conservation and development of local communities neighbouring PAs (Hulme & Murphree, 1999; Mbaiwa, 2004; Rotha et al., 2005; Berkes, 2007; Suich, 2010). The idea is that successful long-term management of PAs can potentially be achieved if local communities participate fully in conservation, have the right to control and manage wildlife resources, and derive tangible benefits from the resources to improve their livelihoods (Songorwa, 1999; Songorwa & Hughey, 2000; Mvungi, 2004; Scherl et al., 2004).

However, an extensive body of literature that explores the success of community-based conservation initiatives (e.g., Gibson & Marks, 1995; Wainwright & Wehrmeyer, 1998; Mbaiwa, 2004; Thakadu, 2005; Taylor, 2009; Nkhata & Breen, 2010; Boudreaux & Nelson, 2011) demonstrates mixed outcomes in contributing to conservation and distributing livelihood and socio-economic benefits to communities neighbouring PAs. This has led to an incomplete understanding of the extent to which community-based conservation initiatives are effective in meeting wildlife conservation and local livelihood

goals. Despite this lack of knowledge, community-based conservation approaches are increasingly being promoted in many areas (Berkes, 2004; Bajracharya et al., 2006).

In Tanzania, initiatives promoting participation of local communities in the management of wildlife resources are supported by the wildlife policy of Tanzania of 1998 (revised in 2007) through the establishment of wildlife management areas (WMA) under community management (Nelson, 2007; Wilfred, 2010). Since the establishment process launched by the government in 2003, there is a growing number of community WMAs around PAs. It is important to understand their contributions to improved wildlife conservation and local livelihoods at community and household levels to ensure that WMAs receive support from local communities and various conservation actors. Previous studies in Western Serengeti indicate that poverty is still a big problem in communities neighbouring the PAs (Kideghesho, 2006; Schmitt, 2010). Also, illegal activities in PAs, such as poaching, bush fires, and illegal livestock grazing, continue to pose challenges to wildlife conservation in both Serengeti National Park and surrounding game reserves (Kideghesho, 2006; Sinclair et al., 2008; Mfunda & Røskaft, 2010; Rentsch, 2012).

Many studies in Serengeti have paid attention to human-wildlife interactions and conflicts (Olf & Hopcraft, 2008; Rentsch, 2012), ecology and the socio-economic conditions of the entire Serengeti ecosystem (Sinclair et al., 2008), and the impacts of community outreach projects under the Tanzania National Park (TANAPA) (Mfunda & Røskaft, 2011), with little focus on the effectiveness of the newly established community WMA in Western Serengeti. This study helps to fill the gap by investigating the contribution of Ikona WMA in achieving wildlife conservation and improved local livelihoods based on the perceptions of community members and wildlife conservation experts in the study area. This is important as the community members' perceptions may differ from those of park managers, and this difference can impede progress towards conservation and livelihood benefits. Allendorf et al. (2006) argue that local community perceptions can form a baseline to assess the effectiveness of community-based conservation programs, and perceptions can help in understanding how local communities behave and respond to conservation interventions (Igoe, 2006).

1.1.1 Research Goal and Objectives

The goal of this study was to assess the effectiveness of Ikona WMA in contributing to wildlife conservation and improved local livelihoods at community and household levels in Western Serengeti, Tanzania. Specifically, the study focused on three research objectives:

- i) To examine local community members' and wildlife conservation experts' perceptions of livelihood benefits attributed to Ikona WMA at community and household levels.
- ii) To assess local community members' and wildlife conservation experts' perceptions of the conservation impact attributed to Ikona WMA in the study area.
- iii) To determine the success and challenges of implementing Ikona WMA as an example of Community-Based Natural Resource Management (CRNRM) in the study area, and suggest areas for improvement.

1.1.2 Significance of the Study

This study aims to add knowledge to existing debates on whether and under what circumstances community-based conservation is able to balance conservation and local development. It also enhances our understanding of the interactions among local communities and natural resources in attempting to achieve improved livelihoods and wildlife conservation. In addition, it contributes relevant information for policy and decision makers at various levels in order to make better decisions to improve the community-based WMA model in Tanzania and elsewhere. The research also adds insight to the relationship and experiences between community and PAs.

1.2 The Study Area

1.2.1 The United Republic of Tanzania

The United Republic of Tanzania was formed out of the union of the two sovereign states of Tanganyika and Zanzibar. The country is located in East Africa between latitudes 1° and 11° south and longitudes 30° and 40° east. It is bordered by Uganda and Kenya to the north, Zambia, Malawi, and Mozambique to the south, Rwanda, Burundi,

and the Democratic Republic of Congo to the west, and the Indian Ocean to the east (Figure 1, bottom left). It has a land area of 945,234 km², and over 36% of its land is under various forms of conservation, from exclusionary national parks to locally initiated and managed community forests and wildlife. The country gained its independence from Britain in 1961, and has a population of approximately 45 million (Marttila, 2011; URT, 2013). Administratively, the country is divided into 30 regions and 138 districts, and is further divided into divisions, wards, and villages. In 1967, the country adopted a socialist ideology, locally known as “Ujamaa,” which emphasized collective production, nationalization of all major means of production under a state economy, and egalitarian resource distribution (Nyerere, 1967; Rodney, 1972).

Tanzania saw an intense decline of its wildlife in the 1970s and 1980s, mainly due to a lack of financial resources to support conservation (MNRT, 2012), and in the early 1980s, its economy experienced significant deterioration caused by the war with Uganda in the late 1970s, the major increase of oil prices, drought, the low price of exports, poor implementation of socialist “ujamaa” policies, and an increase of debt (Frumence, 2011).

In the mid-1980s, the country adopted World Bank and International Monetary Fund’s (IMF) liberalization policies aimed at economic recovery through structural adjustment programs (Frumence, 2011). This marked an end of “ujamaa” policies and the introduction of a free market economy. The architects of structural adjustment and the free market economy forced the government of Tanzania to abolish free access to social services by introducing a cost sharing policy in the social development, education, and health sectors (Frumence, 2011). In the 1990s, the government of Tanzania privatized most public organizations and allowed the major means of production and national economy to be controlled by the private sector. The reform of the country’s economy went hand-in-hand with the introduction in 1995 of a multi-party political system as a way of widening democracy in the country. Despite such government efforts of economic reform, and dedication of a large area of land for conservation, the country remains in poverty. The UNDP (2012), reports that Tanzania is among the poorest countries, ranking 152 out of 187 countries, with comparable data in the UNDP human development index.

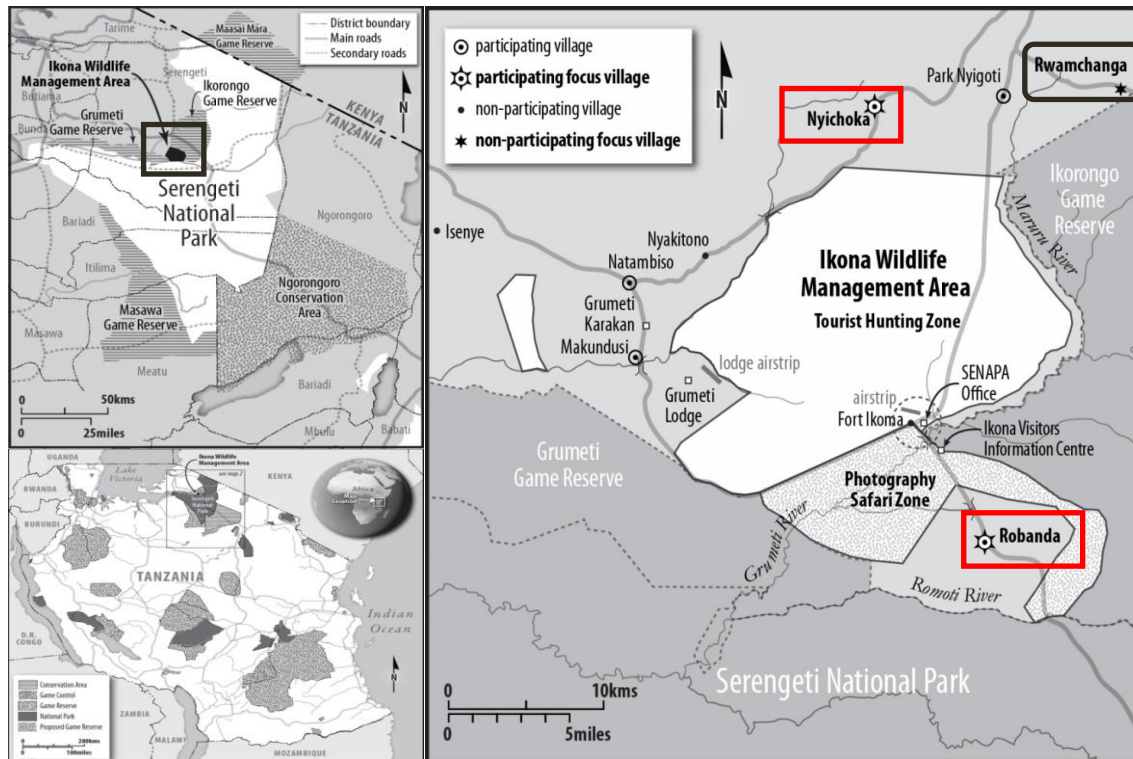


Figure 1 Map of the study area

Note: Map of Tanzania (bottom left), Serengeti Ecosystem (top left), and study villages and Ikona WMA zones (right)

1.2.2 Location and Characteristics of the Research Study Area

The study area borders Serengeti National Park to the east and southeast, Grumeti Game Reserve to the south and southwest, and Ikorongo Game Reserve to the north (URT, 2005). The area around Ikona WMA includes eight villages, five of which (Robanda, Park Nyigoti, Nyichoka, Makundusi, and Nattambiso) manage Ikona WMA (Figure 1) under a community-based organization (CBO) locally known as “Jumuiya ya Hifadhi ya Wanyamapori IKONA (JUHIWAIKO)” – the Ikona Authorized Association (AA). The association was officially registered in 2005, and acquired a certificate of authorization to manage wildlife resources in 2006 and a wildlife resources user rights certificate in 2007 from the Director of the Tanzania Wildlife Division. By virtue of these certificates, a community-based organization acquires status and becomes a Community Authorized Association (AA), with aims to protect and conserve natural resources and their environments and contribute to improving livelihoods in the community (URT, 2011a).

Ikona WMA covers an area of 242.3 km², and is divided into two zones. The Tourist Hunting Zone covers 61.5% (149 km²) of Ikona WMA in the north and west of the area. This zone allows tourist hunting activity through investors licensed to conduct tourist hunting in the area. The second zone is the Photography Safari Zone, which covers 38.5% (93.3 km²) of Ikona WMA and is situated in the south and east of the area, bordering Grumeti and Ikorongo game reserves, and Robanda village (see Figure 1, right), and no tourist hunting activity is allowed in the area. The two zones of Ikona WMA are intended to promote wildlife conservation and the sustainable use of wildlife resources for the benefit of local communities participating in the WMA (URT, 2011a).

1.2.3 Wildlife Resources

The area is rich in wildlife species found in the Serengeti ecosystem, including the wildebeest, lion, elephant, black rhino, cheetah, giraffe, hippo, crocodile, white colobus monkey, buffalo, topi, antelope, and zebra. Others are the hartebeest, klipspringer, and warthog. There is also a variety of bird species associated with open grasslands. Ikona WMA and the surrounding areas of Grumeti and Ikorongo game reserves and the private Grumeti Reserves provide good habitat and a corridor for wildebeest migration in Western Serengeti, especially in the month of July (Figure 2). The wildebeest migrations, together with a diversity of wildlife species of the area, especially around Robanda village, attract interest in photographic safaris and tourist hunting in Ikona WMA and surrounding areas. However, migration sometimes happens during harvest time (between July and September) and causes severe crop damage to many villages adjacent to and located in Western Serengeti National Park.



Figure 2 Wildebeest annual migration cycle and months crossing Western Serengeti

Source: <http://www.roysafaris.com/the-migration.html>

The vegetation cover of the area is mostly woody, sparsely consisting of shrubs, short grasses, and herbs. The woodlands are dominated by various *Acacia* species, except in a few areas with sandy soil in the northwest. Ikona WMA has permanent rivers flowing in the area. These rivers include Grumeti, Rubana, and Maruru. Along these rivers are important riverine forests that provide habitats for a number of wildlife species, including the white and black colobus monkey, crocodile, and hippo (URT, 2011a). The forests also provide nesting habitats for various bird species.

1.2.4 Climate of the Area

The area receives scarce rainfall, amounting to about 700mm per year. The dry season is from July to September. Short rains usually occur in November to March. The planting season starts in October, and harvesting takes place in the months of January to March and May to June, depending on the type of crop (URT, 2005; 2011a). The temperature shows a relatively constant mean monthly maximum of 27° to 28°C at Seronera in Serengeti National Park. The minimum temperature varies from 16°C in the hot months of October-March to 13°C during May-August (Sinclair et al., 2008).

1.2.5 Historical and Ethnic Background

The Western Serengeti in general is highly diverse in terms of ethnicity. More than 20 tribes live in the area, the major ones being Ikoma, Sukuma, Kurya, Ikizu, Natta, Isenye, Zanaki, Zizaki, Ngoreme, Taturu, and Jita (Kideghesho, 2006). However, the dominant tribes found in the communities forming the Ikona WMA are Ikoma, Sukuma, and Natta tribes, which have been living in and using the natural resources of the area for years. Conservation of the natural resources in the Ikona WMA and surrounding areas is linked to traditional hunting and use of other resources, such as fishing and honey gathering. These tribes are also linked to cattle rustling in the area; Maasai from Loliondo and other areas steal cattle from these groups as a traditional practice (Kideghesho, 2008; URT, 2011a). Local leadership in the villages is still based on traditional councils ('litongo') despite the presence of village governments. These traditional councils have assisted in controlling poaching in the area and disciplining the community members violating traditional conservation rules (URT, 2011a). The ethnic groups of the area have historical interaction with Germany, and a number of German historic sites, such as Fort Ikoma, the German bridge, and the German gold mining sites, are found in the area (Kideghesho, 2008). Other notable historic and cultural resources in the area include sacred sites, such as Machaba for Waikoma in Robanda village, Gheteka, Ryara, and Moghatende, all in Nata village (Kideghesho, 2008; URT, 2011a). The historic sites and cultural resources found in the area, together with the fossil footprint in the Romoti River, make it significant for development of cultural tourism with potential for attracting visitors and tourism investors.

1.2.6 Socio-Economic Profile

The area is characterized by many types of land use ranging from PAs like Serengeti National Park, where no human consumptive activity is allowed, to Ikona WMA, where some human activities are restricted, to highly intensive agriculture conducted in some villages at the edge of the wildlife conservation area. The area is also densely settled with villages engaging in agro-pastoralism activities as a major source of their livelihoods (Kideghesho, 2008; Sinclair, 2008). The major food crops cultivated in the area are finger millet, maize, sorghum, and beans, while cotton is a cash crop. Livestock are also raised, including cattle, goats, and sheep (URT, 2005). However, these communities

are challenged by a lack of reliable markets for their livestock and agricultural produce. As a result, they are forced to sell within villages for low prices, or move produce and livestock long distances to better markets, such as Musoma, Mwanza, and Arusha towns (Sinclair et al., 2008).

As stated earlier, the area is a corridor for wildebeest and zebra migration, and sometimes migration occurs during harvest time (between July and September) (see Figure 2) and causes crop damage to many villages in the area. Similarly, wildlife imposes huge economic and social costs on the communities adjacent to PAs of Western Serengeti, including crop damage, livestock depredation, and occasionally killing or wounding of livestock and human beings (Walpole, 2004). The people around this area are poor, with an average annual income earned from agro-pastoralism ranging from US \$150-200 (Kideghesho, 2006). Due to insufficient household income and human population pressures, communities in the area pursue off-farm activities such as illegal hunting and charcoal burning to add to household incomes and provide food such as bush meat for household members, thus posing a threat to wildlife resources (Sinclair et al., 2008; Kideghesho, 2006, 2008; Rentsch, 2012).

1.3 Thesis Organization

The thesis is organized into five chapters. This chapter has introduced the background of the problem under investigation, and the purpose, objectives, and significance of this study. In addition, the chapter has broadly described the location and characteristics of the study area. The next part of this chapter provides an overview of livelihood, protected area, and community-based conservation concepts underpinning this study. It also describes the shift of the protectionist paradigm and experiences of community-based conservation in Africa, and Tanzania in particular, followed by research approaches and methodologies adopted.

Chapters 2, 3, and 4 are organized into paper format based on the principal objectives of this study. Chapter 2 presents findings about local livelihood benefits attributed to Ikona WMA, with a particular focus on benefits community members experienced at household and community levels, as well as community access to basic natural resources in the study area. In Chapter 3, the conservation impacts of Ikona WMA are explored

based on community members' and conservation experts' perceptions. It also presents findings about community members' perceptions of Ikona WMA and the trends of illegal activities in Ikona WMA.

Chapters 2 and 3 inform Chapter 4, which assesses the overall success of Ikona WMA in contributing to improved local livelihoods and conservation in the study area. It also identifies and evaluates the challenges hindering successful implementation of Ikona WMA, and suggests areas for improvement. Chapter 5 provides general conclusions and recommendations, and identifies contributions of this study to knowledge in the field, as well as suggesting areas for further research.

1.4 Theoretical Overview

1.4.1 Concept of Livelihoods

The concept of livelihoods has gained wide acceptance as a valuable means of understanding the factors that influence people's lives and well-being, particularly those of the poor in the developing world (Carney, 2002; Ellis, 2000). Such thinking has come about after considerable efforts to identify appropriate measures for understanding human progress at different levels. Economic measures such as Gross Domestic Product (GNP) and Purchasing Power Parity (PPP) have been used for decades to understand national economic growth, per capita income, and inequality among groups (Lindenberg, 2002). However, the main criticism of such measures is that they cannot reveal the true progress of social well-being. The Physical Quality of Life Index (PQLI) and Human Development Index (HDI) were also developed to provide a broad definition of human development, and focus on many indicators that affect the livelihood of the people, such as health services, water, the quality of food and nutrition, housing, education and change in income distribution, purchasing power parity, literacy rate, and life expectancy as interrelated and fundamental indicators of human well-being (Lindenberg, 2002; Grant, 2007). However, these measures do not fully integrate socio-economic conditions at the family or community level, and lack consideration of ecological indicators. Indeed, the measures ignore the importance of community voices in defining problems and local constraints to better livelihood (Chambers, 1995). Such weaknesses contributed to the

emergence of livelihood thinking as a means of understanding the progress of people, particularly at community and family levels (Scoones, 1998; Blackburn et al., 2000).

Livelihood thinking has its origins in the 1984 work of Robert Chambers (Kollmair & Juli, 2002), which asserts that rural poverty is often unseen or misperceived by outsiders, who are not themselves rural and poor. He suggests that conventional measures of development (e.g., production level, employment, and cash income) do not fit or capture the complex and diverse realities of most rural life (Chambers & Conway, 1992; Kollmair & Juli, 2002). According to Chambers & Conway (1992, p. 6), “a livelihood comprises the capabilities, assets (stores, resources, claims, and access), and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, can provide sustainable livelihood opportunities for the next generation, and contributes net benefits to other livelihoods at the local and global levels and in the short- and long-term.” Ellis (2000, p. 10) also posits that “a livelihood comprises the assets (natural, physical, human, financial, and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household.” Although the two definitions sound different, both explain livelihoods as the means and ability to access various assets that form a basis of living.

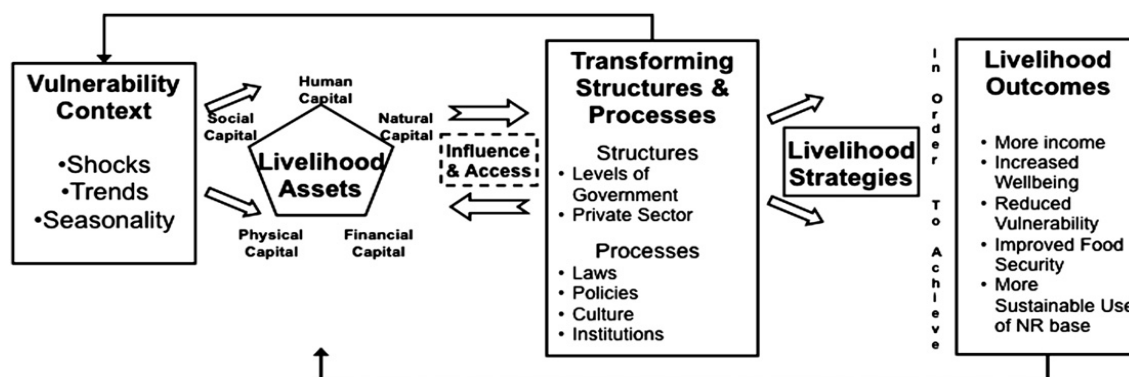


Figure 3 Sustainable Livelihood Framework

Source: Carney, 1998

Figure 3 presents the Livelihood Framework, comprising elements such as vulnerability context, livelihood assets, transforming structures and processes, and livelihood strategies and outcomes, which represent a way of thinking about local

livelihoods (Kollmair & Juli, 2002). The transforming structures and processes are dynamic (e.g., level of government, policy, rules, culture, institutions), and form a core part of the framework that influences access to livelihood assets and livelihood strategies, which results in livelihood outcomes. Livelihood strategies comprise the range and combination of activities and choices that people undertake in order to achieve their livelihood goals. Livelihood strategies depend on the status of livelihood assets and transforming processes; thus, changes in assets status may further or hinder other strategies, depending on the policies and institutions at work (Kollmair & Juli, 2002). Livelihood outcomes are the achievement of the livelihood strategies, such as increase of income, access to services, and increase of general well-being, as well as sustainable use of natural resources. Thus, the livelihood outcome is directly influenced by the dynamic changes of policies and institutions governing various livelihood strategies of a particular community or area.

Although all elements within the sustainable livelihoods framework above are important in understanding local livelihoods, each livelihood asset or combination of assets can provide a good indicator for measuring positive or negative progress of a particular intervention on local livelihoods. The assumption is that positive or negative impacts of interventions such as CBNRM can be indicated by the benefits that flow from the various livelihood assets. “Livelihood assets” are capital or resources that form the basis of people’s livelihoods. This includes *human capital*, comprising the skills, knowledge, ability to work, and good health that together enable people to pursue livelihood strategies and achieve their livelihood objectives (Scoones, 1998). *Physical capital* encompasses the basic infrastructure and producer goods needed to support livelihoods, such as availability of clean and safe water, improved roads and affordable transport, access to information, secure shelter and buildings, and health services. *Natural capital* is natural resource stocks and environmental services (such as land, water, forest, wild animals, and clean air), from which resources flow and services sustain people’s livelihoods (Kollmair & Juli, 2002). *Social capital* includes the social resources (networks, social claims, social relations, affiliations, and associations) upon which people draw when pursuing various livelihood strategies. Further, livelihood assets comprise *financial capital*, which is the capital base or financial resources that people use to achieve their livelihood objectives, such as availability of cash, credit/debt,

savings, and other economic assets, which are essential for the pursuit of any livelihood strategy (Kollmair & Juli, 2002; Scoones, 1998).

Livelihood assets comprise elements both of livelihoods and environment, and thus provide relevant indicators of the success of any intervention that aims to integrate conservation and local livelihoods. They help show how people's livelihoods are being enhanced or constrained (Ashley, 2000). They provide an understanding of the complexity of the situation of poor people in a rural context and the challenges they face (Carney, 2002). The sustainable livelihood framework links broader socio-economic components, livelihood activities to natural resources, and factors mediating access to livelihood assets (Scoones, 1998; Ellis, 2000; Kollmair & Juli, 2002). Indeed, livelihood assets within the framework act as indicators for assessing conservation interventions in relation to access to assets, and exploring relationships among various activities that constitutes household livelihoods (Murray, 2001). Livelihood assets therefore provide an excellent basis for assessing and understanding interventions that aim to improve local livelihoods and conservation.

1.4.2 Overview of Protected Areas

Protected areas are recognized globally as a cornerstone tool for conserving biodiversity (Abbot et al., 2001; Dearden & Bennett, 2005; Bajracharya et al., 2006; Chape et al., 2008; Hartter & Goldman, 2009; Dearden & Mitchell, 2009; Cantu-Salazar & Gaston, 2010). The United Nations Environment Program–World Conservation Monitoring Centre (UNEP-WCMC, 2008, p. 5) defines a protected area as a “clearly defined geographical space recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.” This definition includes all geographically defined areas, marine and terrestrial, for which some degree of protection of biodiversity is a priority. Christ et al. (2003) defined conservation as the management of human use of the biosphere so that it may yield the greatest sustainable benefits to present generations, while maintaining its potential to meet the needs and aspirations of future generations. Thus, conservation emphasizes preservation, maintenance, sustainable utilization, restoration, and enhancement of the natural environment (Christ et al., 2003).

Protected areas have traditionally been set aside for the protection of ecosystems and biodiversity. This includes protection against threats associated with human activities such as land conversion, habitat loss and degradation, introduction of alien species, unsustainable use and over-exploitation of natural resources, and pollution (Primack, 1993; Millennium Ecosystem Assessment, 2005). Protected areas provide numerous benefits to the environment and to society, including the protection of ecological services (e.g., regulation of water flow by intact vegetation cover, water purification, nutrient cycling), soils and water sources, micro-climate stabilization, and maintenance of air quality by reduction of pollution (e.g., reducing carbon dioxide) (Millennium Ecosystem Assessment, 2005; UNEP-WCMC, 2008; IUCN, 2010). Similarly, Dearden & Rollins (2009) outlined several key values of PAs, including aesthetics, wildlife viewing, spiritual, tourism, historical, ecological, scientific, education, and ecological capital.

In addition, PAs can protect lands that hold important cultural value and provide food and important natural resources to human beings, and make significant contributions to socio-economic development and enhancement of community livelihoods through development of eco-compatible and sustainable forms of eco-tourism (UNEP-WCMC, 2008; Dearden & Rollins, 2009; Simpson, 2009; Mbaiwa, 2003; IUCN, 2010). These social and economic benefits from tourism-related activities can include generation of income for the local community, creation of job opportunities, improvement of social services, and encouragement of entrepreneurial activities (Simpson, 2009; Mbaiwa, 2003; Lepp, 2007; Page, 2007). The flow of goods and ecosystem services provides a mutual link between PAs and communities neighbouring those areas.

However, Dearden (2009) noted that the establishment of PAs may displace local peoples from their traditional land and foreclose future economic opportunities for them from those lands. In addition, top-down management approaches of many state-protected areas provide little or no involvement of local communities in decision making and management of PAs, and in most cases the conservation rules imposed in PAs limit access to resources from their natural environment (Brockington, 2004; Nelson & Agrawal, 2008; Heinen, 2010). Under such protectionist conservation approaches, the linkages between PAs and livelihood and socio-economic benefits of communities are not prioritized. This can result in conflicts with PAs that intensify biodiversity loss (Sekhar, 2003; Dearden, 2009; Hartter & Goldman, 2009).

1.4.3 Paradigm Shift in Protected Areas Management

In response to increased threats and conflict between communities and strict protected areas management, since the 1980s there has been a shift of protected area management from a “fences and fines” conservation approach, to a more people-centred approach that recognizes the role of PAs in contributing to socio-economic benefits and enhancement of livelihoods of communities residing in or outside PAs (Songorwa, 1999; Berkes, 2004; Igoe, 2006; Hoole, 2008). The shift was a result of various initiatives, including the Third World Parks Congress in 1982 in Bali, Indonesia, which emphasized the role of PAs to balance conservation and social development. This new momentum paved the way for the World Commission on Environment and Development in 1983, which resulted in the Brundtland report in 1987. The Brundtland document, titled “Our Common Future,” spearheaded the importance of integrating biodiversity conservation with economic development (Naughton-Treves et al., 2005).

Furthermore, the Fourth World Park Congress in 1992 continued to stress the importance of the relationship between people and PAs, and later the Durban Accord in 2003 called for benefits beyond PA boundaries (IUCN-WPC, 2003; Naughton-Treves et al., 2005). These World Park Congresses, and other international conservation conferences, contributed to understanding the role of PAs in human social development, and their cultural value, and reinforced the link between conservation and development (Borrini-Feyerabend et al., 2004; Chape et al., 2008). Committing to supporting the role of PAs in socio-economic development, the IUCN in 1994 developed six protected areas management categories, where category VI emphasized the importance of recognizing the cultural values and sustainable use of wildlife resources (Table 1).

Table 1 The IUCN protected areas management categories

PA Categories	Function
Category Ia	Strict Nature Reserve: managed mainly for science
Category Ib	Wilderness Area: managed mainly for wilderness protection
Category II	National Park: managed mainly for ecosystem protection and recreation
Category III	Natural Monument: managed mainly for conservation of specific natural features
Category IV	Habitat/species Management Area: managed mainly for conservation through management intervention
Category V	Protected Landscape/Seascape: managed mainly for landscape/seascape conservation
Category VI	Managed Resource Protected Area: managed mainly for the sustainable use of natural ecosystems

Source: Borrini-Feyerabend et al., 2004

Since then, efforts to balance conservation and socio-economic development have been undertaken at multiple levels through implementation of various integrated conservation approaches, such as integrated conservation and development projects (ICDP), community-based natural resource management (CBNRM), and community-based conservation (Hughes & Flintan, 2001; Naughton-Treves et al., 2005; Gibbes & Keys, 2010) in many countries. However, achieving a balance between the two objectives of conservation and socio-economic development faces a number of the challenges as few summarized below in Table 2.

Table 2 Factors hindering the balance of conservation and development

Challenges	Descriptions
Increase of human population	Demands for more resources (e.g., land for settlement, agriculture, and grassing, fuel woods, building materials, etc.) create pressure and challenge in biodiversity conservation (Chape, et al., 2008; Dearden, 2009).
Poverty especially in developing countries	Poverty poses major barriers to improved sustainability of resource use and conservation in PAs (Ntiamao-Baidu et al., 2000; Dudley et al., 2008; Dearden, 2009; Spiteri & Nepal, 2006).
Climate change	Temperature increase affects both terrestrial and marine protected areas, including bleaching of corals, submersion of mangroves due to sea level rise, melting of ice, drought, and reduction of fresh water leading to the disappearance of habitats and long term change to protected area ecosystems (Dudley, 2003; Shade & Epps, 2008; Butt, 2011).
Ineffective government policies	Absence of effective conservation policies in PAs, lack of policy coordination in different sectors, and state control over the wildlife resources create challenges for effective conservation and improvement of community livelihoods (Nelson et al., 2007; Nelson & Agrawal 2008; Gibbes & Keys, 2010).
Conflicting targets (conservation and development)	Enhancing livelihoods and expansion of socio-economic benefits in PAs involves many things (i.e., access to livelihood assets, job creation and economic opportunities, benefits for individuals, households and the collective community (Scoones, 1998; Ashley, 2000; Simpson, 2009). Many conservationists stress the principles of conservation which demand preservation, restoration, and protection of endangered species and communities to maintain biological diversity and its function, composition, and structure while neglecting human development. (Biodiversity Support Program, 1993; Trombulak et al., 2004).
Unequal distribution of benefits accrued from PAs	Despite some success learned from community initiatives, many failed to meet the basic needs of the communities and benefits failed to reach the targeted people (Nelson & Agrawl, 2008; Taylor, 2009; Gibbes & Keys, 2010), insufficient equity in distribution and allocation of socio-economic benefits (Kellert et al., 2000).
Inadequate resources	Inadequate skilled labour, technology, and funds for carrying out conservation activities remains a challenge in various places, thus difficult to meet the dual objective (Brockington, 2004; Chape et al., 2008; Novelli & Scarth, 2007).

1.4.4 Protected Area and Wildlife Conservation in Tanzania

Tanzania has extensive PAs that cover over 24% of the land (URT, 2007). The total amount of land in PAs (National Parks, Game Reserves, Forest Reserves, Game Controlled Areas, Wetlands and Marine Protected Areas, and Wildlife Management Areas) may well go beyond 36% of the total land area of the country. That makes Tanzania the country with the largest protected area in Africa (Sachedina, 2008).

Comparisons of wildlife numbers among African countries places Tanzania fourth in terms of mammals (364 species recorded), third for birds (1,140), and second for reptiles (304), amphibians (roughly 130), and vascular plants (roughly 10,000) (Marttila, 2011). The country has the largest population of lions, and the second largest population of elephants in Africa, and its migratory herds of several million wildebeest, gazelle, and zebra are unmatched (Nelson, 2007). According to the International Union for the Conservation of Nature and Natural Resources (IUCN), Tanzania supports a number of species that are threatened worldwide. It is among the top 25 countries in the world as far as endemic species are concerned, and among the top 19 countries in the world for the number of threatened mammals harboured (Marttila, 2011).

The history of wildlife conservation in Tanzania goes back to the pre-colonial era, when indigenous communities had cultural traditions, norms, and practices that helped to conserve biodiversity resources (Kideghesho, 2008). However, laws controlling hunting were first enacted by German colonial rule in 1891 (URT, 2007). The enacted German colonial laws regulated hunting methods and trade in wildlife, with full protection of some endangered species (URT, 1998). This was followed by the establishment of the first game reserve, Selous Game Reserve, by Germany in 1905, which later was gazetted by the British colonial rulers in 1922 (Baldus et al., 2002; URT, 2007). The British Colonial Government established the Game Department, whose roles were to administer the game reserves, enforce hunting regulations, and protect people and crops from raiding animals. After World War II, attention shifted to the preservation of wildlife and the establishment of PAs. The Tanganyika National Parks Ordinance of 1959 established the organization now known as Tanzania National Parks (TANAPA), and Serengeti was gazetted as the first national park in the country (MNRT, 2012). Throughout the colonial era, wildlife management emphasized the dual strategies of propagating legal restrictions on hunting wildlife and establishing PAs to preserve habitats.

After independence in 1961, motivations for wildlife conservation changed from the aesthetic aspirations of Europeans to the economic development priorities of the Tanzanian state, with an increased focus on wildlife's potential to contribute to national income through tourism (Honey, 1999). 'Mwalimu' Nyerere, the first president of Tanganyika, included a statement in the "Arusha Manifesto" that guided wildlife conservation in the country up to 1998:

“...wildlife creatures amid the wild places they inhabit are not only important as a source of wonder and aspiration, but are an integral part of our natural resources and of our future livelihood and wellbeing....” (URT, 2007, p. 2)

Also, Tanzania’s socialist development policies were influential in wildlife conservation; the government of Tanzania passed the Wildlife Conservation Act in 1974, which further consolidated central control over wildlife in state organizations (MNRT, 2012).

During the 1970s and 1980s, as in other African countries, Tanzania experienced intense decline of its wildlife, which was attributed to poverty, thriving markets for wildlife products, increased human population and demand for bush meat, lack of trained personnel and financial resources to do conservation work, as well as local people’s negative attitude towards wildlife conservation (Wilfred, 2010; MNRT, 2012).

In response to this rapid loss of wildlife, especially outside of PAs, the government, through the National Parks Authority and Wildlife Division, began to emphasize collaboration with local communities as part of a protected areas management strategy (Wilfred, 2010). This response marked the beginning of a change in the top-down approach to conservation to a new paradigm in which integration of wildlife conservation into rural development was made a priority in the country.

1.4.5 Overview of Community-Based Natural Resource Management

Community-based natural resource management (CBNRM) is an emerging international approach to natural resource management (Gruber, 2010). It has emerged in response to inadequate performance of the “fences and fines” conservation approach that excludes local people from nature (Songorwa, 1999; Agrawal & Gibson, 1999; Adams & Hulme, 2001). This new conservation approach has been implemented differently in many countries, primarily at the local scale, reflecting varying community circumstances, environments, and politics (Rotha et al., 2005). Although the term community has been defined differently by various scholars, here it is defined as a group of interacting people living in a common location, with varied socio-economic interests and capabilities, bound together under the same laws and regulations with a sense of ownership and control over wildlife resources (Agrawal & Gibson, 1999; Thakadu, 2005). CBNRM is also defined distinctly by different countries, organizations, and institutions. For example, it is generally viewed as a mechanism to address both environmental and socio-economic

goals, and to balance exploitation and conservation of valued ecosystem components (Gruber, 2010). CBNRM Net (2001) defines CBNRM as the management of natural resources under a detailed plan developed and agreed upon by all concerned stakeholders.

The approach is “community-based” when the communities managing the resources have the legal rights, the local institutions, and the economic incentives to take substantial responsibility for sustained use of the resources. Under the natural resource management plan, communities become the primary implementers, assisted and monitored by technical experts. However, central to all definitions is an emphasis on natural resource management that seeks to enhance livelihoods and address the socio-economic needs of the communities, and include community members in decision making and management of natural resources (Kellert et al., 2000; Rotha et al., 2005; Baldus, 2009; Gruber, 2010; Gibbes & Keys, 2010; Suich, 2010). One of the central assumptions of CBNRM is that communities will manage local resources in a sustainable manner if they are assured of their ownership of the natural resources, if they are allowed to use the resources and/or benefit directly from others’ use of them, and if they have a reasonable level of control over management of the resources (Songorwa, 1999; Adams & Hulme, 2001; Gibbes & Keys, 2010; USAID, 2009). It is also based on the idea that if development and conservation can be simultaneously achieved, then the interests of both will be served (Berkes, 2004).

Community-based natural resource management is associated with a variety of related terms, such as community-based conservation, co-management, community resource management, community wildlife conservation, and community forestry. This variation of terms depends on the context and location of particular areas (Kellert et al., 2000; Rotha et al., 2005). However, the term “community-based” distinguishes CBNRM from other forms of conservation, and implies that communities have full, and generally autonomous, responsibility for the protection and use of natural resources.

During the past three decades, CBNRM has been widely adopted in sub-Saharan Africa as a mechanism to combine conservation and rural development efforts (Gibson & Marks, 1995; Adams & Hulme, 2001; Baldus, 2009; Suich, 2010). The development of CBNRM in Africa was in response to a number of factors, including the need for solutions to biodiversity loss outside PAs, the threat of species extinction due to over-utilization of wildlife resources, the failure of top-down conservation approaches, land

use conflicts between rural communities and wildlife managers, and the need to link conservation and development of communities neighbouring PAs (Hulme & Murphree, 1999; Rotha et al., 2005; Mbaiwa, 2004; Barker, 2007; Suich, 2010). In addition, the establishment of CBNRM in PAs resulted from a realization that communities are an integral part of the ecosystem; thus, they should benefit from and play a role in the management of wildlife resources as a mechanism to balance conservation and development in PAs (Songorwa, 1999; Kellert et al., 2000; Taylor, 2009).

The implementation of CBNRM in African countries has taken different shapes in different countries based on the context of particular places and objectives. However, they share some common characteristics, including involvement of community members and local institutions in the management and conservation of natural resources; an interest in devolving power and authority from central or state government to more local and often indigenous institutions and peoples; a desire to link and reconcile the objectives of socio-economic development and environmental conservation; legitimization of local or indigenous resources and property rights; and a desire to integrate traditional values and ecological knowledge in modern resource management (Kellert et al., 2000; Baldus, 2009; Berkes, 2009; Child & Barnes, 2010). CBNRM aspires towards the protection of biodiversity to maintain the integrity and viability of particular ecosystems with their unique combination of species of flora and fauna (Rotha et al., 2005). In addition, CBNRM provides an opportunity to enhance livelihoods sustainably through ecotourism and related economic activities while protecting the natural resources base (Gibbes & Keys, 2010; Child & Barnes, 2010; Simpson, 2009; Mbaiwa, 2003; Lepp, 2007; Pagdee et al., 2006). Murphree (2009, p. 2553) noted that CBNRM in Africa remains “the only viable option for an effective human stewardship of most of the African landscape,” and thus would appear to present a promising strategy for addressing protected area challenges and enhancing local livelihoods.

Scholars have suggested varying principles or conditions for CBNRM to be successful in different places (for details, see Gruber, 2010; USAID, 2009; Thakadu, 2005; Adams & Hulme, 2001; Jossierand, 2001; Kellert et al., 2000; Songorwa, 1999). Some of the principles and conditions outlined include the ability for CBNRM to generate income and develop employment opportunities, the existence of markets for natural or manufactured products, and ensuring participation of various stakeholders

(such as non-governmental organizations or government agencies) and involvement of communities in decision making. In addition, CBNRM prioritizes true devolution of the power to the community, and equity in resource use and benefit sharing among community members. Furthermore, mechanisms for conflict resolution, development and maintenance of cultural identity, the importance of economic returns to the community, and national policies and institutions to support CBNRM are crucial for its success. These conditions are not exhaustive, but provide an indication of requirements for the successful implementation of CBNRM (Baldus, 2009; Gruber, 2010).

1.4.6 Experiences of Community-Based Conservation in Africa

The experience of CBNRM in Africa in contributing to communities' livelihoods and wildlife conservation varies from one country to another. Even within a country, there is great variation among places over time. The variation is a result of different ways of defining success, and the context of the places in terms of culture, socio-economics, institutional frameworks, and political environments that shape the way CBNRM is implemented in a particular area (Blaikie, 2006; Baldus, 2009). These variations led to mixed outcomes of CBNRM in different places, and confound understanding of their effectiveness in contributing to both conservation and livelihood benefits. CAMPFIRE in Zimbabwe, for example, is considered to be the most successful CBNRM in Africa in supporting conservation and the needs of the local communities (Taylor, 2009). However, experience shows that despite the success of CAMPFIRE, in some areas the problem of governance has led to a decline of household dividends and lack of transparency and accountability by local leaders. Also, there is inadequate collective decision making and management of resources, such that the program has failed to provide compensation for wildlife damage, skills training, and capacity building to local communities, and failed to provide a significant contribution to the overall development of communities and the livelihood needs of individual families (Balint & Mashinya, 2006; Mutandwa & Gadzirayi, 2007; Rihoy et al., 2010).

Similarly, findings have shown that CBNRM in Namibia and WMA in Botswana have made substantial economic contributions to the communities. The programs have contributed to increased cash income, and employment from joint venture lodges, trophy hunting concessions, thatching grass sales, community-based tourism enterprises, crafts,

and live game sales (Jones & Weaver, 2009; Boudreaux & Nelson, 2011). Programs have also contributed to construction of schools, livestock vaccination programs, and payments to offset livestock losses and crop damage. Some Namibian conservancies have developed compensation schemes that pay members when they suffer harm from wildlife, while Botswana's WMA has managed to build positive community attitudes towards conservation (Mbaiwa, 2004; Mbaiwa & Stronza, 2011). However, the findings from these studies indicate that poor distribution of financial and employment benefits, limited access to resources, and lack of devolution of power to local communities are conditions that undermine the success of CBNRM in enhancing local livelihoods.

Although there are success stories of CBNRM in supporting the needs of the community and minimizing persistent poverty (see Bajracharya et al., 2006; Mbaiwa, 2004; Taylor, 2009; Jones & Weaver, 2009; Boudreaux & Nelson, 2011), many of them focus on income and employment numbers as the main criteria used to judge success at the community level. Little attention has been given to measuring the effects of CBNRM on local livelihoods, particularly at the household level. This includes assessing its impact on access to local livelihood assets (such as natural, physical, financial, social, and human capital), which form a fundamental base and means of living for local communities (Chambers & Conway, 1992; Kollmair & Juli, 2002; Ashley, 2000; Ellis, 2000). In addition, there has been little consideration of how local community members are involved in planning and decision making, or their perceptions in assessing success. As a result, it is difficult to understand how local communities and conservation experts perceive the effects of CBNRM on conservation and local livelihoods, particularly at the household level. Understanding local community perceptions is important as it can form a baseline to assess the effectiveness of community-based conservation and how local communities behave and respond to conservation interventions (Allendorf et al., 2006; Igoe, 2006).

1.4.7 Community Wildlife Management Areas in Tanzania

Community Wildlife Management Areas (WMAs) were officially initiated in the country in 2003 and are the Tanzanian CBNRM initiative. WMAs are areas of community lands set aside for the purpose of wildlife conservation in which local people have usage rights over the wildlife resources found in the area (Nelson, 2007; URT,

2009; Wilfred, 2010). The concept of community WMAs came about as a result of experiences learned from other pioneering CBNRM programs in Africa, such as CAMPFIRE in Zimbabwe, ADMADE in Zambia, and community-based conservation (CBC) initiatives in Botswana and Namibia. Also, in the 1980s and 1990s, Tanzania implemented donor-funded community wildlife conservation programs such as the Serengeti Regional Conservation Program (SRCP) and the Selous Conservation Program (SCP), funded by NORAD and the German government, respectively. However, these programs failed to provide many tangible benefits to local communities neighbouring PAs (Songorwa, 1999; Mfunda & Røskoft, 2011). For example, Songorwa (1999) highlights that the Selous Conservation Program has contributed to increased numbers of wildlife populations, which negatively affected community food production due to increased wild animal problems. Indeed, local community members who had free access to wildlife resources lost that opportunity due to the conservation program. Also, the program failed to provide compensation even if there was evidence of significant crop or property damage from wildlife. Despite the costs incurred by the communities, local communities did not receive the benefits they expected from the program, apart from the occasional availability of meat for nutrition.

In 1998, the government of Tanzania designed and instituted a wildlife policy that devolves power to local communities to manage and use wildlife resource outside PAs. The Wildlife Policy of 1998 and the revised policy of 2007 recognize the role of local communities neighbouring PAs in protecting wildlife resources and accruing benefits from wildlife by setting aside WMAs on their lands (URT, 1998). In 2002, the government of Tanzania, through the Ministry of Natural Resource and Tourism (MNRT), released the Wildlife Management Areas regulations which provided guidance and procedures for establishing a WMA. In January, 2003, the government officially launched the WMA formation process (Table 3), and 16 pilot WMAs were identified from different parts of the country to undergo the establishment process (Nelson, 2007). Since then, a number of WMAs have been established in the country, and by November, 2012 there were 17 WMAs with user right certificates (allowing community members to manage and use wildlife resources through authorized community-based organizations), while 21 WMAs were in various stages of the development process.

Table 3 Steps for establishment of community WMAs in Tanzania

Steps	Basic steps involve in establishment of WMA
12	Investments in WMAs subjected to EIA and must be approved by Director of wildlife
11	CBO/AA enters into investment agreements
10	CBO/AA applies to the Director for a hunting block*
9	CBO/AA applies to the Director for user rights
8	CBO applies to the Director of wildlife for Authorized Association (AA) status
7	CBO prepares a General Resource Management Plan
6	Villages prepare by-laws to support the land use plans
5	Land use plan is subjected to Environmental Impact Assessment (EIA)
4	Villages prepare land use plans, which must be surveyed and registered
3	CBO prepares a strategic plan
2	Villages form a CBO and register it at Ministry of Home Affairs
1	Village Assembly agrees to form WMA based on Village Council recommendation

*This step is applied only if the CBO/AA wishes to conduct tourist hunting

Source: Nelson, F. (2007)

Between 2003 and 2012, the government instituted several initiatives, including development of guidelines for designation and management of WMAs, assessment and evaluation of pilot WMAs in 2007, and current release of the Wildlife Conservation Act of 2009, as well as new WMA regulations of 2012. These government initiatives help to provide relevant technical information for decision making and smooth implementation of WMAs countrywide. However, Nelson (2007, p. 15) compared key characteristics of Namibia's communal conservancies with Tanzanian WMAs (Table 4), and argued that the "Namibian framework is less prescriptive and more empowering," while in Tanzania the nature of the rights granted to communities and the prerequisites to WMA formation serve as significant constraints on the implementation of WMAs. In addition, Nelson noted that even though some WMAs gazetted in Tanzania communities were not yet earning substantial income from the WMA because of limited income-generating investments. Similarly, Haller et al. (2008) indicate that despite the implementation of a community conservation approach in Selous Game Reserve, local people view the program as neither a developmental option nor a political gain, but rather as a constraint and a burden. Despite such constraints and a growing number of WMAs in the country, there are insufficient studies that assess the effectiveness of WMAs in contributing to wildlife conservation and local livelihoods. The available assessment studies (such as

IRA, 2007; Kaswamila, 2010) have taken a rapid assessment approach, with insufficient time to do a thorough analysis of the effectiveness of WMAs in contributing to both improved local livelihoods and wildlife conservation, as well as understanding how community members and conservation experts perceive WMAs. This study uses the case of Ikona community wildlife management area (Ikona WMA) in Western Serengeti to contribute to filling the existing knowledge gap.

Table 4 Comparison of WMAs in Tanzania and Conservancies in Namibia

	Namibian Conservancies	Tanzanian WMAs
Prerequisite Conditions	Four basic steps: - Define and agree to boundaries - Register membership - Create a management committee - Prepare constitution providing for equitable distribution of benefits	At least 12 steps as indicated in Table 3
Utilization Rights	- Conservancies given exclusive user rights over wildlife, which are not term-limited - Conservancies must apply to government for an annual quota of animals	- User rights to wildlife resources is limited to five year term - Wildlife Division determines all quotas
Control of Revenues	- Conservancies retain 100% of revenue earned from wildlife utilization or joint venture agreements Conservancies determine private sector investors for all activities	- Revenue is divided between the CBO and the government; proportion not formally defined - Wildlife Division determines hunting block concession allocation - Wildlife Division controls revenue from CWMA - All investments in WMAs require Wildlife Division approval

Sources: Nelson, 2007; URT, 2012

1.5 Research Methodology

This section presents and describes criteria used for selecting Ikona WMA and the study villages, followed by a description of the research design and methods used in this study.

1.5.1 Selection of the Study Area

Ikona WMA in Western Serengeti was selected for two main reasons. First, Ikona WMA is among the earliest pilot study areas to establish a community WMA, soon after the government of Tanzania officially unveiled the process in 2003. At the time of this study, Ikona WMA had been in operation for more than seven years, since it was

officially registered as a community-based organization, locally known as “JUHIWAIKO,” in 2005. This period provides sufficient time to adequately assess impacts on wildlife conservation and local livelihoods. Second, the area includes the abundance and diversity of wildlife species found in the Serengeti ecosystem, and functions as an important corridor for wildebeest migration (Sinclair et al., 2008; URT, 2011a). It thus possesses features that attract more tourism investors, photography safaris, and tourist hunting than other WMAs in the country.

Three villages of Robanda, Nyichoka, and Rwamchanga (Figure 4) were included in this study, and were purposefully selected based on two main characteristics. First, the researcher had visited and established contact with the three villages during a reconnaissance trip in June, 2010 through the Protected Area and Poverty Reduction (PAPR) project. The PAPR project is a Canada-Africa Research and Learning Alliance with partners in Canada, Ghana, and Tanzania focusing on investigating issues of conservation, governance, and poverty reduction in communities that fall within or are adjacent to PAs in Canada, Ghana, and Tanzania. This research is funded by PAPR. Second, Robanda and Nyichoka villages are among the five villages forming Ikona WMA, but present different features. Robanda village had already engaged in tourism activities even before the establishment of Ikona WMA, and a large number of tourism investors and the Photography Safari Zone are found there.

Nyichoka village had not engaged in tourism before, but a large portion of the Ikona WMA Tourist Hunting Zone is found in Nyichoka. These characteristics differentiated Robanda and Nyichoka from the other villages of Makundusi, Natambisso, and Park Nyigoti that also participate in Ikona WMA (URT, 2005; Mugini, 2011). Third, Rwamchanga village is not participating in Ikona WMA, but shares the same characteristics with other villages in terms of culture, socio-economic activities, proximity to the protected area, and location within the Serengeti ecosystem. Rwamchanga was considered a control group to allow comparison between two villages participating directly in Ikona WMA and a village not participating directly. Together, the selection of Robanada, Nyichoka, and Rwamchanga villages enabled an understanding of different community members’ perceptions and attitudes toward livelihood and wildlife conservation benefits associated with Ikona WMA.

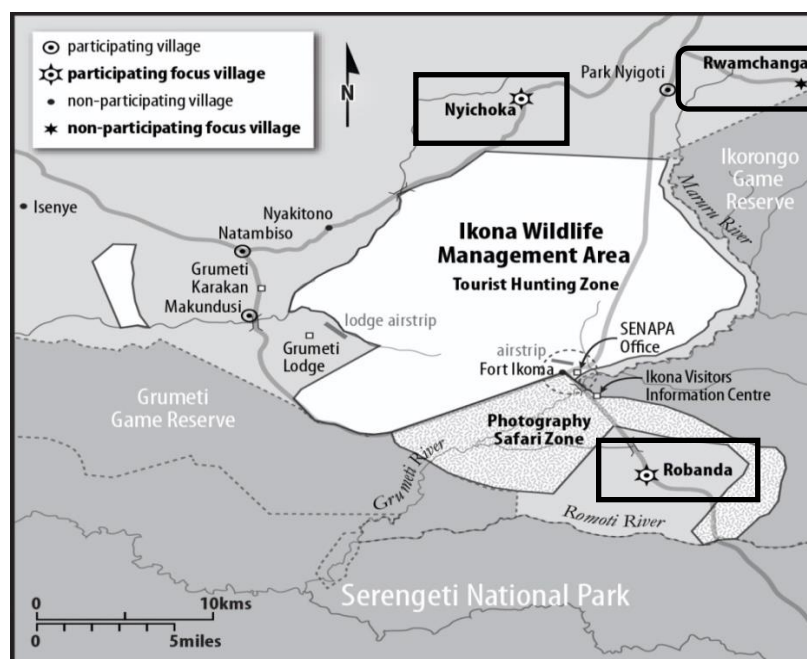


Figure 4 Map of the study villages and Ikona WMA Zones

Note: “Participating” village denotes villages that are directly participating in Ikona WMA.

“Focus” village denotes a village that was included in this research.

1.5.2 Research Design

The study was designed to use mixed methods (Figure 5) to assess the effectiveness of Ikona WMA in contributing to improved conservation and local livelihoods at household and community levels. The methods were designed to collect both primary and secondary data. A mixed method approach provides an opportunity to investigate a phenomenon from various viewpoints and increase data validity, reliability, and representation (Creswell, 2009; Vaske, 2008; Robson, 2011). It allowed the researcher to provide comprehensive analysis of the research problem, as data obtained from one method can help develop or inform the other method. Thus, it allows an opportunity to complement information from multiple methods and minimize the biases of using a single method (Creswell, 2003, 2009; Newing et al., 2011).

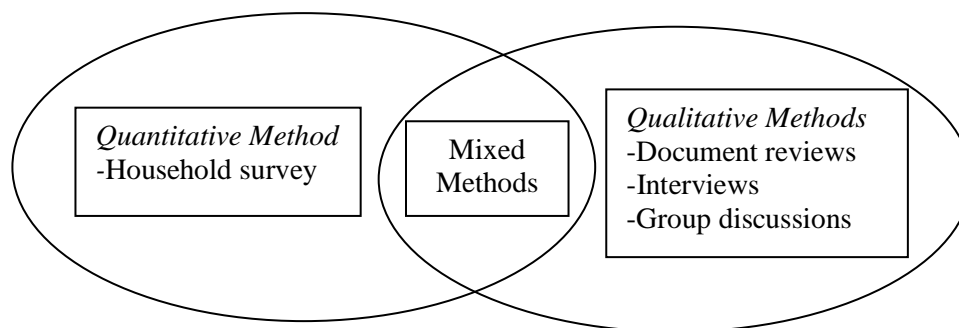


Figure 5 Mixed methods for data collection

The study involved a range of indicators based on various related livelihood assets to assess the extent to which Ikona WMA has contributed to improving communities' livelihoods and wildlife conservation. Livelihood indicators included employment opportunities, provision of social services (such as water, education, health services, and improvement of village roads), involvement of the community in achieving livelihood benefits, household income obtained from Ikona WMA, access to natural resources, training/education opportunities, and alternative sources of income attributed to Ikona WMA. Further indicators for assessing the impact of Ikona WMA on wildlife conservation included trends of illegal activities (such as poaching, bushfires, access to natural resources in WMA), improvement of habitat, increase of wildlife species, and any other conservation changes as perceived by community members, Ikona WMA administrators, and wildlife conservation experts in the study area.

1.5.3 Ethical Considerations and Approvals

Based on the purpose of the study, research participants were very unlikely to incur any risk for their participation in this study. However, due to potential risks associated with conducting research on and with human subjects, ethical considerations were important. Prior to starting the study, I obtained research ethics approval from the University of Victoria (Appendix D) and various research permits in the study area (Appendix E) to ensure that the study takes into consideration ethical requirements and complies with the research regulations of the country at national and local levels. Throughout the research process, full disclosure of project rationales, details, processes, and intent was carried out prior to interviews, focus group discussions, and household

surveys, and oral or written consent was obtained from all participants during all phases of the research. Research participants were assured of anonymity and confidentiality, and that no names or photos would be recorded with the intention of associating an individual's name or identity with his or her responses. Research participants were informed that their participation was voluntary, and they were free to opt out at any time and there would be no harm associated with their decision. Before any interview or group discussion, the researcher requested participants' permission to record information by using a digital electronic recorder for the purpose of capturing all the information. In some cases, research participants refused to be recorded. When that happened, notes of key information were taken by the researcher and assistants.

1.5.4 Data Collection Methods

These included review of documents, household surveys, key informant interviews, and focus group discussions.

1.5.5 Document Review

Secondary data sources in the form of published and unpublished documents related to the research topic and study area were reviewed to obtain a broad understanding of the study area, community-based conservation (CBC) concepts and principles, as well as to understand the concept of WMA in Tanzania and how Ikona WMA is operating in the study area. This involved the retrieval of electronic documents, books, and unpublished reports from libraries, the Tanzanian Wildlife Division, and the Ikona WMA office in Tanzania. Documents reviewed included the Tanzania National Wildlife Policy of 1998 (revised in 2007), the new Wildlife Conservation Act of 2009, the National Guideline for Designation and Management of WMAs, the WMA regulations of 2002, and the new WMA regulations of 2012. Also, the Ikona WMA Constitution of 2011, the Ikona WMA General Resources Management Plan 2005-2009 and its revision for 2011-2015, and various Ikona WMA annual reports were reviewed to acquire insight into rules, regulations, and norms governing wildlife resources use and management, as well as its contribution to improving local livelihoods and wildlife conservation in the study area.

1.5.6 Key Informant Interviews

Semi-structured interviews were conducted with 50 key informants. These were people who were identified by the researcher as more experienced and knowledgeable about Ikona WMA and wildlife conservation based on their job positions and titles in the study area. They were 17 administrators (including the Ikona WMA chair and secretary, the chair/secretary from five Ikona WMA committees, and WMA village representatives from each village), 19 village leaders from three study villages (including village chair/executive officer, sub-village leaders, primary school teachers, and two ward councillors), and 11 wildlife conservation experts in the study area and 4 at the national level. These experts included the Serengeti district natural resource officer and district game officer, Serengeti National Park community outreach officer and tourism warden, and Ikorongo Game Reserve acting officer. Others included Grumeti conservation and community outreach officers, Tanzania National Park (TANAPA) principal community outreach officer, secretary of WMAs Authorized Associations Consortium (AAC), and principal game officers at the national level. A semi-structured interview was preferred as an effective and flexible method to probe for more information about the topic (Robson, 2011; Creswell, 2007), and give the respondents freedom of self-expression and more creativity in providing detailed answers (Healey, 1998).

Interviews at the community level captured information about perceptions of various socio-economic and livelihood benefits attributed to, and conservation impacts of Ikona WMA. Ikona WMA administrators provided information on how the WMA operates, and how they perceive its contribution in improving livelihoods and wildlife conservation in the study area, as well as challenges hindering their CBO to meet their goals. Further, interviews with conservation experts captured information about their experiences, the status of various animal species, trends of various human activities, their views on various conservation and livelihoods benefits attributed to Ikona WMA, and information on how conservation actors in the study area collaborate with or support Ikona WMA. Information from key informants during interviews was captured by electronic recorder at the same time as notes were taken of important issues that arose. In the cases where interviewees refused to be recorded, notes were taken of all proceedings. Information gained from interviews helped to feed other data captured by using other collection

methods. As the principal researcher, I conducted all interviews personally, with key informants using the interview guide questions (Appendix A).

1.5.7 Focus Group Discussions

A focus group is a small group discussion in which participants respond to and discuss a series of questions on a single topic (Krueger & Casey, 2000 in Muruvi, 2011). A total of eight focus group discussions (FGDs), four groups of women and four groups of men each comprising five to ten members, were conducted in three study villages. The focus groups captured information about community members' perceptions and attitudes towards Ikona WMA, their experiences in the establishment process, and conservation impacts and livelihood benefits they attributed to Ikona WMA. Newing et al. (2011, p. 104) noted that the "focus group brings out contrasting views, encourages reflection and often makes people state the reasoning behind the view they express." The method provides a flexible format to explore in-depth information about the groups' attitudes, ideas, perceptions, and experiences on a defined topic (Vaske, 2008). The nature of group dynamics helps in focusing on the most important topic, and it is fairly easy to assess the extent to which there is a consistent and shared view (Robson, 2011).

In Nyichoka village, focus group participants were identified from a village meeting. In that meeting I had an opportunity to introduce myself, my research assistants, and my project goals to community members. After my introduction, I requested 20 volunteers representing both women and men over 18 years of age who were knowledgeable about Ikona WMA to participate in group discussions in order to share their experiences with researchers. Thirty community members were ready and willing to participate, thus I divided them into three groups based on their sex (two groups of men and one group of women) to allow them to be flexible, active, and free to participate in group discussion.

In Robanda and Rwamchanga villages, participants of FGDs were identified and invited from different social development groups existing in both villages. In Robanda and Rwamchanga there were five and four village groups, respectively. The village executive officers of both villages provided lists of names in each group found in their respective villages to the principal researcher. I purposefully selected from this list two or three representatives (a group chair, secretary, and bursar) from each village group based on their position title in the group, as it was thought that they would have more

knowledge about wildlife conservation, and Ikona WMA, and be able to express themselves without fear. The researcher, with assistance from villages' executive officers, helped to approach members who had been selected from each village group, and they were invited to participate in group discussions. Two groups of women were involved in group discussions in Robanda village. However, with no reason given to the researcher, all men who were invited for discussion did not show up. In Rwamchanga village, two groups for men and one for women participated in a group discussion. The group discussion took a maximum of two hours, and I used the focus group guide questions (Appendix B) to lead all discussions while my research assistants recorded the discussion and took notes. The information from the focus groups feeds into the main research questions regarding community members' perceptions about the wildlife conservation area, their experience with Ikona WMA, and livelihood benefits and conservation impacts attributed to Ikona WMA.

1.5.8 Household Survey

Survey methods provide a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population; thus, the researcher can generalize or make claims about the study population (Creswell, 2007). The methods encourage participation and involvement, and the interviewer can judge the extent to which the exercise is treated seriously. It also provides a relatively simple and straightforward approach to the study of attitudes, perceptions, values, beliefs, and motives (Robson, 2011). The study surveyed a total of 300 households in three study villages (sampling procedure is explained next). The surveys captured information about conservation impacts and livelihood benefits attributed to Ikona WMA at community and household levels. In addition, it provided information about community members' perceptions and attitudes towards the WMA and wildlife conservation there. It also captured information about community members' experiences with Ikona WMA, and demographic characteristics such as age, education level, occupation, and number of people living in the same household. Information at the household level was important in this study as it was assumed that members within households have significant experience in the area, and have been interacting with wildlife resources for a long time in attaining their livelihoods, thus the establishment of Ikona WMA may affect their local livelihoods

positively or negatively. In addition, because of their long experience in the area, they have witnessed various changes occurring in their daily lives, so they were able to identify conservation impacts and livelihood benefits associated with Ikona WMA.

A number of steps were taken before conducting the survey in the study villages:

i) The principal researcher (author) developed a household questionnaire draft in English that corresponded to the research questions, and later translated the questionnaire into Kiswahili, which is spoken by the majority of local community members. The questionnaire comprised a series of Likert-type statements with a rating scale of 1 to 4 (where 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree) to measure community members' perceptions and level of agreement about Ikona WMA, and livelihood or conservation benefits attributable to it. In addition, the questionnaire incorporated closed and open-ended questions, to allow respondents to freely express their views and beliefs, and to seek more details about individual responses.

ii) *Recruitment and training of research assistants* – The principal researcher, in collaboration with the community PAPR project coordinator, recruited three local research assistants who had not been involved with any Ikona WMA activities, and had been living in the Serengeti district for more than ten years, thus were familiar with the three study villages. The use of local research assistants was designed to encourage respondents to provide information to a person who was familiar to them and who spoke their language. The design also helped to overcome a language barrier in some cases where respondents were unable to express themselves in Kiswahili, the native language of the researcher. The research assistants were trained for four days, with two days used to pre-test the household questionnaire draft as part of their practical field experience. The training covered basic principles of interview administration, probing techniques, and how to record responses and fill out the questionnaires. It was intended to ensure that research assistants became familiar with the household questionnaire and agreed with the principal researcher on how questions should be asked to avoid misconceptualizations of the questions, thereby supporting consistent data collection.

iii) *Pre-testing the household questionnaire draft* – A pilot household survey was conducted with 15 heads of households, five from each study village. The researcher and research assistants used the household questionnaire draft translated into Kiswahili by going through each question face-to-face with the respondents, and the questionnaires

were filled in by the researcher assistants or researcher. The pilot household survey aimed to ensure that the respondents understood the meaning of the questions and knew how they arrived at their responses to help the researcher to improve wording. Also, it intended to provide practical field survey experience to the research assistants. After the pilot survey, the household questionnaires were reviewed, and some words in questions that were creating difficulty for respondents in understanding the questions/statements were modified and put into simpler language to allow respondents to grasp the questions easily. The revised and improved household questionnaire (Appendix C) was adopted for actual household surveys in the three study villages.

iv) *Selection of sample size* – Based on available village household ledgers maintained by village chairs, simple random sampling was used to obtain a total sample size of 300 households for the survey from three study villages (Table 5). The sample size covered 15% of total households (used also by Bajracharya et al., 2006 and Kangalawe & Noe, 2012) and provided a confidence interval of ± 5.2 and a confidence level of 95%. A simple random selection method was chosen over other sampling methods because it provided an equal chance for all households in each village to be included in the sample (Robson, 2011; Vaske, 2008; Kothari, 2004). The researcher obtained a list of household heads from the village households register maintained by village chairs. A random number generator (<http://stattrek.com/Tables/Random.aspx>) was used to generate random numbers of households to be surveyed in each study village.

Table 5 Sample size

Village name	Total households number	Sample size
Nyichoka	1,022	153
Robanda	603	88
Rwamchanga	383	59
Total	2,008	300

Source: Researcher field data, 2012

Whenever possible, household heads were surveyed at each selected household. The household head can be either a man or woman over 18 years of age who assumes responsibility for the household (Budlender, 1997). The heads of households were

involved in this study as it was assumed that they were primary role players in Ikona WMA and were decision makers at the household level. The household surveys were carried out from afternoon to evening hours when household heads were likely to be at home, as during morning hours the majority of local communities were engaged in various farm activities in the study area. When heads of the household were not at home, researchers returned to the household later on the same day or on the following day, and if there was still no response after a second visit, the household was not surveyed and another household was selected based on a reserve list of random numbers of the households selected previously from original larger household lists.

1.6 Data Analysis

Data captured through focus group discussions and interview methods were transcribed by the researcher on the same day by highlighting and taking notes of key issues that emerged. Later, the recorded information was translated from Kiswahili into English, and then information was grouped and described based on interview and group discussion guide questions responding to the main research questions.

Data from the household survey were first screened and cleaned of some errors in household questionnaires. Then data were coded and entered into Statistical Package for Social Sciences (SPSS) version 16.0 for analysis. Descriptive statistics were applied to obtain percentage, mean, and standard deviation of various conservation and livelihood variables for the three study villages. Exploratory factor analysis using a principle component analysis with varimax rotation was applied (Appendix F.1) as a way of reducing data and increasing interpretability of the identified factors (Choi & Murray, 2010). As a result of factor analysis, 22 variables (Likert-scale) were loaded into six factors (Appendix F1). Of these six factors, three were related to livelihoods and three were related to conservation (Appendix F2). One-way ANOVA was used to test whether there was a statistically significant difference of responses for each livelihood and conservation variable (Appendix F9), and significant differences were calculated based on factor loading means of each study village. The Scheffe-test for multiple comparisons was used to identify which study village had statistically significant differences in community members' perceptions across the three study villages (Appendix F5 and 8).

Chapter 2

Assessing Local Livelihood Benefits from Ikona Community Wildlife Management Area in Western Serengeti, Tanzania

“It is not a sin to have access to bush meat for nutrition during hunting season. Wildlife conservation is just like having a poultry project where you can't sell all the eggs and let your children die with malnutrition” (Key informant statement).

Abstract

Community-based approaches to wildlife conservation are increasingly promoted in many countries. However, information on effectiveness of these approaches in delivering livelihood benefits at community and household levels is often lacking. This chapter examines local community members' and various conservation experts' perceptions of livelihood benefits related to Ikona Wildlife Management Area (WMA) in Western Serengeti, Tanzania. This study collected data from household surveys, interviews, and focus groups conducted in Nyichoka, Robanda, and Rwamchanga villages. Findings show community members from the study villages had mixed perceptions about livelihood benefits associated with Ikona WMA. While there were perceived livelihood and socio-economic benefits at the community level, respondents reported no significant benefits were experienced at the household level. Limited access to natural resources, lack of transparency, low involvement of the community in decision making and planning, lack of monitoring of village social development projects, and unclear benefit sharing criteria pose challenges to Ikona WMA. This study suggests a need for empowering local community members and WMA administrators, as well as re-examining the WMA benefit sharing formula/criterion to ensure that WMAs contribute to livelihood benefits, and alleviate poverty at both community and household levels.

Key words: Wildlife conservation, livelihoods, Ikona Wildlife Management Area, Tanzania.

2.1 Introduction

Over the past three decades, it has been recognized that the effective management of protected areas (PAs) should include the cooperation and support of local communities residing in and outside PAs (Adams & Hulme, 2001; Mugisha & Jacobson, 2004). This has encouraged development of community-based wildlife conservation initiatives aimed at involving local community members in the management of natural resources. These initiatives were developed in response to a number of factors, including the need to link conservation and socio-economic development, the prevention of biodiversity loss outside PAs, and the failure of top-down conservation approaches (Hulme & Murphree, 1999; Songorwa, 1999; Mbaiwa, 2004; Rotha et al., 2005; Suich, 2010). The concept of community-based conservation (CBC) is based on the idea that successful long-term management of PAs can be achieved if local people participate fully in conservation, have the right to control and manage wildlife resources, and derive tangible benefits from the resources therein to improve their livelihoods (Songorwa, 1999; Songorwa & Hughey, 2000; Mvungi, 2004; Scherl et al., 2004).

Community-based natural resource management (CBNRM) programs have been initiated in many countries, especially in Africa (Adam & Hulme, 2001; Abbot et al., 2001; Hulme & Murphree, 2001; Bajracharya et al., 2005; Gubbi et al., 2009). However, the effectiveness of such programs in contributing to wildlife conservation and local livelihoods is poorly assessed and understood (Hackel, 1998; Bajracharya et al., 2006). At the same time, an extensive body of literature that explores the success of community conservation initiatives (e.g., Gibson & Marks, 1995; Wainwright & Wehrmeyer, 1998; Mbaiwa, 2004; Thakadu, 2005; Taylor, 2009; Nkhata & Breen, 2010; Boudreaux & Nelson, 2011) shows mixed outcomes of community-based initiatives in contributing to conservation and distributing socio-economic benefits to local communities neighbouring PAs. This has led to an incomplete understanding of the extent to which community conservation initiatives are effective in meeting wildlife conservation and local livelihoods goals. Despite this lack of knowledge, community-based approaches are increasingly promoted in many areas (Berkes, 2004; Bajracharya et al., 2006).

Community wildlife management areas (WMAs) in Tanzania exemplify a CBNRM program officially initiated in the country in 2003. WMAs are community lands set aside for the purpose of wildlife conservation in which local people have usage rights over

wildlife resources in the area (Nelson, 2007; URT, 2009; Wilfred, 2010). The concept of community WMAs was a result of experiences learned from other pioneering CBNRM programs in Africa such as CAMPFIRE in Zimbabwe, ADMADE in Zambia, and community-based conservation (CBC) initiatives in Botswana and Namibia. Also, in the 1980s and 1990s, Tanzania implemented donor-funded community wildlife conservation programs such as the Serengeti Regional Conservation Program (SRCP) and the Selous Conservation Program (SCP), but these failed to provide many tangible benefits to local communities neighbouring PAs (Songorwa, 1999; Mfunda & Røskoft, 2011).

WMAs emanated from the Tanzanian Wildlife policy of 1998 (revised in 2007), which devolves power to local communities to manage and use wildlife resources outside the protected area as a way to improve their livelihoods through establishment of community WMAs in different parts of the country (URT, 1998). Since then, a number of WMAs have been established in the country, and by November, 2012 there were 17 WMAs with user right certificates (allowing community members to manage and use wildlife resources through an authorized community-based organization), while 21 WMAs were in various stages of the development process (MNRT, 2012).

Between 2003 and 2012, the government of Tanzania instituted several initiatives regarding community WMAs, including development of guidelines for designation and management of WMAs, assessment and evaluation of pilot WMAs in 2007, the release of the Wildlife Conservation Act in 2009, and WMA regulations in 2012. These government initiatives were intended to provide relevant technical information for decision making and to smooth the implementation of WMAs countrywide. Despite such government efforts, and a growing number of WMAs in the country, there are insufficient studies that assess the effectiveness of WMAs in contributing to local livelihoods. The available assessment studies (such as IRA, 2007; Kaswamila, 2010) have taken a rapid assessment approach with insufficient time to do a thorough analysis of the effectiveness of WMAs in contributing to improved local livelihoods, or gaining an understanding of how community members and other conservation experts perceive community WMAs. Other studies, for example Haller et al. (2008), noted that despite the implementation of a community conservation approach in Selous Game Reserve, local people view the program as neither a developmental option nor a political gain, but rather as a constraint and a burden. Additionally, Nelson (2007) noted that even though some

WMAs have been gazetted in Tanzania, communities were not yet earning substantial income from the WMAs because of limited income-generating investments.

It is against this background that this chapter uses community members' and wildlife conservation experts' perceptions to assess livelihood benefits attributed to WMAs at the local level, using a case study of Ikona WMA in Western Serengeti, Tanzania. Specifically, the study assesses local members' perceptions of Ikona WMA in contributing to improved local livelihoods at community and household levels, and compares the perceptions of community members, WMA administrators, and wildlife conservation experts. It is important to understand the contribution of Ikona WMA to local livelihoods as the establishment of the WMA might have affected community livelihoods positively or negatively, and this may have implications for community and wildlife conservation in the study area. Although local livelihoods entail many things (as proposed by Chambers & Conway, 1992; Ashley, 2000; Ellis, 2000; and Kollmair & Juli, 2002), in this paper the improvement of local household economy, improved access to natural resources, and improved community services are the main focus.

2.2 Study Area Description

Ikona WMA is located in the Serengeti district, Mara region in Northern Tanzania (Figure 6). It borders Serengeti National Park to the east and southeast, Grumeti Game Reserve to the south and southwest, and Ikorongo Game Reserve to the north (URT, 2005). It is surrounded by eight main villages, five of which, Robanda, Park Nyigoti, Nyichoka, Makundusi, and Nattambiso (Figure 6), jointly manage Ikona WMA under a community-based organization (CBO) locally known as “Jumuiya ya Hifadhi ya Wanyamapori IKONA (JUHIWAIKO)” – Ikona Wildlife Management Association. The association was officially registered in 2005, and acquired a certificate of authorization to manage wildlife resources in 2006 and a wildlife resources user rights certificate in 2007. These certificates give a CBO status as an Authorized Association (AA), with aims to protect and conserve natural resources and their environment and contribute to improving livelihoods in the community (URT, 2011a).

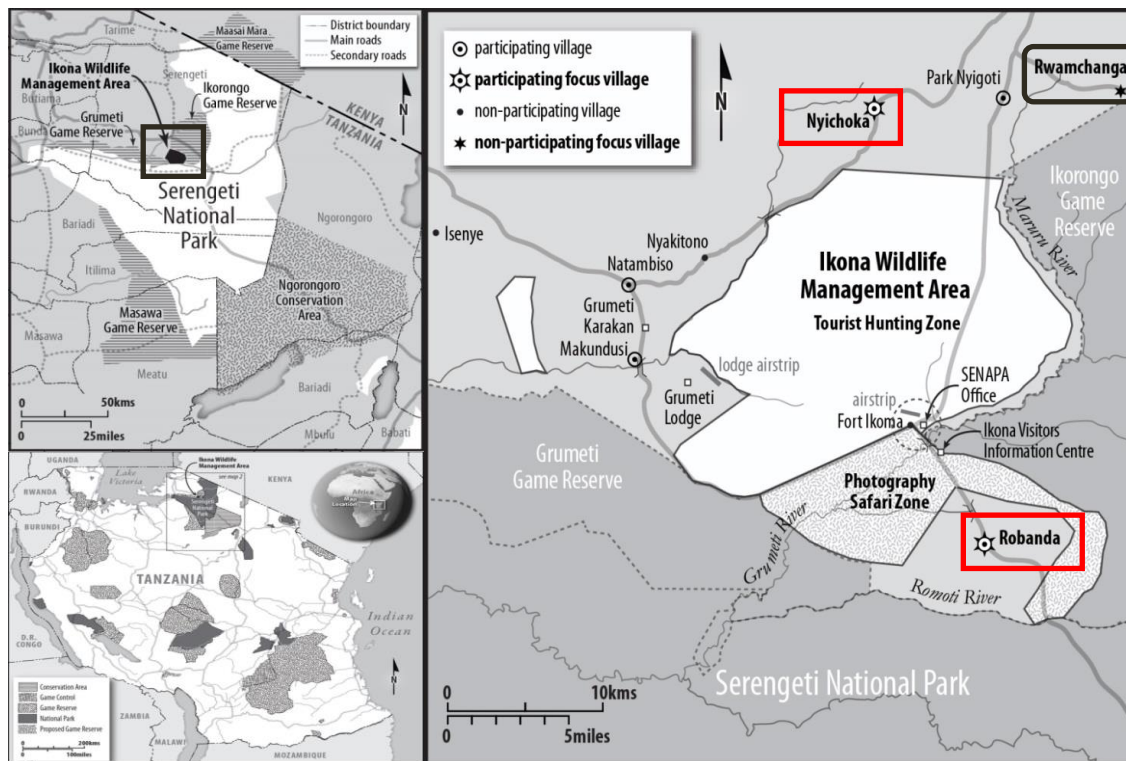


Figure 6 Map of the study area

Note: Map of Tanzania (lower left), Serengeti Ecosystem (top left), and study villages and Ikona WMA Zones (right)

Ikona WMA has an abundance and diversity of wildlife species similarly found in the Serengeti ecosystem, and functions as an important corridor for zebra and wildebeest migration (Sinclair et al., 2008; URT, 2011a). It covers an area of 242.3 km², and is divided into two zones. The Tourist Hunting Zone covers 61.5% (149 km²) of Ikona WMA in the north and west of the area. This zone allows tourist hunting activity through licensed investors. The second zone is the Photography Safari Zone, which covers 38.5% (93.3 km²) of Ikona WMA in the south and east of the area, bordering Grumeti and Ikorongo game reserves and Robanda village (see Figure 6). Tourism activities in this area are undertaken by tourism investors through establishment of campsites and lodges and conducting safari game viewing, and no tourist hunting activity is allowed in this area. The two zones comprise Ikona WMA, which promotes conservation and sustainable use of wildlife resources for the benefit of the local communities (URT, 2011a). The area of Ikona WMA receives scarce rainfall, amounting to about 700 mm per year. The dry season extends from July to September, and short rains

usually occur from November to March. Planting season starts in October, and harvest takes place from January to March and May to June, depending on the type of crops (URT, 2005; 2011a). The temperature shows a relatively constant mean monthly maximum of 27° to 28° C at Seronera in Serengeti National Park. The minimum temperature varies from 16° C in the hot months of October to March, to 13° C during May to August (Sinclair et al., 2008).

From 2002 to 2012, the population of the district has grown from 176,057 to 249,420 (URT, 2013), which indicates an increased demand on natural resources to support the livelihoods of local communities. The area is characterized by many different types of land use, ranging from PAs like Serengeti National Park where consumptive activity is not allowed, to Ikona WMA where both non-consumptive and consumptive activities are allowed, to highly intensive agriculture conducted in some villages at the edge of the wildlife conservation area (Sinclair et al., 2008). The study villages are also densely settled with villagers engaging in agro-pastoralism activities as a major source of their livelihoods (Kideghesho, 2008; Sinclair et al., 2008). The major food crops cultivated in the area are finger millet, maize, sorghum, and beans, while cotton is a cash crop. Livestock are also raised, including cattle, goats, and sheep (URT, 2005). However, communities are challenged by a lack of reliable markets for their livestock and agricultural produce.

As stated earlier, the area is a corridor for wildebeest and zebra migration, and sometimes migration happens during harvesting time (between July and September) and causes crop damage to all the villages surrounding Ikona WMA. Similarly, wildlife imposes huge economic and social costs on the communities adjacent to PAs of Western Serengeti, including crop damage, livestock depredation, and occasionally killing or wounding livestock and human beings (Walpole, 2004). People in this area are poor, with an average annual income earned from agro-pastoralism ranging from US \$150-200 (Kideghesho, 2006). Due to insufficient household income and human population pressures, communities in the area pursue off-farm activities, such as illegal hunting and charcoal burning, to add to household incomes and provide food such as bush meat for household members, thus posing a threat to wildlife resources (Sinclair et al., 2008; Kideghesho, 2006; Rentsch, 2012).

2.3 Methods

Ikona WMA in Western Serengeti was purposefully selected for this study for three main reasons. First, Ikona WMA is among the earliest pilot study areas to establish a community WMA, soon after the government of Tanzania officially unveiled the process in 2003. Second, Ikona WMA has been in operation for more than seven years since it was officially registered as a community-based wildlife conservation association in the year 2005. Since this is one of the longest running WMAs, enough time has elapsed to adequately assess its contribution to local livelihoods in the study area. Third, the area has an abundance and diversity of wildlife species similarly found in the Serengeti ecosystem, and functions as an important corridor for wildebeest migration (Sinclair et al., 2008; URT, 2011a). Thus, it possesses unique features that attract more tourism investors, photographic safaris, and tourist hunting than other WMAs in the country.

The study involved two villages (Robanda and Nyichoka) participating in Ikona WMA and one (Rwamchanga) not participating. All three villages border Ikona WMA and were selected purposefully as the researcher had already established contact in these communities, thus making it relatively easy to work in them. Including Rwamchanga village in this study provides an opportunity to compare community perceptions towards livelihood benefits attributed to the wildlife conservation area between communities participating and not participating in Ikona WMA.

A mixed method approach, including literature review, key informant interviews, focus group discussions, and household surveys, was used to capture information about community perceptions of livelihood benefits attributed to Ikona WMA. The mixed method approach allowed the researcher to understand and analyze the research problem as broadly as possible, provided an opportunity to complement information from multiple methods, and minimized the biases of using a single method (Creswell, 2003, 2009; Robson, 2011; Newing et al., 2011).

Review of literature relevant to the research topic and study area was conducted to gain a broad understanding of the study area, CBNRM concepts and principles, as well as to understand the concept of livelihoods and WMAs in Tanzania and how Ikona WMA is operating in the study area. This involved official documents such as the Wildlife Policy, Wildlife Act, WMA regulations, and Ikona WMA annual reports obtained from the

Wildlife Division and Ikona WMA office in Tanzania. Other documents included books, electronic papers, and unpublished documents obtained from libraries.

Based on available village household ledgers maintained by village chairpersons, a simple random sampling was used to obtain a sample size of 300 households for the survey from three study villages (see Chapter 1 for details). The sample size covered 15% of total households (used also by Bajracharya et al., 2006 and Kangalawe & Noe, 2012) and provided a confidence interval of ± 5.2 and a confidence level of 95%. A structured household questionnaire was designed that incorporated closed and open-ended questions to allow respondents to freely express their views and beliefs, and to seek more details about individual responses. Closed questions involved statements with a Likert scale of 1 to 4 (where 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree), and were used to measure community members' perceptions and level of agreement about various livelihood benefits attributed to Ikona WMA. The household questionnaire also contained questions on socio-economic and demographic variables including gender, age, education level, household size, and the number of years respondents have resided in the village, as well as their main livelihood activities. This questionnaire was first written in English, and then translated into Kiswahili, which is spoken and understood by the majority of local community members.

The household questionnaire (Appendix C) was administered face-to-face in selected households by trained local research assistants. The three local research assistants who conducted the household survey were not involved with any Ikona WMA activities before the study, and had already lived in Serengeti district for more than ten years and thus were familiar with the three study villages. The use of local research assistants was designed to encourage respondents to provide information to a familiar person who spoke their local language. This design also helped overcome a language barrier in which respondents were unable to express themselves in Kiswahili, the native language of the researcher. Whenever possible, household heads were surveyed at each selected household. The household head can be either a man or woman over 18 years of age who assumes responsibility for the household (Budlender, 1997). Household surveys were carried out from afternoon to evening hours, when household heads were likely to be at home and not engaged in farming activities. When household heads were not at home, research assistants returned to the household later in the same day or on the following

day, and if there was still no response after a second visit, the household was not surveyed and another household was selected based on a reserve list of random numbers of the households selected previously from original larger household lists (for a more detailed description of methodology, refer to Chapter 1). The study obtained an ethical research certificate of approval (Appendix D) from the University of Victoria to ensure that all potential risks associated with conducting research on and with human subjects are taken into consideration in this study. This included obtaining oral or written consent, and stating the right to participate voluntarily and the right to withdraw at any time. The purpose of the study, the assurance of confidentiality and anonymity, and the benefit of the study were clearly explained to research participants as proposed by Creswell (2003).

Quantitative data from household surveys were first screened and cleaned of errors, then coded and entered into Statistical Package for Social Sciences (SPSS) version 16.0 for analysis. Descriptive statistics were applied to obtain percentage, mean, and standard deviation of various conservation variables for the three study villages. Exploratory factor analysis using a principle component analysis with varimax rotation (Appendix F1) was applied as a way of reducing data to increase interpretability of the identified factor (Choi & Murray, 2010). As a result, 10 out of 22 variables in Likert scale format were loaded into three factors related to livelihoods, including separate factors related to: 1) improvement of household economy; 2) community access to natural resources; and 3) community services (Appendix F2). One-way ANOVA was used to test whether there were significant differences in responses among the study villages based on each factor mean (Appendix F4). Further, the Scheffe Post Hoc-test for multiple comparisons was used to identify which specific study village had statistically significant differences in community members' perceptions across the three study villages (Appendix F5).

Household data were supplemented by data from semi-structured interviews with 50 key informants. Key informants included people who were more knowledgeable about Ikona WMA and wildlife conservation based on their job positions and their titles in the study area. This included 17 Ikona WMA administrators and WMA village representatives, 19 village leaders and ward councillors at the village level, and 11 wildlife conservation experts at the study area level and 4 at the national level. In addition, a total of eight focus group discussions (FGDs) comprising a range of five to ten people were conducted at the village level. A focus group is a small group discussion

in which participants respond to and discuss a series of questions based on the research topic (Newing et al., 2011; Krueger & Casey, 2000 in Muruvi, 2011). Interviews and FGDs were recorded digitally, except in a few cases where respondents were unwilling to be recorded and instead notes were taken.

Both key informant interviews and FGDs captured broad information about the research topic, such as community members' perceptions and attitudes towards Ikona WMA, and their experiences and livelihood benefits associated with Ikona WMA, as well as conservation experts' views about community WMAs. Qualitative data were transcribed by the principal researcher on the same day of the interview and FGD by highlighting and taking notes of key issues that emerged in the interviews/FGDs based on research topics. Later, the recorded information was translated from Kiswahili into English and the information was grouped based on interview (Appendix A) and group discussion (Appendix B) guide questions responding to the main research questions.

2.4 Results

2.4.1 Sample Population Characteristics

In the three study villages, the largest age group (29.3%) was 30 to 39 years old. Of the 300 households surveyed, there were 158 (52.2%) male and 142 (47.3%) female heads of households (Table 6). Most respondents (82%) reported having a primary education, with (8%) reporting not having attended any formal education. Only 10% reported having attained secondary education. The most common (43.7%) household size was four to six people, and 66% of respondents had lived in the area more than 20 years. Unemployment rates were high, with only 13.6% of respondents employed in Ikona WMA or by private tourism investors and government institutions. The majority of respondents (64.1%) were engaged in farming and keeping livestock as major sources of their livelihoods. The remainder (22.2%) were engaged in various livelihood activities, including charcoal- and brick-making, carpentry, sales of thatching grass, local brewing, and others engaged in small business (kiosks), as indicated below (Table 6).

Table 6 Sample population characteristics

<i>Gender</i>	n	%	<i>Residency time in the village</i>		<i>Livelihood activities (Multiple responses)</i>		F	%
Male	158	52.7	1 - 5 years	18	6.0	Livestock keeping	233	27.4
Female	142	47.3	6 - 10	28	9.3	Farming	299	35.2
			11 - 15	23	7.7	Employed in Ikona WMA	12	1.4
			16 - 20	33	11.0	Employed in other institution	17	2.0
20 – 29 years	78	26.0	21+	198	66.1	Engaged in small business	99	11.7
30 – 39	88	29.3				Charcoal making	16	1.9
40 – 49	68	22.7	<i>Household size</i>			Thatching grasses sales	27	3.2
50 +	66	22.0	1 - 3 people	40	13.3	Local beer brewing	93	11.0
<i>Education level</i>			4 - 6	131	43.7	Other	53	6.2
Primary	246	82.0	7 - 9	86	28.7	<i>Total</i>	849	100
Secondary	30	10.0	10 - 12	35	11.7			
Informal	24	8.0	13+	8	2.7			

n = Number, % = Percentage, F = Frequency of multiple responses

The ANOVA-test indicated no significant difference based on age, gender, or number of years that respondents resided in the village in all three livelihood factors, namely household economy, access to natural resources, and community services. Only educational level was significant in respondents' perception of the household economy factor, $F(2, 297) = 5.888, P < .003$ (Table 7). The Scheffe Post Hoc-test of comparison indicated that the differences in community perception based on education level exist between community members who attended primary and informal, and secondary and informal education, ($P < .018$) and ($P < .004$) respectively. There was no significant difference in perceptions ($P > .273$) between community members who attended primary and secondary education with regard to improvement of household economy (Table 8).

Table 7 Difference in community perception based on education levels

ANOVA						
<i>Livelihood factors</i>		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
<i>Household Economy</i>	Between Groups	5.175	2	2.587	5.888	0.003
	Within Groups	130.518	297	0.439		
	Total	135.693	299			
<i>Access to Natural Resources</i>	Between Groups	0.072	2	0.036	0.074	0.929
	Within Groups	145.477	297	0.490		
	Total	145.550	299			
<i>Community Services</i>	Between Groups	2.580	2	1.290	2.53	0.081
	Within Groups	151.466	297	0.510		
	Total	154.047	299			

* $P \leq 0.05$, Significant

Table 8 Comparison of community education level with livelihood factors

		Multiple Comparisons – Scheffe-test		* P ≤ 0.05 is significant			
<i>Livelihood Factors</i>	<i>(I) Education Level</i>	<i>(J) Education Level</i>	<i>Mean Difference (I-J)</i>	<i>Std. Error</i>	<i>Sig.</i>	<i>95% Confidence Interval</i>	
						Lower Bound	Upper Bound
<i>Household Economy</i>	Primary Ed	Secondary Ed	-0.207	0.128	0.273	-0.52	0.11
		Non formal Ed	.405*	0.142	0.018	0.06	0.75
	Secondary Ed	Primary	0.128	0.273	-0.11	0.52	
		Non formal Ed	.612*	0.182	0.004	0.17	1.06
	Non formal Ed	Primary	-.405*	0.142	0.018	-0.75	-0.06
		Secondary Ed	-.612*	0.182	0.004	-1.06	-0.17
<i>Access Natural Resources</i>	Primary Ed	Secondary Ed	0.012	0.135	0.996	-0.32	0.35
		Non formal Ed	0.057	0.15	0.93	-0.31	0.43
	Secondary Ed	Primary Ed	-0.012	0.135	0.996	-0.35	0.32
		Non formal Ed	0.044	0.192	0.973	-0.43	0.52
	Non formal Ed	Primary Ed	-0.057	0.15	0.93	-0.43	0.31
		Secondary Ed	-0.044	0.192	0.973	-0.52	0.43
<i>Community Services</i>	Primary Ed	Secondary Ed	0.027	0.138	0.981	-0.31	0.37
		Non formal Ed	0.343	0.153	0.081	-0.03	0.72
	Secondary Ed	Primary Ed	-0.027	0.138	0.981	-0.37	0.31
		Non formal Ed	0.317	0.196	0.271	-0.16	0.8
	Non formal Ed	Primary Ed	-0.343	0.153	0.081	-0.72	0.03
		Secondary Ed	-0.317	0.196	0.271	-0.8	0.16

2.4.2 Perceptions of Livelihood Benefits from Ikona WMA

Respondents were asked to rate their level of agreement with statements about ten related livelihood variables using the Likert scale (i.e., 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree). Statements were categorized into three livelihood factors: household economy, community access to natural resources, and community services, to compare the difference in community perceptions among and within two villages participating in Ikona WMA and a village not participating in Ikona WMA (Table 9). As seen in Table 10, results showed statistically significant variation in community perceptions across the three study villages with regard to three livelihood factors. These are discussed in detail below.

Table 9 Response of community members based on livelihood variables per village

Livelihood Variables	Loadings	Nyichoka Village (N=153) %					Robanda Village (N=88) %					*Rwamchanga Village (N=59) %					ANOVA **Sig.			
		1	2	3	4	Mean	STD	1	2	3	4	Mean	STD	1	2	3		4	Mean	STD
Household Economy																				
Increase of household income	.739	68	13.1	12.4	6.5	1.58	0.94	42	21.6	30.7	5.7	2.00	0.98	74.6	16.9	5.1	3.4	1.37	0.74	.000
Households benefit financially from W/conservation (WMA)	.682	55.6	19	19	6.5	1.76	0.98	42	19.3	31.8	6.8	2.03	1.01	74.6	11.9	13.6	0	1.39	0.72	.000
WMA created alternative sources of income	.648	51	13.7	24.2	11.1	1.95	1.10	23.9	25	39.8	11.4	2.39	0.98	52.5	35.6	10.2	1.7	1.61	0.74	.000
More employment opportunity	.555	30.7	13.7	38.6	17	2.42	1.10	12.5	19.3	56.8	11.4	2.67	0.84	20.3	6.8	69.5	3.4	2.56	0.86	.152
Involved in achieving livelihood benefits from wildlife conservation (WMA)	.542	49	15.7	24.8	10.5	1.97	1.08	33	30.7	29.5	6.8	2.10	0.95	78	13.6	8.5	0	1.31	0.62	.000
Access to Natural Resources																				
Grazing lands are easily accessible	.715	70.6	8.5	13.7	7.2	1.58	0.98	26.1	13.6	42	18.2	2.52	1.07	55.9	25.4	18.6	0	1.63	0.79	.000
It is easier to access farm land now	.562	37.9	15.7	35.3	11.1	2.20	1.07	19.3	10.2	52.3	18.2	2.69	0.99	40.7	22	25.4	11.9	2.08	1.07	.000
It is easier to access fuel wood, poles, medicine and thatching grasses	.580	47.1	32	14.4	6.5	1.80	0.92	37.5	33	27.3	2.3	1.94	0.86	54.2	32.2	13.6	0	1.59	0.72	.058
Community Services																				
There is more access to credit/loan	.769	54.2	23.5	10.5	11.8	1.80	1.04	47.7	25	22.7	4.5	1.84	0.93	83.1	8.5	8.5	0	1.25	0.60	.000
Community services (school, dispensary, water, road, transport) have been improved	.436	23.5	3.3	34.6	38.6	2.88	1.16	2.3	5.7	38.6	53.4	3.43	0.71	25.4	22	52.5	0	2.27	0.85	.000

*Village not participating in Ikona Wildlife Management Area

Note: 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree, STD = Standard Deviation, **P ≤ .05, Significant (for more detail see Appendix F9)

Table 10 Differences in community perceptions based on factor mean per village

<i>Livelihood Factors</i>	<i>Factor mean per villages</i>			<i>ANOVA F-test</i>		
	Nyichoka (N=153)	Robanda (N=88)	*Rwamchanga (N=59)	df	F	Sign
Household Economy	1.9359	2.2386	1.6475	2 297	15.287	** .000
Access to Natural Resources	1.8584	2.3864	1.7684	2 297	22.789	** .001
Community Services	2.3399	2.6364	1.7627	2 297	31.812	** .000

*Village not participating in Ikona WMA

** $P \leq .05$, Significant

Table 11 Comparison of communities' perceptions across the study villages (Scheffe-test)

<i>Livelihood Factors</i>	<i>Village names</i>		
	Nyichoka *Rwamchanga	Robanda *Rwamchanga	Robanda Nyichoka
Household Economy	** .015	** .000	** .002
Access to Natural Resources	.667	** .000	** .000
Community Services	** .000	** .000	** .004

*Village not participating in Ikona WMA

** $P \leq .05$, Significant

2.4.3 Household Benefits from Ikona WMA

For the *household economy factor*, results indicate that out of five livelihood variables (Table 9) only one variable, increase of employment opportunity, was not statistically significant ($F(2,297) = 1.895$, $P > .152$) (Appendix F9), and was perceived positively by community's members in Robanda and Rwamchanga villages. Findings show that despite community members in Rwamchanga village not participating in Ikona WMA, they have a more positive perception of employment opportunity created by Ikona WMA. In this village, 72.9% of respondents agreed or strongly agreed that WMA created employment opportunities, higher percentages than for Robanda at 68.2% and

Nyichoka at 55.6% (Table 9). Findings from group discussions in Rwamchanga and Robanda indicate that some community members had secured job opportunities from tourist investors in Ikona WMA, while residents of Nyichoka village had not. None of the communities expressed positive perceptions of the remaining four livelihood variables in the household economy factor.

More than 63% of respondents in each village expressed negative perceptions about the contribution of Ikona WMA to increasing household income, creating alternative sources of income, involving community in achieving livelihood benefits, and whether households benefit financially from wildlife conservation. Of the three communities, Rwamchanga village members expressed more negative perceptions, and over 84% of the respondents in the village disagreed with statements about the four variables under household economy factor, followed by over 64.7% of the respondents in Nyichoka village (Table 9). Testing difference in community perceptions about the household economic factor, the ANOVA-test indicates significant difference ($F(2, 297) = 15.287$, $P < .000$) in the three study villages (Table 10). Results of the Scheffe-test indicate that differences in community perceptions exist between Rwamchanga and Robanda ($P < .000$) and Rwamchanga and Nyichoka villages ($P < .015$). Differences in perception also existed between Robanda and Nyichoka villages ($P < .002$) participating in Ikona WMA (Table 10).

Responding to the question about whether communities accrue benefits at the household level from Ikona WMA, interviews with administrators revealed that they currently see no direct conservation benefits accruing to households, but they perceived indirect benefits at the household level. The indirect household benefits reported by WMA administrators include control of problem animals, especially elephants, enabling the community to increase crop harvests which in turn adds to the household economy. The Ikona WMA also contributes financial support for social development projects in the villages. As a result, each household retains their income for family development, whereas before each household was required to contribute money for social development projects in the village. The WMA has also attracted tourism investors who create job opportunities for individuals to earn incomes to help support their households. It also provides education scholarships for a few children from the poorest families, as

illustrated in the following comments reported by WMA administrators, which were reflective of responses of the majority of WMA administrators when responding to the question of whether household members accrue benefits.

“...Normally at the household level we support very little, especially when there is a social problem like death or if someone became seriously sick...then we provide a little financial support or transport service...”

“...WMA has little budget to support students especially for those who have passed exams but parents are unable to support their children for further studies...”

“...there are not many benefits at the household level, but few household members have secured employment in WMA. Also, it provides financial support for villages’ development projects. This has helped each household not to contribute money for the village development project, and instead retain their household income for family development...”

Conservation experts from Serengeti district and Serengeti National Park expressed negative perceptions about the contribution of Ikona WMA to improving household economy. Eight out of eleven wildlife conservation experts interviewed in the study area reported that much of Ikona WMA benefits accrue to the community level and not to the household level, as illustrated in the following statements when responding to the question about household benefits accrued from Ikona WMA. However, a minority of conservation experts had different views and disagreed about the whole concept of community WMA in the study area.

“...the problem I see is that benefits from Ikona WMA fail to reach down to village members; only a few people, especially leaders, are getting more benefits and less is invested for community development...”

“...the community experiences nothing at the household level; benefits seen are at the community level, especially construction of school classes and health clinics...”

2.4.4 Benefits Regarding Access to Natural Resources

With regard to community access to natural resources, results show that out of three variables (access to grazing land, access to farm lands, and access to fuel wood, tree poles for house construction, medicinal plants, and thatching grasses), only community members in Robanda village expressed positive perceptions about two variables. Regarding access to grazing and farm lands, 60.2% and 70.5% of respondents, respectively, expressed the existence of benefits (Table 9). Rwamchanga villages had more negative perceptions of all variables related to community access to natural

resources compared to Robanda, with Rwamchanga perceiving the least benefits. All three communities expressed negative perceptions on the contribution of the Ikona WMA in accessing resources like fuel wood, poles, thatching grasses, and medicinal plants from WMA. Of the three variables about community access to natural resources, findings indicate that only access to fuel wood, poles, medicinal plants, and thatching grasses was not statistically significant ($F(2, 297) = 2.88, P > .058$) across the three study villages (see Appendix F9).

Although there was variation in responses to the three variables related to community access to natural resources, an overall mean for this factor expresses negative perceptions of community members about access to natural resources in the three study villages (Table 10). However, the ANOVA-test for this factor indicates significant differences ($F(2, 257) = 22.789, P < .001$) in community perceptions across the three study villages (Table 10). Results show that significant differences in perception ($P < .000$) exist between the two villages participating in Ikona WMA, where Robanda benefits more than Nyichoka, and significant different between Robanda and Rwamchanga villages. Findings also indicate no significant difference ($P > .667$) in community perceptions about access to natural resources between Nyichoka and Rwamchanga villages (Table 11). The results show that despite Nyichoka participating in Ikona WMA, community members do not perceive more benefits than Rwamchanga village in terms of access to natural resources.

In all three study villages, community members perceived that the wildlife conservation area was limiting their access to various natural resources, however their perceptions differed from WMA administrators and conservation experts. Interviews with wildlife conservation experts and WMA administrators revealed that WMA regulations allow community access to some resources from Ikona WMA through application for an access permit, but no community members had applied for a natural resource access permit in Ikona WMA. This was revealed when they were responding to the question about whether communities are allowed to access natural resources in Ikona WMA, as illustrated in the following statement of one WMA administrator which reflects the majority opinion of WMA administrators and conservation experts in the study area.

“... our goal is to ensure animals are safe in Ikona WMA, so access to natural resources in WMA is restricted and no one is allowed even to pass there; but under some special cases, like access to medicine and to do rituals, people can be allowed after applying for an access permit and not otherwise...”.

2.4.5 Livelihood Benefits at the Community Level

Regarding improvement of community services, results indicate that of two livelihood variables in this factor, over 70% of the respondents in Nyichoka and Robanda villages have positive perceptions about the improvement of social services, such as construction of school classes and health clinics, construction of a water dam (marambo), transport services, and improvement of village roads at the community level. Community perceptions in Rwamchanga village were almost evenly split, with 52% of respondents observing some improvement of community social services in their village. Results show that over 70% of the respondents from each study village expressed negative perceptions about the contribution of Ikona WMA in improving community access to financial resources like credit or loans in the study area (Table 9). The findings indicate that the two variables under community services were statistically significant ($P < .000$) across the three study villages (Appendix F9).

Based on an overall mean for the community service factor in the three study villages, the results show community members in Robanda village hold more positive perceptions about improvement of community services than members in Nyichoka and Rwamchanga villages, who expressed negative perceptions about this factor (Table 9). Findings show significant differences among the three study villages, $F(2, 297) = 31.812$, $P < .001$ (Table 10). Differences in perceptions exist between the two villages participating in Ikona WMA and Rwamchanga village ($P < .001$). The results also indicate that despite both Robanda and Nyichoka villages participating in Ikona WMA, there was significant difference ($P < .004$) in community perceptions between the two villages (Table 10).

The findings from household surveys conform to results from interviews with WMA administrators and conservation experts in the study area, who also expressed positive perceptions regarding the contribution of Ikona WMA in delivering livelihood benefits at the community level, as reflected in the following comments from WMA administrators that represent the opinion of a majority of conservation experts and WMA administrators

interviewed in the study area. However, few wildlife conservation experts interviewed at the national level see no significant contributions of WMAs to community development, and they expressed doubts about the financial management of community WMAs.

“...in general I can say the contribution of Ikona WMA in supporting community services is more than 70%, much achievement based on improving social infrastructure such as school classes, health clinics, teacher’s houses, and constructing water dams for livestock and human consumption. We are proud of that little achievement; from nothing to something is good progress.....”.

“...there are lots of community benefits accrued from Ikona WMA. For example, each village member receives some amount of money that helps them to improve social services in their respective village. Now you can see new primary school classes, dispensaries, and water dams for livestock in villages participating in Ikona WMA, and other villages have managed to construct teacher’s houses as well as a new village office...”

2.5 Discussion

Community-based wildlife conservation is expected to provide both conservation and local development with the assumption that they could be simultaneously achieved, the interests of both could be served (Berkes, 2004). In this study, we examined the community/residents’ perceptions of local livelihood benefits from Ikona WMA across the three study villages and among WMA administrators and conservation experts in Western Serengeti, Tanzania. The discussion that follows focuses on three livelihood factors, namely household economy, access to natural resources, and community services benefits.

2.5.1 Perceived Benefits at the Household Level

The results from this comparative study indicate predominantly negative perceptions by community members about the contribution of Ikona WMA in improving local household economy across the three study villages. However, the community not participating in Ikona WMA perceived fewer household benefits compared with the two participating villages (Robanda and Nyichoka). This indicates that community members participating in Ikona WMA were experiencing some indirect benefits at the household level, which supports the findings of Nepal & Spiteri (2011) that individuals who perceive more benefits from a park are likely to hold more favourable perceptions and attitudes towards park management than those perceiving fewer benefits.

Findings show that, despite the fact that WMA administrators acknowledge few benefits to community members at the household level, they were the group that reported some indirect benefits attributed to Ikona WMA at the household level (such as control of problem animals linked with increases of household harvest, and financial support of village development projects helping to retain household income for other family requirements) compared to community members' and conservation experts' perceptions of this factor. However, such indirect benefits at the household level were not reported by the majority of community members, thus making it difficult for them to associate improvement of their household economy with benefits from Ikona WMA. This point is illustrated in the following statement from one WMA administrator responding to the question regarding benefits communities accrue at the household level:

“...since having Ikona WMA, community members are not contributing money for village development projects; instead their household income is used for other family requirements, but they don't recognize this benefit...”

This is evidence that without local communities realizing direct and tangible benefits at the individual and household level, it will be difficult to associate conservation benefits with the improvement of their livelihood, particularly at the household level, a condition that might affect efforts towards wildlife conservation. Rozemeijer & Jansen (2004) noted that benefits that reach down to the household level are significantly meaningful and can catalyze changes in people's perceptions and attitudes towards conservation.

Although community members perceive an increase of employment opportunities compared to before the establishment of Ikona WMA, only a few individuals had an opportunity to secure employment from tourist investors in Ikona WMA, while most employment opportunities were taken by people from outside. Those few who secured jobs were the only community members who perceived direct benefits from wildlife conservation that could help to improve individual household incomes. Similar findings by Emerton & Mfunda (1999) noted that direct employment in tourist-related enterprises is negligible in the Western Serengeti because most employees originated from outside the area. Despite a lack of direct benefits at the household level from Ikona WMA, there were no efforts in place to introduce various income generating activities that could add

income and minimize community members' need to rely on consumption of natural resources for their livelihoods.

This implies that community members in the study area continue to bear costs caused by wildlife (i.e., crop raiding and livestock predation) without experiencing substantial benefits at the household level, a condition that can discourage community interest in supporting wildlife conservation (Songorwa, 1999; Mfunda & Røskaft, 2011). Lack of household benefits from Ikona WMA has also been attributed partly to the low number of employment opportunities available, lack of strategies for empowering communities to pursue income generating activities, lack of access to financial resources, and low education level for the majority of community members (82%) which impede community members from entering tourism ventures. This is reflected in the following comment from one village leader when responding to the question regarding his general view about the contribution of Ikona WMA to local livelihoods during an interview, a comment which reflects the opinion of 10 out of 19 village leaders and 9 of 17 WMA administrators interviewed in the study area.

“...you know all tourist investors in Ikona WMA sign contracts to provide first priority to local people for any job opportunity that arises, but they always need someone who is professional and who can speak English, thus creating difficulties for our people to secure a job post; as a result, most job opportunities from investors have been taken by the people from Arusha and elsewhere...”

2.5.2 Benefits Regarding Access to Natural Resources

The findings of this study reveal varying perceptions of community members about community access to natural resources across the three study villages. Community members in Nyichoka and Rwamchanga villages expressed more negative perceptions compared to community members in Robanda village. In Nyichoka and Rwamchanga villages, community members reported that an increase of livestock and human population in both villages, together with the establishment of Ikona WMA in Nyichoka village, has created a shortage of grazing and farm lands. Increases in the livestock population, particularly in Nyichoka village, has been associated with a lack of enforcement of the village land use plan and corruption, as reflected in the following

comment from one key informant at the village level when responding to the question about whether community members have access to natural resources in the study area:

“...we have a good village land use plan, and we demarcated area for grazing and forest, but our leaders are corrupt and they have allowed even pastoralist immigrants to establish settlements on the village land designated as grazing area...”

This suggests that growing human and livestock populations in the study villages, and ineffective implementation of village land use plans in villages participating in wildlife conservation are conditions that can threaten wildlife resources, particularly in Ikona WMA. Schmitt (2010) also reported similar findings that as immigration increases, the density of people and number of livestock will lead to a scarcity of agricultural land, and human-wildlife conflict will increase in Western Serengeti.

Community members in Rwamchanga village had more negative perceptions about access to natural resources from the conservation area. This is attributed to limited access to natural resources such as fuel wood, poles, water for livestock, and shortage of grazing lands, as well as the poor relationship existing between the village and game rangers from surrounding PAs, all of which has resulted in a failure to realize the potential benefits of wildlife conservation. These conditions might have caused negative perceptions and attitudes towards wildlife conservation compared to Robanda and Nyichoka villages. The following statement from one village leader in Rwamchanga village during an interview reflects the view of the majority of community members who participated in group discussions and key informants interviewed in the village when responding to the question about whether community members experience benefits and access to natural resources from wildlife conservation.

“...you know people in this village consider wild animals as the first enemy of their lives because wild animals have been valued more than human beings. Imagine people are working hard on their farm, but they harvest nothing in this village because of problem animals, especially elephants, and we don't see any benefits from wildlife conservation; rather they create conflict...”

This is similar to the findings of Hoole & Berkes (2010) in Namibia, where communities living next to the park perceived a lack of benefits from conservation and limited access to natural resources, particularly grazing land.

The increase of problem animals was also affecting people's livelihoods and their perception towards wildlife conservation in the study villages, especially in Rwamchanga village. There was no compensation/consolation for community members who have suffered from problem animals in all three study villages as required by Tanzania's animal damage consolation regulations of 2011. Mutandwa & Gadzirayi (2007) noted similar findings in CAMPFIRE – Gonono ward where community members complained they were never compensated for wildlife damage. Lack of benefits from wildlife conservation has made community members in Rwamchanga village see wild animals as having no value to their livelihoods; as a result, some community members continue to practice illegal activities such as poaching and grazing in conservation areas. This indicates how villagers can be both poachers and guardians of wildlife, depending on the nature and extent of the benefits they experience from wildlife conservation. Nepal & Spiteri (2011) argue that if the benefits the communities experience from conservation do not outweigh the costs of wildlife conservation, it is difficult to improve perceptions and attitudes of communities towards wildlife conservation in PAs.

Interestingly, to some extent community members participating in Ikona WMA expressed tolerance of the costs they experience from wildlife, as reflected in the following statement from one respondent during group discussion in Nyichoka village in response to the question regarding costs and benefits that the community experienced from Ikona WMA.

“...people complain a lot about elephant crop raiding and shortage of grazing lands, but we are getting money from wildlife conservation...you see now we are building a maternity ward in our village because of having these wild animals in our area...”

This implies that some community members were able to realize the linkage between conservation and improvement of their livelihoods despite the majority view that conservation limited access to natural resources in the study area.

In Robanda village, community members expressed negative perceptions about access to fuel wood, poles, medicine, and thatching grasses. However, they perceived more access to farm and grazing lands compared to Nyichoka and Rwamchanga villages. This was contrary to the findings obtained from village leaders during interviews, who expressed great shortages of grazing and farm lands in Robanda village, to such an extent

that they expressed their intention to demand back part of the land contributed for Ikona WMA for agriculture and settlement, as illustrated in the following statement from one village leader which reflects the opinion of the majority of village leaders when responding to the question regarding community access to natural resources:

“...our village population is growing, so we need WMA leaders and government to allow us to contribute only 60% of village lands for Ikona WMA instead of 72% of land which we dedicated for wildlife conservation in order to get land for other human activities, especially farm and grazing land...”

This suggests demands for more lands in Robanda village to accommodate agriculture activities and a growing population. Nonetheless, the demand for more land might be in the interest of some village leaders and not in the interest of the community members, as findings indicate that the majority of community members perceived grazing and farm lands as not a big problem in their village.

Limited access to bush meat was expressed by all three communities during focus group discussions and interviews, which might have affected community perceptions towards wildlife conservation. Historically, these communities and other communities in Western Serengeti are hunters, and commonly supplement their diets of domestic livestock and basic grain crops with wildlife meat (Loibooki et al., 2002; Mfunda & Røskaft, 2010; Rentsch, 2012). These communities were also among the communities involved in the Serengeti Regional Conservation Project (SRCP) in the early 1990s, where a quota for community hunting was set and endorsed by the Wildlife Division through SRCP to local people (Mfunda & Røskaft, 2010). However, Ikona WMA has no such arrangement for local community members to access bush meat, a condition that makes community members unhappy, as one respondent in Robanda village commented when responding to the question regarding access to natural resources in the WMA which reflects the views of four group discussions and eight key informants interviewed at the village level.

“..... nobody is against wildlife conservation and we know the value of wild animals, but it is not a sin if we could have access to bush meat for food nutrition during hunting season.....you know wildlife conservation is like having a poultry project but you can't sell all the eggs, and let your children die with malnutrition...”

This finding suggests that Ikona WMA should also take into consideration what communities most value and integrate those values in plans in order to let the interests of communities in Ikona WMA continue. Murray & King (2012) noted that an overall purpose of such protected area developments should also serve to reconnect humans to nature and help to create local, high-value, and sustainable livelihoods. Similarly, Bianchi (2003) argues that it is important to consider different interest groups in community conservation and incorporate their range of distinctive values and interests.

WMA administrators and wildlife conservation experts differed with community perceptions about access to natural resources. They perceived community members were not limited in accessing natural resources in Ikona WMA as regulations allow them access under special access permits. However, they acknowledged that community members have low awareness about application procedures for natural resources access permits in WMAs. Chamber & Conway (1991) and Kollmair & Juli (2002) noted that natural resources and environmental services are crucial in supporting life, particularly in local environments where the community depends on livelihoods from natural resources. Thus, the conservation benefits in the study area should go beyond monetary, and access to basic natural resources that are crucial to support local livelihoods, such as collection of dry fuel wood in Ikona WMA which serves as a main source of energy in the study villages, would be significant for the future of the WMA.

2.5.3 Perceived Benefits at the Community Level

Community members participating in Ikona WMA had different perceptions of livelihood benefits at the community level associated with Ikona WMA from those not participating. As stated earlier, findings in Rwamchanga village showed that community members are not receiving any substantial livelihood benefits associated with wildlife conservation apart from individual employment opportunities from tourism investors found in neighbouring villages. However, at the time of this research, Serengeti National Park (SENAPA) had just started to initiate Community Conservation Bank (COCOBA) groups in Rwamchanga village as a way to empower community members financially. Most community services found in Rwamchanga village, such as the primary school, dispensary, Manchira secondary school, and police station, serve all of Manchira ward

and depend on financial support from the government through the district council and money contributions from community members for village social development projects.

Compared with other villages participating in Ikona WMA, Rwamchanga village has no regular transport service, and mostly depends on bicycles with a few using motorcycles to connect with Mugumu town, where community members access most of their basic needs and social services. Water supply for livestock and human beings is still a problem in this village, with only one water dam available. This makes it difficult for many community members from distant parts of the village (e.g., from Nyasirori area) to access the village water dam, so they depend on river water in Ikorongo Game Reserve. Insufficient community services, as well as costs the community incurs from wildlife have negatively affected community members' perceptions and attitudes towards wildlife conservation in Rwamchanga village. Berkes (2004) noted that if communities are not experiencing benefits it could be difficult for them to support conservation.

In Nyichoka village, community members perceived some benefits experienced from Ikona WMA at the community level compared with Rwamchanga village. The most reported benefits at the community level were social infrastructures such as construction of primary school classes, a teacher's house, and an elementary classroom for the children. Others include construction of a maternity ward locally known as "nyumba ya mama na mtoto," maintenance of a village vehicle that serves as an ambulance, and construction of a water dam for livestock and human beings. Also, the village has started to construct a village office using the money obtained from Ikona WMA. Ikona WMA vehicles also provide free transport services for community members to Mugumu town, where community members obtain most of their basic needs. However, decisions about village social development projects failed to reflect community members' priorities, and some community members in Nyichoka village complained about the nature of village development projects funded by Ikona WMA, as illustrated in the following comment from a key informant at the village level representing the opinions expressed by many community members interviewed and participated in group discussions when responding to the question regarding their involvement in decision making.

"...now village leaders have decided to use WMA money to construct kindergarten class while we have big problems with water here and nobody cares..."

A similar finding was noted by Vedeld et al. (2012) in Mikumi National Park, where decisions about community projects do not always reflect local priorities. This indicates low involvement of communities in decision making and participation in designing and implementing community social development projects, which does not embrace the principles of the community-based conservation approach.

One interesting finding in Nyichoka village is the perception at the community level that establishment of Ikona WMA has helped to create peace and harmony, as well as build good relationships between village leaders and community members. One village leader in responding to the question about whether the community experienced benefits from Ikona WMA stated that:

“...before having Ikona WMA we were going from house to house to collect money for village development projects, and when we found somebody who had no money to contribute, we took any of his/her property for auction to get money for village development projects...now there is peace and good relationships with our community members as they are no longer contributing for village development projects; instead we are using Ikona WMA money for that...”

This suggests that benefits accrued from Ikona WMA have brought harmony and peace to the community, conditions necessary for the community members to engage in various livelihood activities rather than running from their home to avoid paying money for village social development projects.

Similarly, community members in Robanda village had positive perceptions towards the contribution of Ikona WMA to improved community services compared to Nyichoka and Rwamchanga villages. The benefits reported by the community members include construction of a village office, health clinic, primary school, and teachers' houses, and at the time of this study they were constructing a secondary school and primary court. However, most of the improved social services in Robanda village were not associated with benefits from only Ikona WMA, but also from other tourism investors who are not part of Ikona WMA. Despite the fact that Robanda village has continued to receive revenue from different sources related to tourism and wildlife conservation, the WMA administrators and conservation experts in the study area expressed the view that there has been no substantial community development related to the amount of revenue the village has been receiving for a number of years. This view is illustrated in the following

comment from a wildlife conservation expert at the national level which is also reflective of the views of six wildlife conservation experts in the study area and ten WMA administrators interviewed when responding to the question regarding benefits accrued at the community level from Ikona WMA.

“...well there are some benefits from Ikona WMA to communities, but some villages like Robanda have been receiving support from us for a number of years apart from lots of money the village obtains from tourist investors and Ikona WMA. I often pass through that village, but I don't see any obvious changes compared to other villages with fewer sources of revenue...”

This might suggest a lack of effective village development project monitoring and financial management, conditions that provide room for financial leakage and ultimately hinder community members from realizing substantial benefits from Ikona WMA.

Communities participating in Ikona WMA expressed positive perceptions at least towards the contribution of Ikona WMA in improving community services compared to Rwamchanga village. There was, however, insufficient involvement of community members in planning and deciding about the kind of development they wish. Most of the community services, especially schools, water points, and dispensaries, have been unequally distributed within villages, and many of them are located in one centre, while other sub-villages, particularly those located far away at the edge of the conservation area, are left without any social services. A good example is Nyichoka village, where some community members were not contributing money for village development projects, while in other sub-villages in the same village, community members were still contributing money for village development. In addition, social services like primary schools, village dispensaries, and water dams were mostly located in one centre, which left other sub-villages (e.g., Nyigoti) isolated from those services. Similar findings of unequal distribution of conservation benefits were reported by Kellert et al. (2000) and Nepal & Spiteri (2011) in Nepal and Kenya, where local members living in remote parts of Annapurna and Makalu-Burn conservation areas received substantially fewer development benefits than those in closer proximity to the community natural resources conservation headquarters. In Kenya, only a small minority of community members received monetary benefits from Kimana Community Wildlife Sanctuary (KCWS). Mbaiwa (2004) argues that poor distribution of conservation benefits could threaten the

sustainability of CBNRM, and may affect communities' perceptions towards wildlife conservation. The problem of unequal benefit sharing among members of Ikona WMA, lack of transparency of WMA leaders, poor relationships between villages and WMA leaders, and insufficient involvement of community members in decision making might also account for negative perceptions toward Ikona WMA contributions to improving local livelihoods in the study villages.

2.6 Conclusions and Recommendations

The findings of this study have shown that communities participating in Ikona WMA perceive some benefits at the community level compared to Rwamchanga village, where community members experienced no benefits from wildlife conservation. However, Ikona WMA has achieved fewer improvements in the household economy. Limited access to basic natural resources in the WMA remains difficult for the communities, despite WMA regulations providing such an opportunity under a special access permit. These findings indicate negative perceptions of community members in all three villages about the contribution of Ikona WMA to improving the household economy of people in the study area. This has been attributed to the low rate of employment opportunities available, low levels of education of community members (over 80% primary school only), and a lack of access to financial resources which impede them from entering into various tourism ventures that are available to help them to improve their household economy. Thus, to ensure that members at the household level feel the benefits of wildlife conservation in the study area, there is a need to empower the local communities to develop skills, particularly in environmental education, tourism, and entrepreneurship, to enable communities to utilize opportunities available in their local environment to improve their livelihoods. In addition, the introduction of micro-financing to communities participating in wildlife conservation, and various affordable alternative income generating activities that are environmentally friendly, such as beekeeping and poultry projects, could significantly help to add income to individuals and households.

Natural resources are integral to the daily livelihood of local communities throughout the three study villages. Almost everyone is a subsistence farmer, and the majority are livestock keepers, using village lands for agriculture and grazing. Almost all households

use firewood for cooking on a daily basis. Thus, limiting access to these crucial resources impacts their livelihoods negatively. For sustainable use of these resources, village leaders should enforce village land use plans and find mechanisms to control a growing livestock population in the study area, such as introducing high penalties for any livestock found in the conservation area or village forest based on criteria agreed to by all community members. Further, it is important to ensure that community members are involved in decision making and that their values are considered in Ikona WMA plans, particularly with regard to access to bush meat for adequate nutrition and other basic resources from WMAs, in order for community members to continue to support conservation and to keep their hope and trust in Ikona WMA alive.

Participating communities have positive perceptions towards the contribution of Ikona WMA in improving community services. However, to ensure every community member feels the benefits of wildlife conservation, equal sharing of conservation benefits at the village level is important. Also, community involvement in decision making and in all Ikona WMA activities is important to ensure transparency and accountability of administrators to the local communities. This will help to build trust among Ikona WMA members and between village leaders and WMA administrators. In addition, there is a need to ensure effective village project monitoring and sound financial governance for both Ikona WMA management and all participating villages. Further, re-examining benefits sharing formulas among communities participating in Ikona WMA would help to minimize community grievances regarding Ikona WMA revenue sharing, particularly in Robanda village.

I conclude finally that increasing problem animals, particularly elephants, are to a large extent negatively affecting people's livelihoods in all three study villages, a condition that makes community members, especially in Rwamchanga village, see wild animals as the first enemy of their livelihoods. If this problem is not solved and community members continue to experience costs from wildlife conservation without realizing substantial benefits that reach the household level, conservation efforts in Western Serengeti will increase human-wildlife conflicts and provide a barrier to community interest in wildlife conservation, a condition that will compromise a future for Ikona WMA and the great Serengeti ecosystem as a whole.

Chapter 3

Conservation Impact of Ikona Community Wildlife Management Area in Western Serengeti, Tanzania

“Wild animals are valued more than human beings; they have the right to eat and destroy our crops and nobody cares, but when our livestock enter into conservation areas just to access water it becomes wrong and instead we are arrested, beaten, and fined.”
(Comment from one group member in Rwamchanga village)

Abstract

Community-based conservation (CBC) is based on the idea that if conservation and development could be simultaneously achieved, then the interest of both could be served (Barkes, 2004). However, there is concern that evidence about whether community-based conservation has benefited conservation is often at best indirect and unclear. This study investigates the conservation impact of Ikona WMA in Western Serengeti, Tanzania. It is based on a survey of 300 household heads, 50 key informant interviews, and 8 focus groups in the three villages of Nyichoka, Robanda, and Rwamchanga. The results indicate that community members had positive perceptions about the establishment of Ikona wildlife management area (Ikona WMA). However, those community members who experienced benefits from wildlife conservation see more positive conservation impacts than those who did not experience benefits. Decline of illegal activities, increase of wildlife species and improvement of habitat, as well as increased income to support wildlife conservation, were major positive impacts attributed to Ikona WMA. Findings reveal that increased numbers of problem animals, limited access to natural resources, shifting of poaching from outside to within the national park, illegal grazing in the conservation area by corrupt rangers, and an increase of livestock populations were perceived to be negative impacts associated with the establishment of the WMA. The study suggests that increasing livelihood benefits, improving conservation education, and strengthening collaboration with other wildlife conservation stakeholders could help to improve community perceptions and support of wildlife conservation in the study area.

Key words: Ikona WMA, protected area, wildlife conservation, Tanzania.

3.1 Introduction

Over the past three decades, it has been recognized that the effective management of protected areas (PAs) should include the cooperation and support of local communities residing in and outside PAs (Adams & Hulme, 2001; Mugisha & Jacobson, 2004). This has encouraged development of community-based wildlife conservation initiatives aimed at involving local communities in decision making over the management of natural resources. The community conservation initiatives were developed in response to a number of factors, including the desire to link and reconcile the objectives of socio-economic development and environmental conservation, legitimization of local or indigenous resources and property rights, and the desire to integrate traditional values and ecological knowledge in modern resource management (Kellert et al., 2000; Berkes, 2007; Baldus, 2009; Child & Barnes, 2010). The designers of these initiatives also aspire to protect biodiversity outside and inside PAs, and to maintain the integrity and viability of particular ecosystems with their unique combination of species of flora and fauna (Hulme & Murphree, 1999; Rotha et al., 2005; Suich, 2010). In addition, they aim to enhance livelihoods sustainably through ecotourism and related economic activities, while protecting the natural resources base of particular areas (Gibbes & Keys, 2010; Child & Barnes, 2010; Simpson, 2009; Lepp, 2007; Pagdee et al., 2006).

Community-based natural resource management (CBNRM) programs have now been initiated in many countries, especially in Africa (Adam & Hulme, 2001; Abbot et al., 2001; Hulme & Murphree, 2001; Bajracharya et al., 2005; Gubbi et al., 2009). However, an extensive body of literature that explores the success of community-based conservation initiatives (e.g., Gibson & Marks, 1995; Wainwright & Wehrmeyer, 1998; Mbaiwa, 2004; Thakadu, 2005; Taylor, 2009; Nkhata & Breen, 2010; Boudreaux & Nelson, 2011) demonstrates mixed outcomes of community-based initiatives in contributing to conservation and distributing socio-economic benefits to local communities neighbouring PAs. This has led to an incomplete understanding of the extent to which community conservation initiatives are effective in providing conservation and local livelihood benefits. Despite a lack of knowledge, community-based approaches are increasingly being promoted in many areas (Berkes, 2004; Bajracharya et al., 2006).

Community wildlife management areas (WMAs) were officially initiated in Tanzania in 2003 and represent Tanzania's attempt to implement CBNRM. WMAs are community lands set aside for the purpose of wildlife conservation in which local people have usage rights over the wildlife resources found in the area (Nelson, 2007; URT, 2009; Wilfred, 2010). The concept of community WMAs came about as a result of experiences learned from other pioneering CBNRM programs in Africa such as CAMPFIRE in Zimbabwe, ADMADE in Zambia, as well as community-based conservation (CBC) experiences from Botswana and Namibia. Also, in the 1980s and 1990s, Tanzania had implemented donor-funded community wildlife conservation programs such as the Serengeti Regional Conservation Program (SRCP) and Selous Conservation Program (SCP), which failed to provide many tangible benefits to local communities neighbouring PAs (Songorwa, 1999). Further, it was as a result of the Tanzania wildlife policy of 1998 (revised in 2007) which devolves power to local communities to manage and use wildlife resources outside the PAs through establishment of community WMAs in different parts of the country (URT, 1998). Since then, a number of WMAs have been established in the country, and by November, 2012 there were 17 WMAs with user right certificates (allowing community members to manage and use wildlife resources through authorized community-based organizations), while 21 WMAs were in various stages of the development process (MNRT, 2012).

Between 2003 and 2012, the government of Tanzania instituted several initiatives, including development of guidelines for designation and management of WMAs, assessment and evaluation of pilot WMAs in 2007, and the current release of the Wildlife Conservation Act of 2009 and new WMA regulations of 2012. These government initiatives help to provide relevant technical information for decision making and smooth implementation of community WMAs nationwide. Despite such government efforts to smooth the process of establishing WMAs, and a growing number of WMAs in the country, there is insufficient evidence that the new community WMAs have benefited conservation in the country. Infield & Namara (2001, p. 48) noted that "assessing the effectiveness of community conservation approaches in supporting conservation of biodiversity is necessary if such programs are to find support amongst protected area managers and be integrated into day to day management operation." Thus, the aim of

this study was to assess conservation benefits attributed to Ikona WMA in Western Serengeti, Tanzania through eliciting local community members' and conservation experts' perceptions. Specifically, the study identifies the perceptions of community members towards Ikona WMA and conservation impacts attributed to Ikona WMA in the study area. Local community members' perceptions can form a baseline to assess the effectiveness of community-based conservation programs in delivering conservation benefits (Allendorf et al., 2006). Perceptions can also help to understand how local communities behave and respond to conservation (Igoe, 2006). Positive community members' perceptions and attitudes can be viewed as indicators of protected area success (Struhsaker et al., 2005).

3.2 Overview of CBNRM

Community-based natural resource management (CBNRM) is an emerging international approach to natural resource management (Gruber, 2010). It has emerged in response to insufficient performance of the previous top-down resource management and conservation "fences and fines" approach, which was based primarily on a purely technical approach to natural resource management while excluding local people from nature (Songorwa, 1999; Agrawal & Gibson, 1999; Adams & Hulme, 2001). CBNRM is defined as an approach to natural resource management that seeks to support long-term sustainability through broad participation of community members and resource users in decision making (Berkes, 2005).

The CBNRM approach draws on the principle of social capital, which includes building local social networks, norms, and trust that enable participants to act together more effectively to achieve shared goals (Berkes, 2005; Mbaiwa, 2008; Gruber, 2010). Such relationships of trust, reciprocity and exchange, common rules, and connectedness in groups are what make up social capital, and together with strong local institutions, are necessary conditions for resource management and shaping individual action to achieve positive resource management and conservation outcomes (Petty & Smith, 2003). Enhanced social capital influences wise use of resources and avoids what Garrett Hardin in 1968 called a "tragedy of the commons" (Mbaiwa, 2008; Boudreaux & Nelson, 2011).

Although the CBNRM approach is promoted in many countries as a natural resource management strategy that promises to address social justice and environmental protection, the approach has received criticism about its ability to ensure long-term success and sustainability of natural resources (Gruber, 2010). Some CBNRM critics conclude that the approach is ineffective in maximizing conservation of biodiversity, its dual objectives of conservation and development are conflicting, and local communities are not competent to manage wildlife resources (Child & Lyman, 2005). Similarly, Redford & Sanderson (2000) noted that conservation and development objectives, both important in their own right, should be separated because the mixed objective does not serve either goal well. In addition, reviews of implementation of integrated conservation and development programs (ICDPs) and CBNRM in various places indicate that they are either primarily concerned with conservation or socio-economic development, but rarely both (Brechin et al., 2002; Berkes, 2007; Baral et al., 2007; Murphree, 2009; Salafsky, 2011). Thus, there is a need for scholars to continue to investigate for best practices of balancing conservation and local livelihoods in community conservation cases as it is important to ensure both objectives are attained.

3.3 The Study Area

The study was carried out in Ikona WMA, located in Serengeti district, Mara region in Northern Tanzania (Figure 7). The area borders Serengeti National Park to the east and southeast, Grumeti Game Reserve to the south and southwest, and Ikorongo Game Reserve to the north (URT, 2005). It is jointly managed by five villages, namely Robanda, Park Nyigoti, Nyichoka, Makundusi, and Nattambiso (Figure 7), under a community-based organization (CBO) locally known as “Jumuiya ya Hifadhi ya Wanyamapori IKONA (JUHIWAIKO)” – the Ikona Wildlife Management Association. The association was officially registered in 2005, and acquired a certificate of authorization to manage wildlife resources in 2006 and a wildlife resources user rights certificate in 2007. By virtue of these certificates, a community-based organization acquires status and becomes a community Authorized Association (AA) with aims to protect and conserve natural resources and their environment, and contribute to improving livelihoods of the communities (URT, 2011a).

Ikona WMA covers an area of 242.3 km², and is divided into two zones. The Tourist Hunting Zone covers 61.5% (149 km²) of Ikona WMA in the north and west. This zone allows tourist hunting activity through investors licensed to conduct tourist hunting in the area. The second zone is the Photography Safari Zone, which covers 38.5% (93.3 km²) of Ikona WMA in the south and east, bordering Grumeti and Ikorongo game reserves and Robanda village (Figure 7). Tourism activities in this area are undertaken by tourism investors through establishment of campsites and lodges, and conducting safari game viewing, and no tourist hunting activity is allowed in this area. The two zones comprise Ikona WMA, which promotes conservation and sustainable use of wildlife resources for the benefit of local communities (URT, 2011a).

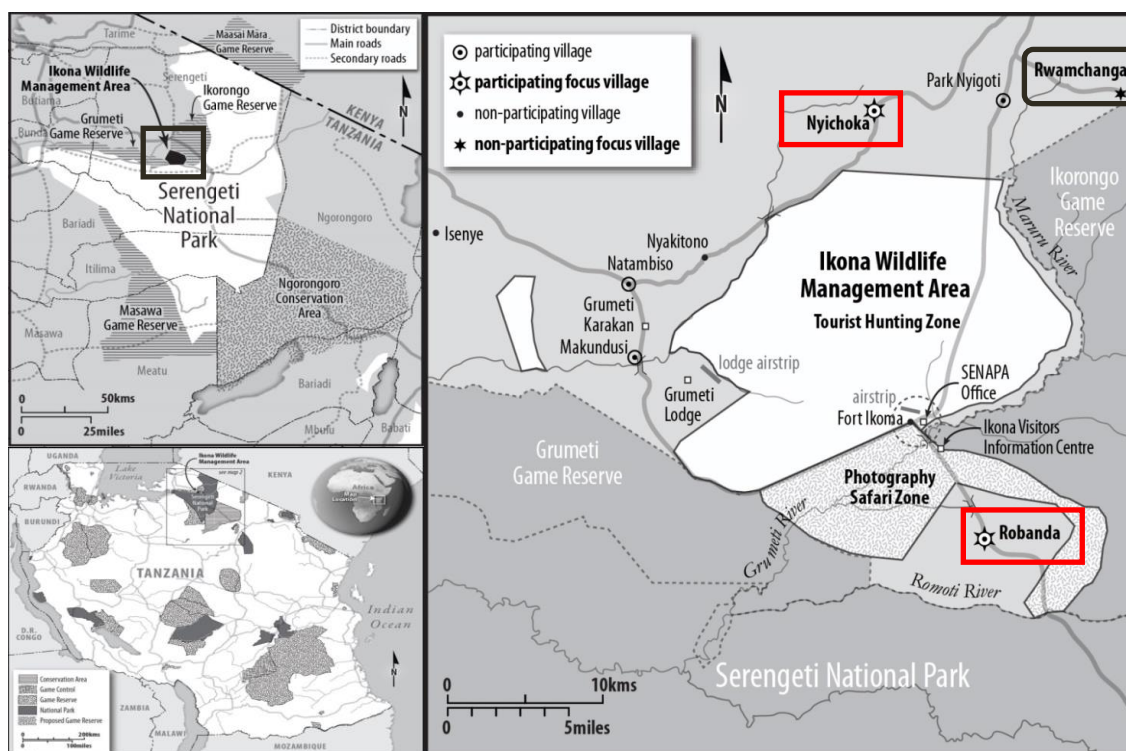


Figure 7 Map of the study area

Note: Map of Tanzania (lower left), Serengeti Ecosystem (top left), and Study Villages and Ikona WMA Zones (right)

The area is rich in wildlife species found in the Serengeti ecosystem, including wildebeest, lion, elephant, black rhino, cheetah, giraffe, hippo, crocodile, white colobus monkey, buffalo, topi, antelope, and zebra. Others are the hartebeest, klipspringer, and

warthog (URT, 2011a). There is also a variety of bird species associated with open grasslands. Ikona WMA and surrounding areas of Grumeti and Ikorongo game reserves provide a good habitat, and function as a corridor for wildebeest migration in Western Serengeti. The wildebeest migration, together with a diversity of wildlife species of the area, especially around Robanda village, has attracted interest in photographic safaris and tourist hunting in Ikona WMA and surrounding areas (see Chapter 1 for a detailed description of the study area). However, a number of challenges facing wildlife conservation in Serengeti have been reported, including increased human populations and resulting demand for bush meat, poverty, insufficient trained personnel and financial resources to do conservation work, as well as local people's negative attitudes towards wildlife conservation (Kideghesho, 2006; Schmitt, 2010; Mfunda & Roskaft, 2010; Rentsch, 2012).

3.4 Methods

Ikona WMA in Western Serengeti was purposefully selected for three main reasons. First, Ikona WMA is among the earliest pilot study areas to establish a community WMA, soon after the government of Tanzania officially unveiled the process of establishing WMAs in 2003. Second, Ikona WMA has been in operation for more than seven years, since it was officially registered as a community-based wildlife conservation association in 2005. Since this is one of the longest running WMAs, enough time has elapsed to adequately assess its impacts on wildlife conservation. Third, the area has an abundance and diversity of wildlife species similarly found in the Serengeti ecosystem, and functions as an important corridor for wildebeest migration (Sinclair et al., 2008; Kideghesho, 2006; URT, 2011a). Thus, it possesses unique features that attract more tourism investors, photographic safaris, and tourist hunting than other WMAs in the country.

A mixed method approach, including literature review, key informant interviews, household surveys, and focus group discussions, was used to assess community perceptions of Ikona WMA and its impact on wildlife conservation in the study area. The mixed method approach was adopted as it allowed the researcher to understand and analyze the research problem as broadly as possible, provided an opportunity to

complement information from multiple methods, and minimized the biases of using a single method (Creswell, 2009; Newing et al., 2011).

A review of literature relevant to the research topic and study area was conducted to gain a broad understanding of the study area, community-based natural resource management concepts and principles, as well as to understand the concept of WMA in Tanzania and how Ikona WMA is operating in the study area. This involved official documents such as the Wildlife Policy, Wildlife Act, WMA regulations, and Ikona WMA annual reports obtained from the Wildlife Division and Ikona WMA office in Tanzania. Other documents included books, electronic papers, and unpublished documents obtained from libraries.

Based on available village household ledgers maintained by village chairpersons, simple random sampling was used to obtain a sample size of 300 households for the survey from three study villages. The sample size included 15% of total households (used also by Bajracharya et al., 2006 and Kangalawe & Noe, 2012) and provided a confidence interval of ± 5.2 and a confidence level of 95%. A structured household questionnaire (Appendix C) was designed by the researcher and incorporated closed and open-ended questions to allow respondents to freely express their views and beliefs, and to seek more details about individual responses. Closed questions involved statements with a Likert scale of 1 to 4 (where 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree), and were used to measure community members' perceptions and level of agreement about Ikona WMA, trends of illegal activities in the WMA, and general impact of Ikona WMA on wildlife conservation. The household questionnaire was first written in English, and then translated by the researcher into Kiswahili, which is spoken and understood by the majority of community members in the study area.

The household questionnaire was administered face-to-face in the selected households by three trained local research assistants. Local research assistants were not involved with any Ikona WMA activities before the study, and had already lived in Serengeti district for more than ten years and thus were familiar with the three study villages. The use of local research assistants was designed to encourage respondents to provide information to a person who was familiar to them and who spoke their local language. The design also helped to overcome a language barrier in some cases where

respondents were unable to express themselves in Kiswahili, the native language of the researcher. Whenever possible, household heads were surveyed at each selected household. The household head can be either a man or woman over 18 years of age who assumes responsibility for the household (Budlender, 1997). The household surveys were carried out from afternoon to evening hours, when household heads were likely to be at home. When heads of the household were not at home, researchers returned to the household later in the same day or on the following day, and if there was still no response after a second visit, the household was not surveyed and another household was selected based on a reserve list of random numbers of the households selected previously from the original larger household list. (For a more detailed description of methodology, refer to Chapter 1.)

Household data were supplemented by data from semi-structured interviews with 50 key informants. Key informants included people who were more knowledgeable about Ikona WMA and wildlife conservation selected based on their job positions and their titles in the study area. This included 17 Ikona WMA administrators and WMA village representatives, 19 village leaders and ward councillors at the village level, and 11 wildlife conservation experts at the district level and 3 at the national level. In addition, a total of eight focus group discussions (FGDs) comprising a range of five to ten people were conducted at the village level. A focus group is a small group discussion in which participants respond to and discuss a series of questions based on a research topic (Newing et al., 2011; Krueger & Casey, 2000 in Muruvi, 2011). Interviews and focus group discussions were recorded by digital electronic recorder, except in a few cases where respondents were unwilling to be recorded, in which case notes were taken instead.

Both key informant interviews and focus group discussions captured broad information about the research topic, such as community members' perceptions and attitudes towards Ikona WMA, perceived trends in illegal activities and conservation impacts attributed to Ikona WMA, as well as views of wildlife conservation experts about the contributions of Ikona WMA to improved wildlife conservation in the study area.

Quantitative data from household surveys were first screened and cleaned of errors. Then data were coded and entered into Statistical Package for Social Sciences (SPSS) version 16.0 for analysis. Descriptive statistics were applied to obtain percentage, mean,

and standard deviation of different conservation variables for the three study villages. Exploratory factor analysis using a principle component analysis with varimax rotation was applied (Appendix F1) as a way of reducing data to increase interpretability of the identified factor (Choi & Murray, 2010). As a result, 12 out of 22 variables in Likert-scale format were loaded into three groups related to conservation, including variables related to community perceptions of Ikona WMA, trends of illegal activities in the conservation area, and the conservation impacts of Ikona WMA (Appendix F2). One-way ANOVA was used to test whether there were significant differences in responses among the study villages based on the conservation factor mean (Appendix F7). Further, the Scheffe Post Hoc-test for multiple comparisons was used to identify which specific study village had statistically significant differences in community members' perceptions across the three study villages (Appendix F8).

Qualitative data were transcribed by the principal researcher on the same day of the interviews and focus group discussions by highlighting and taking notes of key issues that emerged in the interviews/group discussions based on research topics. Later, the recorded information was translated from Kiswahili into English and then grouped based on interview (Appendix A) and group discussion (Appendix B) guide questions responding to main research questions.

3.5 Results

The study examined the conservation impact associated with Ikona WMA based on perceptions of community members, WMA administrators, and conservation experts. Findings presented below pertain to the three factors related to wildlife conservation, including: 1) community members' perceptions of Ikona WMA; 2) trends of illegal activities in Ikona WMA; and 3) perceived conservation impacts associated with Ikona WMA in the study area.

3.5.1 Perceptions of Ikona WMA

Respondents were asked to rate their level of agreement with statements about whether or not the establishment of Ikona WMA was a good idea, and whether respondents experienced any benefits from Ikona WMA. Results indicate that over

65.5% of respondents in the three study villages support the establishment of Ikona WMA. Community members in Nyichoka village expressed more positive perceptions, followed by Robanda and Rwamchanga villages (Table 12). More than 60.1% of the respondents in Nyichoka and Robanda villages strongly disagreed and disagreed with the statement that there had been no community benefits from Ikona WMA in the past five years. This indicates that communities participating in Ikona WMA have experienced some benefits related to wildlife conservation compared to over 70% of the respondents in Rwamchanga village who strongly agreed or agreed with the above statement (Table 12). Findings indicate a significant difference in community perception based on two statements regarding community's perceptions of Ikona WMA (Appendix F9).

The overall factor mean for community perceptions about Ikona WMA indicates positive community perceptions across the three study villages. The ANOVA-test result indicates a significant difference ($F(2, 297) = 4.929, P < .008$) in community perception towards Ikona WMA across the three study villages (Table 13). A Scheffe Post Hoc-test was then conducted to determine specifically which villages differed in perceptions about the establishment of Ikona WMA across the three study villages, and the results show significant differences in community members' perceptions between the two villages participating in Ikona WMA, Nyichoka and Robanda villages ($P < .028$), and between Robanda and Rwamchanga villages ($P < 0.023$). Findings indicate no statistically significant difference ($P > .790$) in community members' perceptions about Ikona WMA between Nyichoka and Rwamchanga villages (Table 14).

Table 12 Response of community members based on conservation variables per village

Conservation Factors	Factor Loadings	Nychoka village (N=153) %					Robanda village (N=88) %					*Rwamchanga village (N=59) %					ANOVA **Sign.			
		1	2	3	4	M	ST.D	1	2	3	4	M	ST.D	1	2	3		4	M	ST.D
Perceptions of Ikona WMA																				
No benefits from wildlife conservation (WMA)	.572	43.8	16.3	23.5	16.3	2.12	1.15	34.1	31.8	22.7	11.4	2.11	1.01	13.6	13.6	25.4	47.5	3.07	1.08	.000
Establishment of Ikona WMA was a good idea	.434	9.8	0.7	11.8	77.8	3.58	0.92	13.6	4.5	42	39.8	3.08	1.00	23.7	6.8	37.3	32.2	2.8	1.15	.000
Perceived illegal activities trend in WMA																				
It is easier to graze livestock in conservation area	.704	86.3	5.2	4.6	3.9	1.26	0.72	86.4	8	4.5	1.1	1.20	0.57	88.1	6.8	1.7	3.4	1.20	0.64	.757
There is more poaching in the WMA than before	.614	87.6	5.2	2.6	4.6	1.24	0.72	79.5	14.8	4.5	1.1	1.27	0.60	67.8	16.9	10.2	5.1	1.53	0.88	.003
There is less bush fire in conservation area now	.589	1.3	5.9	14.4	78.4	3.70	0.64	6.8	12.5	47.7	33	3.07	0.85	8.5	3.4	45.8	42.4	3.22	0.87	.000
It is easier to access bush meat than before WMA	.556	92.2	5.9	2	0	1.10	0.36	81.8	14.8	3.4	0	1.22	0.49	83.1	13.6	3.4	0	1.20	0.48	.073
Perceived conservation impacts of WMA																				
Increased protection and conserving of wildlife resources	.724	15	2	10.5	72.5	3.41	1.09	20.5	6.8	22.7	50	3.02	1.18	22	10.2	33.9	33.9	2.80	1.14	.001
Increased involvement of community in wildlife conservation	.609	35.9	12.4	32.7	19	2.35	1.15	23.9	17	46.6	12.5	2.48	0.99	55.9	23.7	15.3	5.1	1.69	0.91	.000
Trend for problem animals have declined since WMA	.577	41.8	15	19.6	23.5	2.25	1.23	87.5	6.8	3.4	2.3	1.20	0.61	91.5	5.1	1.7	1.7	1.14	0.51	.000
Improved community livelihood attributed to wildlife conservation	.566	30.7	8.5	32	28.8	2.59	1.20	26.1	21.6	44.3	8	2.34	0.96	44.1	27.1	18.6	10.2	1.95	1.02	.001
There is more conservation education than before	.545	30.7	13.7	31.4	24.2	2.49	1.16	22.7	18.2	48.9	10.2	2.47	0.96	45.8	18.6	28.8	6.8	1.97	1.02	.005
There is an increase of wild animals in conservation area than before	.459	24.8	13.7	28.8	32.7	2.69	1.17	11.4	20.5	38.6	29.5	2.86	0.97	25.4	10.2	39	25.4	2.64	1.13	.407

1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree, M = Mean, ST.D = Standard Deviation;
*Village not participating in Ikona Wildlife Management Area, **P ≤ 0.05, Significant (for more detail see Appendix F9)

Table 13 Differences in community's perceptions based on conservation factor mean per village

<i>Conservation Factors</i>	<i>Factor mean per village</i>			<i>ANOVA F-test</i>		
	Nyichoka N=153	Robanda N=88	**Rwamchanga N=59	Df	F	Sign
Perception of Ikona WMA	2.8497	2.5966	2.9237	2,297	4.929	*.008
Perceived trends in illegal activities	1.8252	1.6903	1.7881	2,297	5.194	*.006
Perceived conservation impacts	2.6285	2.3958	2.0311	2,297	24.142	*.000

**Village not participating in Ikona WMA

*Mean difference is significant at/below 0.05

Table 14 Comparison of community members' perceptions across the study villages

<i>Conservation Factors</i>	<i>Multiple comparison – Scheffe-test</i>		
	Nyichoka **Rwamchanga	Robanda **Rwamchanga	Nyichoka Robanda
Perception of Ikona WMA	.790	*.023	*.028
Perceived trends in illegal activities in WMA	.744	.182	*.006
Perceived conservation impacts of WMA	*.000	*.001	*.010

**Village not participating in Ikona WMA

*Mean difference is significant at/below 0.05

The results from community group discussions and interviews with WMA administrators show that the majority of respondents support the establishment of Ikona WMA, and perceive a positive contribution to wildlife conservation in the study area. However, wildlife conservation experts expressed mixed perceptions about the establishment of Ikona WMA and its contribution to wildlife conservation. A good example of their mixed perceptions was revealed when conservation experts provided their general views about Ikona WMA as illustrated in the following statements:

“...WMA is a good concept, although its impacts on wildlife conservation are minimal, as we still experience poaching from communities participating in WMA...”
(*conservation expert*)

“...establishment of Ikona WMA has provided an opportunity for many villages to experience benefits from wildlife conservation when before only Robanda was benefiting...” (*conservation expert*)

“...this idea of community (WMA) is not realistic, and it is difficult for communities to manage wildlife conservation....management of wildlife is professional work and not everyone can do that job...” (*conservation expert*)

3.5.2 Perceived Trends in Illegal Activities in Ikona WMA

Regarding perceived trends in illegal activities in Ikona WMA, four statements were used to determine whether respondents perceived changes in trends of illegal activities since the establishment of Ikona WMA. Results (Table 12) indicate that over 84.7% of all respondents disagreed with three statements, including that it is easier to graze in the conservation area, there is increased poaching in WMA, and better access to bush meat. This indicates a decline in illegal activities in the WMA which may be attributed to the establishment of Ikona WMA. The majority (80.7%) of all respondents agreed with the statement that there is a decline of bush fires in the WMA since the establishment of Ikona WMA. Of the four statements regarding trends of illegal activities in WMA, two statements, including increase of poaching and fewer bush fires in the WMA, indicate significant differences in community perceptions (Appendix F9).

The ANOVA-test based on the factor mean (Table 13) indicates a significant difference ($F(2, 297) = 5.194, P < .006$) in community perception about trends in illegal activities in the conservation area across the three study villages. Scheffe-test results show differences between the villages participating in Ikona WMA ($P < .006$), but no statistically significant difference in perceptions was found between the communities participating in Ikona WMA and the community not participating (Table 14).

The decline in illegal activities in Ikona WMA also confirmed the findings from group discussions and key informant interviews at the community level which indicate a decline in poaching activities, charcoal burning, deforestation, collecting fuel wood, livestock grazing, and uncontrolled bush fires. A majority of Ikona WMA administrators reported experiencing minimal poaching events compared to the time previous to the establishment of Ikona WMA, and acknowledged that most people arrested for poaching were from neighbouring villages that are not participating in Ikona WMA. Decline of illegal activities, particularly poaching, was also expressed by a majority of conservation experts in the study area. However, 3 out of 11 conservation experts interviewed reported no big changes of illegal activities in the study area. Interestingly, the following statements made by a WMA administrator, conservation expert, and village leader were reflective of the perceptions of the majority of respondents when answering the question regarding conservation changes attributed to Ikona WMA in the study area.

“...poaching has declined, and the few poachers remaining mostly originate from villages not participating in wildlife conservation...” (*WMA administrator*)

“... I can say we have managed to reduce poaching and other illegal activities in the area by 90%.....now animals are seen very close because of the attractive environment and safety...” (*village leader*)

“...there is a decline of poaching events from villages participating in Ikona WMA, and now the bush meat market has collapsed...” (*conservation expert*)

3.5.3 Perceived Conservation Impact of Ikona WMA

Respondents were asked to rate their level of agreement about conservation impacts attributed to Ikona WMA in the study area based on six variables under the conservation impact factor (Table 12). The results indicate that over 72.7% of the respondents in the two villages participating in Ikona WMA perceive increased protection and conservation of wildlife resources as one impact of Ikona WMA. This was supported by 67% of respondents from the community not participating in Ikona WMA. More than 61.5% of all respondents perceived an increase of wildlife species as an impact of Ikona WMA. Robanda community members expressed more positive perceptions (68.1%), followed by Rwamchanga (64.4%), and Nyichoka village (61.5%). Community members were asked to identify wildlife animal species they perceived to have increased and that are now easily seen in the WMA, and the results are shown in Figure 8 (Others include lions, leopards, and cheetahs), all of which community members and WMA administrators reported were not seen in the area before the establishment of Ikona WMA.

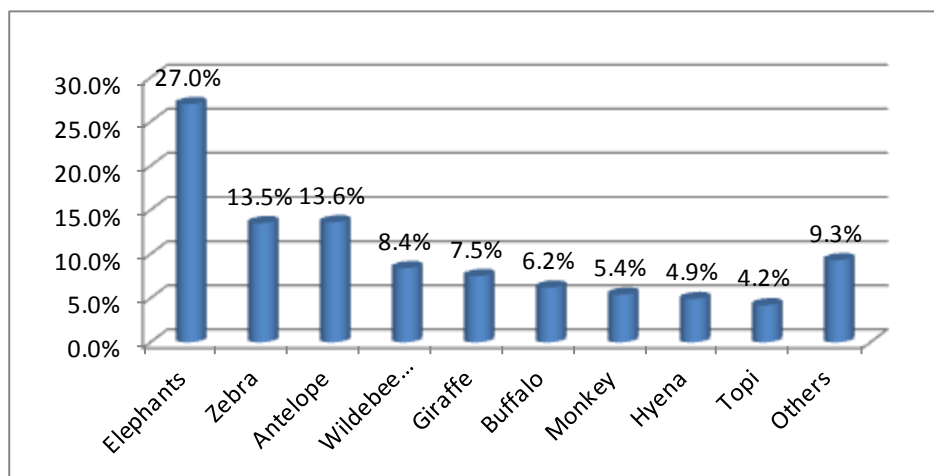


Figure 8 Wildlife species perceived to have increased in Ikona WMA

Regarding the statement that Ikona WMA has contributed to a decline of problem animals in the study area, the results indicate a high level of disagreement by 96.6% of the respondents in Rwamchanga, followed by 94% in Robanda, and 57.6% in Nyichoka village. This implies that increases of wild animal species might be linked to increased animal problems in the study area. Out of the three study villages, over 64.4% of the respondents in Rwamchanga village expressed negative perceptions about the impact of Ikona WMA in terms of increasing the involvement of community in wildlife conservation, increasing conservation education, and impact on their livelihood. More than 51.7% of the respondents participating in Ikona WMA agreed with those three impacts (Table 12). The results indicate that out of the six statements regarding the conservation impact of Ikona WMA, one statement only, the increase of wild animals, indicates no significant difference ($F(2, 297) = 0.903, P > .407$) of community perceptions in the three study villages (Appendix F9).

Concerning differences in community perceptions about conservation impacts of Ikona WMA based on factor mean, the ANOVA-test results indicate a significant difference ($F(2, 297) = 24.142, P < .000$) across the study villages (Table 13). Multiple comparisons using Scheffe-test indicate a significant difference in community perception between Nyichoka and Rwamchanga villages ($P = .000$), and Robanda and Rwamchanga villages ($P < .001$). The results also indicate a significant difference ($P < .010$) between the two communities participating in Ikona WMA based on perceived conservation impact of Ikona WMA (Table 14).

Other perceived impacts of Ikona WMA on conservation stated during group discussions and interviews with WMA administrators and community members include improvement of habitat (which was associated with decreases of deforestation and uncontrolled bush fires), increasing financial resources from tourism investors to support wildlife conservation activities in the area, and community members participating in Ikona WMA becoming friendly with wild animals and being willing to provide information about illegal activities. These conditions were reported as not having been experienced prior to the establishment of Ikona WMA, as illustrated in the following comments representing the majority of views of community members and WMA administrators when responding to the question regarding the conservation impact of Ikona WMA:

“...before animals were seen as an enemy, but now animals are seen as friends of the community, and community members are willing to provide information of any illegal events in WMA...” (*group discussion member*)

“...last year (2011) I was surprised to see wildebeest grazing together with livestock in our village land; this was impossible to experience before Ikona WMA because people used to kill them for food...” (*illustration from one of “Mzee” old man – aged about 70*).

“...now there is good vegetation cover which attracted some migratory animals like wildebeest, who have become resident animals in our area throughout the year, something which was not there before Ikona WMA...” (*village game scout*)

“...through Ikona WMA we manage to get money to support conservation; now we have four vehicles, and we have employed 20 trained village game scouts who conduct patrols in the area daily...” (*WMA administrator*)

The wildlife conservation experts in the study area also saw an improvement in community members’ perceptions and attitudes about wildlife conservation, as poachers have become good conservers (village game scouts), and it has created buffer zones to Serengeti National Park and Ikorongo and Grumeti game reserves.

With regards to whether conservation impact perceived in the study area is attributed to the establishment of Ikona WMA, the results from interviews and focus group discussions also indicate that a majority of community members and WMA administrators attributed conservation impacts and changes to Ikona WMA. However, to some extent WMA administrators differ from conservation experts, who attribute conservation impact, especially increases of wild animals, improving community attitudes, and conservation awareness not only to Ikona WMA, but also to various conservation efforts by government and private tourism investors. This was illustrated by comments from 8 out of 11 wildlife conservation experts in the study area and 2 at the national level when responding to the question regarding conservation impact attributed to Ikona WMA:

“...To a large extent it helped to protect wildlife outside the protected area, but it is not clear and also difficult to know the conservation impact attributed to Ikona WMA only as there are many government and private conservation projects in Serengeti...” (*conservation expert in the study area*)

“...Ikona WMA functions as a buffer zone for PAs, and now we are experiencing lots of positive conservation changes in Serengeti, however it is hard to tell exactly whether it is the impact of Ikona WMA ...” (*conservation expert, national level*)

Regarding whether there were negative conservation impacts associated with the establishment of Ikona WMA, results from group discussions and interviews with village

leaders point to increases of problem animals which affects food production, limited access to natural resources, and shortage of grazing land and increasing livestock populations in the study area. In Rwamchanga village, for example, it was reported that Ikorongo conservation area has created bad relationships between community members and rangers because of strict charges and harassment of community members when their livestock enter the conservation area searching for water or good pasture. The village is not a member of Ikona WMA, thus experiences no benefits from Ikona WMA and surrounding Ikorongo and Grumeti game reserves, conditions that make wildlife not valuable in supporting local livelihoods and village social development.

Decline of village revenues was also a negative impact associated with the establishment of Ikona WMA expressed by community members in Robanda village. Before the establishment of Ikona WMA, tourism investors paid revenues directly to the village. However, after the establishment of WMA, most tourism investors came under Ikona WMA management, and revenues which were previously directed to Robanda are now shared equally among the five participating villages. As a result, some community members in Robanda village are no longer interested in Ikona WMA. These negative impacts are illustrated in the following comments made by community members during group discussions where each comment represents the views of a majority in each study village when responding to the question whether they experienced any costs attributed to the establishment of Ikona WMA:

“...water for livestock is a big problem now and creates conflict in our village. During the dry season we take our animals to drink water and sometimes to graze in WMA, because it is difficult to let your livestock die while you know where you can get pasture and water...” (*Group discussion member, Nyichoka village*)

“...you know our village used to obtain much revenue from tourism investors before Ikona WMA. Now there are many tourist investors in Robanda, but we are earning less revenue because of sharing equally with other Ikona WMA village members who have no tourist investors. This makes the community unhappy with Ikona WMA.....also there is an increase of problem animals in our area and people complain much as there is no compensation provided to them when they suffer from problem animals. This condition affects people’s attitudes about wildlife conservation...” (*community key informant, Robanda village*)

“...wild animals are more valued than human beings, they have the right to eat and destroy our crops and nobody cares, but when our livestock enters into a conservation area just to access water it becomes wrong and instead we are arrested, beaten, and fined...” (*group discussion member, Rwamchanga village*)

3.6 Discussion

This section presents discussion about conservation impacts attributed to Ikona WMA in the study area. It starts with a discussion about community members' perceptions of Ikona WMA, followed by the trends of illegal activities in the conservation area, and discusses generally perceived conservation impacts associated with Ikona WMA in the study area.

3.6.1 Communities' Perceptions of Ikona WMA

The rationale behind community-based wildlife conservation is to engender support for conservation among local communities by involving them in management and decision-making, and by providing benefits to offset the costs of protection. If that is achieved, we expect local communities to display more positive perceptions and attitudes towards conservation and the associated benefits (Walpole & Goodwin, 2001). In this study, overall findings show that all respondents from the three study villages have positive perceptions about the establishment of Ikona WMA in the study area. However, community members in Rwamchanga village experienced no social or economic benefits from Ikona WMA and surrounding Ikorongo and Grumeti game reserves. As a result, the majority of respondents in that village had negative attitudes towards wildlife conservation, and considered wildlife as a barrier to their development. Similar results were noted by Songorwa (1999) in Selous Game Reserve, where the local community perceived wildlife as a significant factor causing underdevelopment rather than as a potential resource for their development. In addition, Mutandwa & Gadzirayi (2007) argued that if wildlife has no socio-economic benefit for rural communities adjacent to PAs, community members have no reason to support conservation. This suggests that without community members in Rwamchanga village experiencing benefits from wildlife conservation, their negative perceptions and attitudes towards wildlife will remain unchanged, hindering efforts for wildlife conservation in the study area.

Despite the fact that two communities participate and benefit directly from Ikona WMA, there appears to be a significant difference in their perception of its establishment. Nyichoka village community members display more positive perceptions than Robanda village. This may be a result of many respondents in Robanda village being dissatisfied

with the equal sharing of benefits among all the members of Ikona WMA, which has led Robanda to receive less revenue than they did before its establishment. Nyichoka village, which had not experienced tourism activities before, expressed more support for the establishment of Ikona WMA as members received some benefits at the community level (see Chapter 2). The socio-economic benefits experienced by a community appear to influence community members' positive perceptions of Ikona WMA, as illustrated in the following statement made by a WMA administrator when responding to the question regarding general views about the establishment of Ikona WMA.

“...now village members have become friendly to wild animals; imagine that you can see wild animals roaming in people's farms or around their residence without being killed; this was impossible before Ikona WMA...”

This suggests that Ikona WMA has improved community attitudes and behaviour towards wild animals in the village. Mutandwa & Gadzinayi (2007) noted the same effect in CAMPFIRE in Zimbabwe, where community attitudes towards wildlife conservation improved due to social and economic gains.

In comparison with conservation experts' views about the establishment of Ikona WMA in the study area, the majority interviewed support the idea, and consider community WMAs as a good option for minimizing costs of protection and for building good relationships with communities neighbouring PAs, as well as for providing an opportunity for many communities neighbouring PAs to experience benefits from wildlife conservation. However, some conservation experts expressed mixed feelings about the whole concept of community WMAs, and are distrustful about the ability of community members to manage and conserve wildlife resources, as illustrated in the following statement from wildlife conservation experts in the study area:

“...establishment of Ikona WMA has provided an opportunity for many villages to experience benefits from wildlife conservation when before only Robanda was benefiting...”

“...this idea of community (WMA) is not realistic, and it is difficult for the community to manage wildlife conservation...management of wildlife is professional work and not everyone can do that job...”

This suggests that the mixed perceptions among wildlife conservation experts and lack of trust in the ability of communities for wildlife conservation may affect efforts to empower local communities in achieving conservation goals in the

study area. Gruber (2010) showed that building trust among the conservation stakeholders is a precondition to ensuring effective conservation in community-based natural resource management.

3.6.2 Perceived Trends in Illegal Activities in Ikona WMA

Following the establishment of Ikona WMA in the study area in 2003, both community members participating in, as well as those not participating in Ikona WMA, perceive a decline in illegal activities in the study area compared with the time before the establishment of Ikona WMA. Illegal activities most mentioned by community members, WMA administrators, and conservation experts as having declined include poaching, bush fires, grazing in the WMA, and the market in bush meat, as well as a complete cessation of charcoal burning in the WMA. There was no difference in community perceptions about the decline of illegal activities in the study area between communities participating and not participating in Ikona WMA. This evidence suggests that Ikona WMA has made a significant contribution to supporting conservation in the study area. Boudreaux & Nelson (2011) also noted such a decline in illegal activities in Namibian conservancies as a great success of community-based natural resource management in contributing to wildlife conservation.

There was a difference in community perceptions between the two villages participating in Ikona WMA. Some community members in Robanda village said they were no longer interested in Ikona WMA due to insufficient involvement and lack of substantial village revenue from it. Mfunda & Røskalft (2011) noted that distribution of benefits from conservation is an important precondition to effective conservation since it can prompt a change in people's perceptions towards PAs and affect relationships among conservation stakeholders.

Although a majority of respondents agreed about the decline of illegal activities in the study area, in Rwamchanga village some community members continue to engage in poaching and grazing activities in Ikorongo and Grumeti game reserves, while in Nyichoka and Robanda villages there was occasional poaching carried out in secret and in a highly organized way by some community members in collaboration with disloyal village game scouts. This was confirmed by the statement of one village executive

officer when responding to the researcher's brief research feedback presented to village council members:

“...it is true there were some village game scouts who were not faithful and collaborated with a WMA anti-poaching commander to do poaching in WMA, but when we became aware of that we changed the commander immediately, so I am not sure if that is still going on...”

This suggests that, although community members participating in Ikona WMA show a willingness to participate in and hold positive perceptions about wildlife conservation, it may not necessarily be linked to changes in people's behaviour. Infield & Namara (2001) noted that community-based conservation attempts to influence thinking and attitudes in the belief that this will lead to changes in behaviour, but such changes do not always occur.

3.6.3 Perceived Impacts of Ikona WMA on Conservation

The impact of CBNRM on wildlife conservation has varied from place to place. Most positive impacts found in the literature about community-based wildlife conservation experiences in Africa include an increase of wildlife species, improvement of wildlife habitats, and general improvement of community attitudes towards wildlife conservation (Mbaiwa, 2004; Taylor, 2009; Murphree, 2009; Baldus, 2009). Increases in problem animals and limited community access to natural resources are negative impacts noted in many community-based wildlife conservation initiatives (Songorwa, 1999; Allendorf et al., 2006). In this study, there was variation in community perceptions about the impact of Ikona WMA on wildlife conservation across the three study villages. This variation in community perceptions needs to be understood to ensure that Ikona WMA provides a positive impact on wildlife conservation.

Both communities participating in Ikona WMA perceive more conservation impacts associated with Ikona WMA than does the community not participating in Ikona WMA. The main perceived impact of Ikona WMA includes improvements in some community services, increased protection of wildlife, increases in conservation awareness, and involvement of community members in wildlife conservation. In addition, increases of some animal species, particularly elephants, in the WMA, increases of money from tourism-related activities to support conservation, and improvement of wildlife habitat

in WMA has attracted some migratory animal species such as wildebeest to become permanent residents in Ikona WMA. One respondent during group discussion in Nyichoka village made the following comment when responding to the question regarding community views about the contribution of WMA in reducing illegal activity in the study area. (This comment was reflective of the responses of the majority of community members who participated in group discussions and interviews.)

“... if there was no Ikona WMA, perhaps there would be no wild animals seen around our village, as everyone could continue to hunt freely in the area as it used to be in the past...”

The evidence demonstrating the progress of Ikona WMA towards wildlife conservation in the study area supports similar findings noted by Bajracharya et al. (2005) and Boudreaux & Nelson (2011) in Nepal and Namibia respectively, where increases of wildlife species, increased money to support conservation and improvement of conservation awareness, and social services to local communities were the main conservation impacts attributed to community conservation initiatives.

In Rwamchanga village, an increase of wild animal species and protection were perceived as the main impact of the conservation area, however the community sees no improvement in conservation awareness and involvement in wildlife conservation, as well as no positive impacts of wildlife conservation to their local livelihoods. This suggests that communities participating in and benefiting directly from wildlife conservation felt more positive about the conservation impacts of Ikona WMA than does the community not participating in Ikona WMA. Hulme & Murphree (1999) noted that community-based conservation initiatives that generate substantial income and provide equitable benefits strengthen local support for conservation.

Contrary to community members' and WMA administrators' perceptions, conservation experts in the study area stated that conservation changes in Ikona WMA, especially increases in wildlife animal species, decline of poaching, improvement of habitat, and attitudes towards wildlife conservation, could not be attributed to Ikona WMA alone. There are a number of conservation interventions in the Serengeti ecosystem which may have also influenced the impacts seen in the area, as illustrated in the following statement made by one conservation expert in the study area when responding to the question regarding impacts attributed to Ikona WMA.

“...well, there are some conservation changes, especially decline of poaching and increase of some species of wild animals, but it is very difficult to tell whether the changes are associated with the establishment of Ikona WMA or not, as we have many wildlife conservation interventions in Serengeti ecosystem...”

This mixed result suggests that the perceived positive conservation impacts in Ikona WMA might not be attributable to Ikona WMA alone, but to joint conservation efforts from government, international organizations, private tourism investors, and communities in the study area.

Although communities participating in Ikona WMA perceived improvement in conservation education and awareness in the study area, and increased money to support wildlife conservation, this was contrary to the practical situation on the ground where there were no efforts, nor Ikona WMA budget, allocated for environmental education to the communities due to a lack of capacity in terms of experts and financial resources. This confirms the conservation experts’ views that improvement of conservation awareness in the study area might be attributed to other conservation intervention in Serengeti and not only to Ikona WMA. It suggests that the conservation goal of Ikona WMA might not be realistic in the future if there are no efforts to ensure community education and awareness within and outside Ikona WMA.

3.6.4 Perceived Negative Impacts of Ikona WMA

Regarding negative impacts of Ikona WMA, the increases of some wildlife species has led to increases of problem animals, especially elephants, in the study villages, which impacts negatively on local community livelihoods. This has affected community perceptions towards wildlife conservation, particularly in Rwamchanga village compared to the villages participating in Ikona WMA, who at least expressed tolerance of costs from problem animals. The costs of problem animals have been reported in many areas as having a negative influence on community members’ perceptions, attitudes, and behaviour towards PAs (Infield & Namara, 2001; Qingcheng et al., 2011).

An increase in livestock populations in the study area is also perceived by community members as a negative impact of Ikona WMA, adding pressure on natural resources, particularly for grazing land. The increase of livestock in the study area is partly associated with occasional veterinary services provided to the community participating in Ikona WMA. This service may have attracted pastoralists from other places to immigrate

to the area to take advantage of the services. Although WMA administrators, conservation experts, and community members in the study area confirm the increase of livestock populations in the study area, it remains unclear whether the increased number of livestock and human populations is linked with the establishment of Ikona WMA. Schmitt (2010) noted that growing numbers of livestock and human populations has major implications for wildlife resources in the Serengeti ecosystem, calling for an investigation of factors causing and ways of minimizing the impacts.

It is expected that Ikona WMA and surrounding Ikorongo and Grumeti game reserves could provide buffer zones for Serengeti National Park (SNP). Some respondents, however, reported that because of strong protection of wildlife in Ikona WMA and surrounding Ikorongo and Grumeti game reserves, some illegal practices, particularly poaching, have shifted to Serengeti National Park, where poachers consider themselves safer than outside the park, as illustrated in the following statement from one wildlife conservation expert in the study area which reflects similar comments made by different groups of respondents when answering the question regarding conservation impact attributed to Ikona WMA.

“...it is not easy for poachers to shoot animals, especially elephants, in our area now...we patrol our area 24 hours a day in collaboration with our neighbours; the problem is that now poachers concentrate in Serengeti National Park where they can shoot elephants and remain safe...”

This suggests that, while celebrating conservation progress and achievements in protecting wildlife outside the PA, the park management should strengthen protection and enforcement of laws and regulations inside Serengeti National Park to ensure that wild animals remain safe in the park and that Serengeti is kept conserved for future generations.

Other negative impacts reported by the majority of the respondents in the study villages included limiting access to natural resources, and harassment of community members by Ikorongo Game Reserve rangers, especially in Rwamchanga village. The harassment was most reported in connection with conflict over resources, especially a shortage of grazing lands and limiting access to stream water in the conservation area, which is important for their livestock. It was interesting to find that most of the community members who complained about harassment were from Rwamchanga village.

This suggests that people in communities participating in Ikona WMA might have more wildlife conservation awareness, and awareness of regulations and rules governing natural resource use. Harassment of community members, together with limiting access to natural resources, might have also influenced negative perceptions of community members in Rwamchanga village about the Ikona WMA and surrounding Ikorongo and Grumeti game reserves.

Interestingly, due to limiting access to grazing lands in Rwamchanga village, some Ikorongo Game Reserve rangers were reported to accept bribes from some livestock owners to allow them to graze illegally in the conservation area. Also, bribes were paid as a way to persuade rangers to free livestock arrested in the conservation area and to not enforce the conservation laws and regulations as required. Explaining the experience with Ikorongo and Grumeti game reserves rangers, one livestock owner in Rwamchanga village had this to say:

“...it is no problem to graze in conservation areas if you have money; you know rangers are human beings. Normally we mobilize money from two or three people with large herds of cattle to give to rangers, and after that we can be allowed to graze for some days without interference...”

Similarly, such ranger behaviour has been reported in Uganda, where rangers were making false accusations in order to demand bribes in exchange for allowing illegal grazing and poaching (Infield & Namara, 2001). In addition, some livestock keepers in Rwamchanga village have changed their time for grazing their livestock, grazing during night hours in Ikorongo Game Reserve to avoid being arrested by rangers. This suggests that the reported decline of illegal activities in Rwamchanga village might not be realistic, but rather that community members have changed their tactics for grazing and poaching in the conservation area. Gibson & Marks (1995) argue that, in some cases, there has been no decline in illegal activities compared with before the inception of community-based programs as poachers tend to change their tactics and prey selection.

3.7 Conclusions and Recommendations

Generally, the findings of this study have shown that, despite the difference in community member perceptions in the study villages, community members participating in Ikona WMA have demonstrated to a large extent positive perceptions about wildlife

conservation compared to Rwamchanga village. Socio-economic gains and livelihood benefits from wildlife conservation to communities participating in Ikona WMA (see Chapter 2) may have influenced their positive perception and attitudes towards Ikona WMA and towards conservation in general compared to the community not participating in Ikona WMA.

The study also revealed that, despite the fact that the two communities participating in Ikona WMA both experienced benefits from wildlife conservation, there is variation between the two villages in perceptions about Ikona WMA, trends of illegal activities, and conservation impacts associated with Ikona WMA. These variations are attributed partly to dissatisfaction of community members in Robanda village with current equal sharing of benefits from Ikona WMA with communities who do not generate any income or have any tourism investment in their village. Community members in Nyichoka village, who had not experienced benefits from wildlife conservation before the establishment of Ikona WMA, were happy with the current equal sharing of benefits from Ikona WMA. Such mixed community feelings about benefit sharing need to be addressed through re-examining benefit sharing formulas among the communities participating in wildlife conservation (WMA) in order to strengthen community support.

This study supports the social exchange theory, which posits that people evaluate an exchange based on the costs incurred and benefits derived as a result of that exchange (Andereck et al., 2005). The extent of benefits and costs communities experience from wildlife conservation influences community members' perceptions about Ikona WMA and wildlife conservation in general. The community members (Nyichoka and Robanda villages) in the study area who perceived benefits demonstrated positive perceptions and attitudes towards Ikona WMA compared to communities who perceived only costs (Rwamchanga village) and have negative perceptions and attitudes towards wildlife conservation. Thus, increased socio-economic and livelihood benefits from wildlife conservation are likely to influence more positive perceptions and attitudes of community members towards Ikona WMA and other surrounding wildlife conservation areas.

Gibson & Marks (1995) noted that in some community conservation programs there has been no decrease in wildlife poaching rates compared to the situation before inception of the programs. This study demonstrates success in minimizing illegal activities, particularly bush fires, poaching, and the frequency of grazing in Ikona WMA.

The majority of the respondents, including conservation experts, have indicated decreased poaching in the study area compared to the time before the establishment of Ikona WMA. Thus, strengthening community WMAs in Western Serengeti and elsewhere remains a viable solution to minimize conflict and illegal activities in PAs.

The CBNRM approach has been criticized for being ineffective in maximizing conservation of biodiversity (Child & Lyman, 2005). This study indicates that participating community members felt more positive impacts of Ikona WMA on wildlife conservation than community members not participating. The positive impacts associated with Ikona WMA include improved protection of wild animals through village game scouts, increase of wild animal species, especially elephants, increased conservation awareness, and income from tourism-related activities to support conservation and village social development projects. The improvement of wildlife habitat in Ikona WMA has attracted some migratory species such as wildebeest and zebra to become permanent residents, whereas previously such animal species were only seen seasonally in the area. The presence of other wildlife conservation interventions in the great Serengeti ecosystem may also have accounted for conservation improvements in the study area. However, Ikona WMA has demonstrated positive contributions in improving conservation in the study area.

The study suggests strengthening conservation awareness efforts for communities that are both in and outside Ikona WMA. Ikona WMA could establish a conservation education committee that promotes collaboration with other conservation actors, such as Tanzania National Park (TANAPA) and Ikorongo and Grumeti game reserves, through their community outreach programs and conservation departments. This will help to make conservation education sustainable and improve community relationships with parks management in the study area. Improvement of conservation infrastructure, such as vehicles for patrolling, communication systems, and training for more village game scouts, could help to achieve conservation goals in the study area. However, the village game scouts should be trained well, work according to professional skills and ethics, and their daily activities should be monitored to ensure that they become good conservers and not part of the problem.

The study demonstrated a number of negative impacts perceived to be attributed to Ikona WMA and surrounding conservation areas. These included increases of problem

animals that affect community livelihoods and their perceptions towards wildlife conservation, increases of livestock populations which increase pressure on natural resources, a shift of illegal activities, especially poaching, from outside PAs to Serengeti National Park due to improvements of wildlife protection outside the PAs, limiting access to natural resources, especially grazing lands, which has led to livestock owners bribing rangers to allow illegal grazing in the conservation area, and a decline of Robanda village revenue due to lack of consensus about conservation benefits sharing criteria. These negative impacts impede efforts towards wildlife conservation in the study area.

The study contributes to the debate about whether or not community-based conservation can contribute to improved conservation, and concludes that in this study area the Ikona WMA, as an example of CBNRM, has indeed improved wildlife protection and conservation. Ikona WMA to a large extent is effective in delivering conservation benefits in the study area, and provides evidence that add to other scholar's work (such as Bajracharya et al., 2006; Mbaiwa, 2008, Boudreaux & Nelson, 2011) that demonstrate CBNRM as an effective approach in delivering conservation benefits.

However, the prevailing perceptions about negative impacts associated with Ikona WMA should be addressed to ensure that wildlife conservation and community benefits are strengthened. This can be achieved through increased collaboration with other private and government conservation stakeholders in the study area, and more involvement of community members in wildlife conservation activities. Ikona WMA should have a plan for consolation of those affected by problem animals, and also play a role in helping affected community members to undergo consolation application procedures to the Wildlife Division based on the wildlife conservation regulations (dangerous animals damage consolation) of 2011 (URT, 2011b). This is a unique solution in Tanzania because elsewhere it is called compensation in recognizing those affected by problem animals in order to improve community attitudes to and support for wildlife conservation.

Further, to ensure sound wildlife resource management, ways must be found to build good relationships between the park management and neighbouring communities not participating in wildlife conservation, such as Rwamchanga village in this case study. This will be a good pathway to reconciling livelihoods and conservation benefits to communities neighbouring PAs in the study area and elsewhere. Park management

should also play their role to ensure more intensive protection and enforcement of laws and regulations inside Serengeti National Park when there is improvement of wildlife protection outside the PAs. This will help to ensure that wild animals remain safe in and outside the national park in order to keep Serengeti alive for future generations.

Chapter 4

Conservation and Local Livelihoods in Protected Areas: Success and Challenges from Ikona Wildlife Management Area in Western Serengeti, Tanzania

“Community-based conservation is based on the idea that if conservation and development could be simultaneously achieved, then the interests of both could be served” (Berkes, F., 2004, p. 261)

Abstract

This paper examines the success and challenges of implementing community-based conservation in protected areas (PAs) using the Ikona Wildlife Management Area (WMA) in Western Serengeti, Tanzania as a case study. The paper is based largely on primary data from key informant interviews, focus group discussions, and household surveys, as well as secondary data and literature relating to community-based natural resource management (CBNRM) as a means of promoting both conservation and improvement of local livelihoods. The findings indicate that Ikona WMA has had some notable success in contributing to wildlife conservation and local livelihoods. However, it faces a number of challenges, such as low participation of communities in decision making, lack of power and ownership over wildlife resources, insufficient monitoring of ecological and social development projects, and problems of equal benefit sharing and distribution, as well as insufficient collaboration among the conservation actors in the study area. Greater attention should focus on broad level community participation in decision making, devolving complete power to the local community over wildlife resources in the WMA, and fostering equal benefit sharing, particularly at the village level, along with empowering local communities' skills, all of which would cultivate local interest in supporting wildlife conservation outside the PAs and ensure that CBNRM contributes to improved local livelihoods of communities neighbouring PAs.

Key words: Ikona WMA, wildlife conservation, CBNRM, livelihoods.

4.1 Introduction

Global biodiversity is seriously threatened by widespread habitat loss, over exploitation of species, invasive species, pollution, climate change, and a growing world human population (Bertzky et al., 2012). Protected area networks, notably national parks with strict protection regimes, are widely considered a principal means for conserving global biodiversity (Dearden & Rollins, 2009; Cantu-Salazar & Gaston, 2010). However, there are concerns that a “top-down” approach to the management of protected areas (PAs) is a form of conservation without any consultation with local people neighbouring PAs, and often works against their interests (Baldus, 2009). For the past three decades, there has been a paradigm shift in biodiversity conservation approaches, from exclusive PAs towards people-centred conservation. This has encouraged development of community-based conservation (CBC) initiatives aimed at achieving joint objectives of biodiversity conservation and improvement of rural livelihoods in many countries (Gibson & Marks, 1995; Suich, 2010). Such initiatives were also developed from a desire to integrate traditional values and ecological knowledge into modern resource management (Baldus, 2009; Child & Barnes, 2010), and to protect biodiversity loss outside PAs while maintaining the integrity and viability of particular ecosystems (Hulme & Murphree, 1999; Rotha et al., 2005; Suich, 2010). CBC aims to provide an opportunity to enhance livelihoods sustainably through ecotourism and related economic activities, while protecting the natural resources base (Gibbes & Keys, 2010; Child & Barnes, 2010; Simpson, 2009).

This paper examines the success and challenges learned from the implementation of CBC in Tanzania, with particular attention to community wildlife management areas (WMAs) officially initiated in Tanzania in 2003 and representing Tanzania’s attempt to implement community-based natural resource management (CBNRM). The research uses a case study of Ikona WMA in Western Serengeti to investigate the contributions of Ikona WMA in meeting the dual objectives of wildlife conservation and improved local livelihoods. It also evaluates the progress Ikona WMA has made in meeting some of the conditions for successful implementation of CBNRM, and identifies the existing and potential challenges affecting successful implementation of Ikona WMA in order to

recommend areas for improvement of CBC in Tanzania to ensure that WMAs improve local livelihoods and conservation in PAs.

4.2 Overview of the Study

CBNRM is an emerging international approach for natural resource management (Gruber, 2010). It has emerged in response to insufficient performance of the previous top-down resource management and conservation “fences and fines” approach, which was based primarily on a purely technical approach to natural resource management while excluding local people from nature (Songorwa, 1999; Agrawal & Gibson, 1999; Adams & Hulme, 2001). CBNRM is defined as an approach to natural resource management that seeks to support long-term sustainability through broad participation of community members and resource users in decision making (Berkes, 2005).

The principal assumption of CBNRM is that communities will manage local resources in a sustainable manner if they are assured of their ownership of the natural resources; they are allowed to use the resources and/or benefit directly from others’ use of them, and they have a reasonable level of control over management of the resources (Songorwa, 1999; USAID, 2009; Gibbes & Keys, 2010). It is expected that CBNRM will provide substantial benefits to local communities as incentives to influence negative behaviour and attitudes towards wildlife (Gibson & Marks, 1995; Spiteri & Nepal, 2006). These conservation incentives to local communities are, however, mostly creating job opportunities related to wildlife (such as village game scouts and local tour guides), and providing financial incentives to support development projects (such as the construction of schools, water dams, teachers’ houses, dispensaries, roads, bridges, milling machines) (Gibson & Marks, 1995; Keller et al., 2000; Nelson, 2007). This also includes other benefits related to empowerment of local community members, such as imparting entrepreneurial and managerial skills, in order to cultivate their interest in supporting conservation (Spiteri & Nepal 2006; Songorwa, 1999).

Past studies have also highlighted conditions for successful implementation of CBNRM in various places (see Gruber, 2010; USAID, 2009; Thakadu, 2005; Adams & Hulme, 2001; Jossierand, 2001; Kellert et al., 2000; Songorwa, 1999). The major conditions identified by scholars include participation of the local community in decision

making and implementing their decisions, true devolution of power and responsibility over natural resources from the state to local communities, the ability for CBNRM to generate income and develop employment opportunities, and the ability to collaborate with various conservation stakeholders. Other conditions include equity in resource use and benefit sharing among community members, support from national policies and institutions and their ability to demonstrate good governance, particularly in terms of transparency, accountability, rule of law, participation, and effectiveness in meeting their goals. These conditions are not exhaustive, but provide an indication of requirements for the successful implementation of CBNRM (Adams & Hulme, 2001; Gruber, 2010).

Although CBNRM has been initiated in many countries, especially in Africa (Hulme & Murphree, 1999; Gubbi et al., 2009), the effectiveness of the approach in meeting conservation and development goals has been criticized by many scholars (Table 15).

Table 15 Common criticisms of the community-based conservation (CBC) approach

-
- Failure to deliver enough benefits to outweigh the cost communities experience from wildlife
 - Failure to stop poaching
 - Governments not willing to devolve responsibility for natural resources to local communities
 - Communities are not capable of managing wildlife
 - Wildlife conservation and rural development are conflicting targets
 - Ineffective in maximizing conservation of biodiversity
 - As a panacea ignores the necessity of managing commons at multiple levels
-

Summary of CBC criticisms from Child & Lyman, 2005; Berkes, 2007; and Baldus, 2009.

An extensive body of literature that explores the success of CBC initiatives (e.g., Mbaiwa, 2004; Thakadu, 2005; Taylor, 2009; Nkhata & Breen, 2010; Boudreaux & Nelson, 2011) demonstrates mixed outcomes of success and failure in contributing to conservation and distributing socio-economic and livelihood benefits to local communities neighbouring PAs. This has led to an incomplete understanding of the extent to which CBC initiatives are effective in meeting the dual objectives of conservation and improvement of local livelihoods. Despite this lack of knowledge about outcomes, community-based approaches are increasingly being promoted in many areas (Berkes, 2004; Bajracharya et al., 2006; Igoe, 2006).

CBNRM in Tanzania is practiced through Community Wildlife Management Areas (WMAs). WMAs are community lands set aside for the purpose of wildlife conservation in which local people have usage rights over the wildlife resources found in the area (URT; 2009; Wilfred, 2010; Kangalawe & Noe, 2012). The concept of community WMAs came about as a result of experiences learned from other pioneering CBNRM programs in Africa such as CAMPFIRE in Zimbabwe (Hulme & Murphree, 1999; Taylor, 2009), ADMADE in Zambia (Gibson & Marks, 1995; Nkhata & Breen, 2010), as well as community-based conservation (CBC) experiences from Botswana (Thakadu, 2005; Mbaiwa, 2004; 2008), and Namibia (Hoole, 2008; Kanapaux & Child, 2011; Boudreaux & Nelson, 2011). WMAs were also a response to Tanzania's donor-funded community wildlife conservation programs established in the 1980s and 1990s, such as the Serengeti Regional Conservation Program (SRCP) and Selous Conservation Program (SCP), which failed to provide many tangible benefits to local communities neighbouring PAs (Songorwa, 1999; Mfunda & Røskaft, 2010).

The WMA program was enabled by the Tanzania Wildlife Policy of 1998 (revised in 2007), and devolves power to local communities to manage wildlife resources outside PAs, recognizing corridors, migration routes, and buffer zones. The WMA program was initiated to ensure that local communities neighbouring PAs obtain substantial tangible benefits from wildlife conservation through the establishment of WMAs under the control of CBOs in various parts of the country (URT, 1998). The WMAs aim to protect and conserve all natural resources and their environments, and to contribute significantly to improving the livelihoods of communities neighbouring PAs (URT, 2011a).

Between 2003 and 2012, the government of Tanzania instituted several processes to support formation of the WMA program, including development of guidelines for designation and management of WMAs, assessment and evaluation of pilot WMAs in 2007, and release of the Wildlife Conservation Act of 2009 and new WMA regulations of 2012. These government initiatives help to provide relevant technical information for decision making and smooth implementation of community WMAs nationwide. A number of WMAs have been established in the country, and by November, 2012 there were 17 WMAs with user right certificates which allow community members to manage and use wildlife resources through authorized community-based organizations, and an additional 21 WMAs were in various stages of the development process (MNRT, 2012).

Despite government efforts to support the process of establishing WMAs, and a growing number of WMAs in the country, there is insufficient information that demonstrates whether the new community wildlife management areas have been effective and successful in contributing to both wildlife conservation and local livelihood benefits. It is the goal of this study to fill this gap by focusing on Ikona WMA in Western Serengeti, Tanzania. In this paper, success is regarded as any positive impacts or benefits that community members, WMA administrators, and wildlife conservation experts attribute to Ikona WMA that have contributed to improved wildlife conservation and local livelihoods in the study area. This may include a range of benefits, such as tourism development and promotion, maintenance of natural resources for controlled present or future use, ecological services, improvement of social services and local livelihoods, compensation schemes, revenue sharing, and greater decision-making power at the community level (Spiteri & Nepal, 2006). Haque et al. (2009) noted that identifying and analyzing elements of success in integrating conservation goals with livelihood improvement is important for other similar initiatives, and for ensuring that such CBC initiatives find support among PA managers.

4.3 The Study Area

Ikona WMA is situated in the vast Serengeti ecosystem, which is variously protected by several kinds of PAs in Northern Tanzania (Figure 9). It borders Serengeti National Park to the east and south, Grumeti Game Reserve to the southwest, and Ikorongo Game Reserve to the northeast (URT, 2005). Ikona WMA is a community wildlife conservation area that is jointly managed by the five participating villages of Robanda, Park Nyigoti, Nyichoka, Makundusi, and Nattambiso (Figure 9) under a community-based organization locally known as “Jumuiya ya Hifadhi ya Wanyamapori Ikona (JUHIWAIKO).”

Ikona WMA covers an area of 242.3 km², and is divided into two zones. The Tourist Hunting Zone covers 61.5% (149 km²) of Ikona WMA in the north and west of the area. This zone allows intensive tourism activities through tourism investors licensed to conduct tourist hunting in the area. The second zone is the Photography Safari Zone, which covers 38.5% (93.3 km²) of Ikona WMA in the south and east of the area

bordering Grumeti and Ikorongo game reserves and Robanda village (see Figure 9). Tourism activities such as game drives, bird watching, and camping are undertaken in this zone by various tourism investors, and no tourist hunting activity is allowed in this zone. The two zones of Ikona WMA are intended to promote conservation and sustainable use of wildlife resources in the area for the benefit of the local communities participating in wildlife conservation (URT, 2011a).

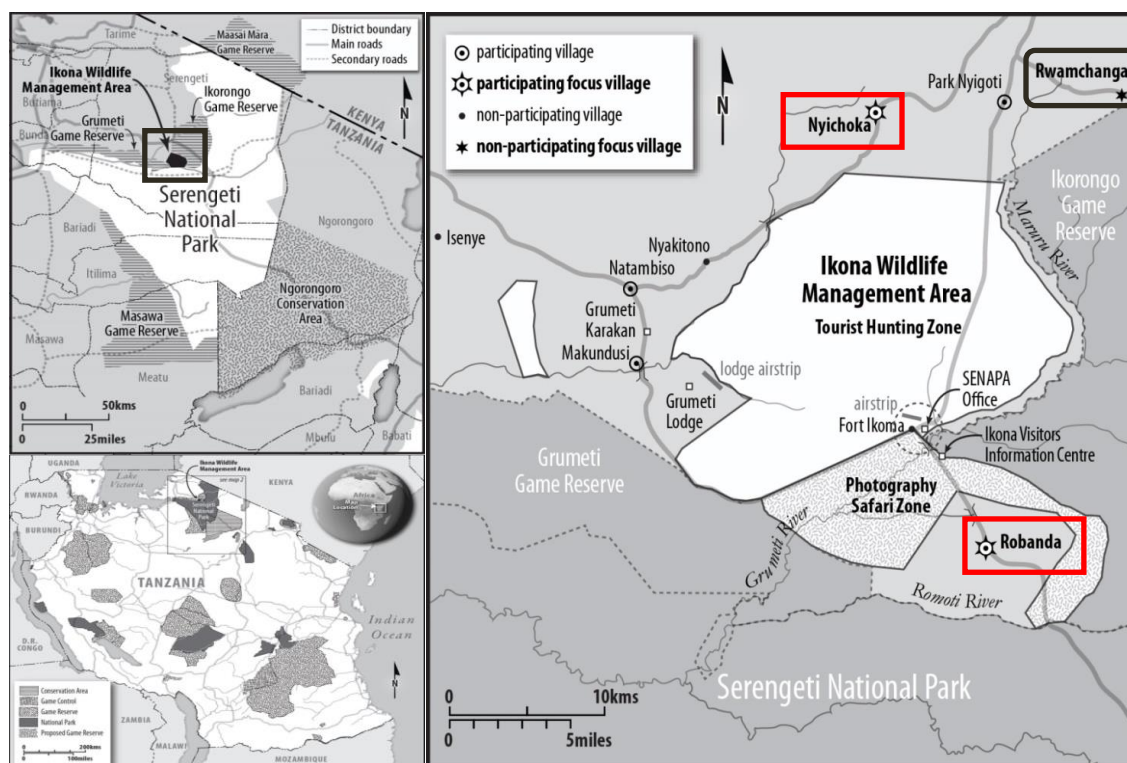


Figure 9 Map of the study area

Note: Tanzania (lower left), Serengeti Ecosystem (upper left), and the Study Villages and Ikona WMA Zones (right)

The area is rich in wildlife species similarly found in the Serengeti ecosystem, including wildebeest, lion, elephant, black rhino, cheetah, giraffe, hippo, crocodile, white colobus monkey, buffalo, topi, antelope, zebra, hartebeest, klipspringer, and warthog (URT, 2011a). There is also a variety of bird species associated with open grasslands. Ikona WMA and the surrounding areas of Grumeti and Ikorongo game reserves provide a good habitat and corridor for wildebeest migration in Western Serengeti, especially in the month of July, which attracts many tourists to the area.

The area is characterized by many different types of land uses, ranging from PAs like Serengeti National Park, where no human consumptive activity is allowed, to Ikona WMA, where some human activities are restricted, to some areas at the edge of the WMA where highly intensive agriculture is conducted in some villages. The area is also densely settled with villages engaging in agro-pastoralism activities as a major source of their livelihoods (Sinclair et al., 2008; Kideghesho, 2008). The major food crops cultivated in the area are finger millet, maize, sorghum and beans, while cotton is a cash crop. Livestock are also raised in these communities, including cattle, goats, and sheep (URT, 2005).

The communities are challenged by a lack of reliable markets for their livestock and agricultural produce. In addition, wildlife imposes huge economic and social costs on the communities adjacent to PAs of Western Serengeti, including crop damage, livestock depredation, and occasional killing or wounding of livestock and human beings (Walpole, 2004; Mfunda & Røskaft, 2011). People in this area are poor, with an average annual income earned from agro-pastoralism ranging from US \$150-200 (Kideghesho, 2006). Due to insufficient household incomes and human population pressures, communities in the area pursue off-farm activities such as illegal hunting and charcoal burning to add to household incomes and to provide food such as bush meat for household members, thus posing a threat to wildlife resources (Sinclair et al., 2008; Kideghesho, 2006; Mfunda & Røskaft, 2010; Rentsch, 2012).

4.4 Methods

The study was carried out in Nyichoka and Robanda villages, which participate in Ikona WMA, and in Rwamchanga village, which does not participate (see Figure 9). All of the three study villages border the protected area and were selected purposefully as the researcher had already established contact with these communities before the research began in 2010. The inclusion of Rwamchanga village in this study enabled a comparison of community perceptions and attitudes about Ikona WMA, wildlife conservation, and livelihoods impacts associated with Ikona WMA of communities participating and not participating in wildlife conservation.

A mixed methods approach, including household surveys, key informant interviews, and focus group discussions, was used to assess community perceptions of conservation and livelihood benefits associated with Ikona WMA and challenges affecting its successful implementation. Mixed methods allowed the researcher to provide a more comprehensive analysis of the research problem, complementing information from multiple methods and minimizing the biases of using a single method (Creswell, 2009; Robson, 2011; Newing et al., 2011).

Based on available village household ledgers maintained by each village's chairperson, simple random sampling was used to obtain a total sample size of 300 households for the survey from villages of Nyichoka (153), Robanda (88), and Rwamchanga (59). The sample size covered 15% of total households (a percentage used also by Bajracharya et al., 2006 and Kangalawe & Noe, 2012), and provided a confidence interval of ± 5.2 and a confidence level of 95% (see Chapter 1 for sample size details). Whenever possible, household heads were surveyed at each selected household. The household head was any adult over 18 years of age who assumed responsibility for the household (Budlender, 1997). A household face-to-face questionnaire was administered to selected household heads by three local trained research assistants who were not involved with any Ikona WMA activities before the study and had lived in the Serengeti district for more than ten years, and thus were familiar with the three study villages. The survey captured data on socio-economic and demographic variables including gender, age, education level, household size, and number of years respondents had resided in the village, as well as main livelihood activities. It also captured community members' perceptions about conservation and livelihood benefits associated with Ikona WMA, and challenges that negatively affect successful implementation of Ikona WMA.

Household data were supplemented by data from semi-structured interviews with 50 key informants. Key informants included people who were knowledgeable about Ikona WMA and wildlife conservation identified by the researcher based on their job positions and titles in the study area. This included 17 Ikona WMA administrators, 17 village leaders, and 2 ward councillors at the village level, and 10 wildlife conservation experts at the district level and 4 at the national level. In addition, a total of eight focus group discussions comprising a minimum of five to a maximum of ten people were conducted at the village level. A focus group is a small group discussion in which participants

respond to and discuss a series of questions based on the research topic (Newing et al., 2011). Interviews and focus group discussions were recorded with a digital electronic recorder, except in a few cases where respondents were unwilling to be recorded and notes were taken instead. Both key informant interviews and focus group discussions aimed to capture broad information about the research topic, such as community members' and wildlife conservation experts' perceptions of Ikona WMA, perceived conservation and livelihood benefits associated with Ikona WMA, as well as challenges affecting successful implementation of Ikona WMA.

Quantitative data from the household surveys were first screened and cleaned of some errors in the household questionnaires. Then data were coded and entered into Statistical Package for Social Sciences (SPSS) version 16.0 for analysis. Descriptive statistics were applied to obtain the percentage, mean, and standard deviation of various conservation and livelihood variables for the three study villages. Qualitative data were transcribed by the researcher on the same day of the interview/focus group discussion by highlighting and taking notes of key issues that emerged in the interviews/group discussions based on the research questions. Later, the recorded information was translated from Kiswahili into English and then grouped based on interview and group discussion guide questions that respond to the main research questions (for more description of research methods refer to Chapter 1).

4.5 Results and Discussion

This paper examines the success and challenges related to CBNRM learned from the implementation of Ikona community Wildlife Management Area in the Western Serengeti. The paper builds from the findings of the previous chapters in relation to community-based literature to understand the progress made by Ikona WMA in balancing conservation and local livelihoods as core objectives, and evaluates the achievements of Ikona WMA in meeting the conditions for successful implementation of CBNRM as identified in the literature, including aiming to achieve conservation and improved local livelihoods, participation and involvement of community members, community power over wildlife resources, income generation and benefit sharing, community collaboration in wildlife management, and accountability and transparency of

community-based organizations to local communities. It also identifies and evaluates the challenges that affect successful implementation of Ikona WMA in the study area.

4.5.1 Features for Success in Improving Livelihoods and Conservation

It is widely reported that communities are likely to support conservation when they experience benefits from it (Gibson & Marks, 1995; USAID, 2009; Gibbes & Keys, 2010). Overall assessment of Ikona WMA shows that it has had some success in contributing to livelihood improvement in the two communities participating in wildlife conservation, particularly at the community level. In addition, conservation efforts, including enforcement, resulted in some increase in wildlife and sustainable use of resources (see Chapter 2).

Adam & Hulme (2001) posit that community conservation is likely to achieve both conservation and local development if it yields sustainable revenue flow. Ikona WMA has been able to increase revenues from various fees associated with tourism investment in their area from Tsh. 16,500,000 (US \$10,313) in 2007 to Tsh. 729,915,608 (US \$456,197) in 2011 (Ikona Report, 2012). Fifty percent of its annual revenue is distributed equally to the villages forming the WMA to support various village social development projects. The remaining 50 percent is used to strengthen WMA management, and not less than 15 percent out of this 50 percent is dedicated to wildlife conservation (URT, 2012). As an indicator of progress, Ikona WMA has launched a visitor information centre and introduced a visitor entry gate fee to add revenues and create job opportunities and a market for cultural produce from the local community.

Findings from community group discussions with the communities participating in Ikona WMA and the interviews with WMA administrators in the study area indicate that, with revenues that the villages obtained from Ikona WMA, each village has been able to improve social infrastructure, including construction of primary school classrooms, teachers' houses, a dispensary, a delivery ward, and water holes (marambo) for livestock and human use. In Nyichoka village, for example, they have also managed to construct a kindergarten classroom, supply student desks, maintain a village vehicle that serves as an ambulance for the village dispensary, and during the time of this research, construct a village office. In Robanda village, money obtained from Ikona WMA also contributed to supporting the construction of a new secondary school and village office. Such

improvements to education and other social infrastructure in the study area have provided the opportunity for improving student learning environments and motivated teachers to work in the village. These improvements indicate the success of Ikona WMA in contributing to the social infrastructure at the community level which had not been evident prior to financial support from Ikona WMA. Similar benefits were noted from conservancies in Namibia and WMA in Botswana (Mbaiwa, 2004; Kanapaux & Child, 2011; Boudreaux & Nelson, 2011). Such benefits are regarded as an indicator of success of CBC in improving livelihoods of local communities.

However, the findings in Chapter 2 show that Ikona WMA has achieved less in distributing benefits at individual and household levels, particularly the failure to improve the household economy and to provide access to basic natural resources in the study area. Only a few individuals secured employment in Ikona WMA, mostly village game scouts and WMA administrators, and some children from poor families have received educational scholarships. In addition, some livestock keepers have received direct benefits from Ikona WMA by way of veterinary services (e.g., livestock vaccinations). The majority of community members, particularly those who live at the edge of the conservation area and who suffered most from problem animals, experienced no benefits from Ikona WMA. Simpson (2009) noted a similar experience in Maputaland, South Africa, where community-based initiative benefits were limited to the few households who have members directly employed by the association, leaving the majority accruing no direct benefits from CBC.

Despite insufficient benefits experienced by communities at the household level (refer to Chapter 2), there were no efforts by Ikona WMA to ensure that conservation benefits contributed to improved individual or household incomes of the participating communities. This was revealed during interviews with WMA administrators when responding to the question of whether community members accrued benefits at the household level from Ikona WMA, as indicated in the following comment which was reflective of the opinions of 13 out of 17 WMA administrators interviewed:

“...currently we are not focusing directly on individual or household levels; our main focus is on the things which serve the public interest at the community level, like schools, clinics, and water, and when we achieve that, we can then think about how our organization can provide direct benefits at the household level...after all, it is impossible for Ikona WMA to provide money for each village member...”

This implies no priority for Ikona WMA to ensure that communities experience benefits at the household level, despite the costs individual household members in the study area experience for participating in wildlife conservation and being adjacent to a protected area. Without benefits being realized by individuals and reaching the household level, conservation efforts in the study area might not be sustainable. Rozemeijer & Jansen (2004) noted that benefits that reach the household level are significantly meaningful, and can catalyze changes in people's perceptions and attitudes towards conservation, and develop community interest in and support for wildlife conservation (Songorwa, 1999; Gibbes & Keys, 2010). Therefore, considering benefits at household and individual levels, and assuring access by household members to basic resources such as fuel wood, and occasional access to grazing land and bush meat, particularly during dry and hunting seasons, respectively, could have a significant impact on individuals' attitudes towards and support for wildlife conservation.

Interviews and focus group discussions with community members in Rwamchanga village indicate that a few individuals secured jobs from Ikona WMA tourism investors, however to a large extent there were no benefits experienced by community members from either Ikona WMA or neighbouring Ikorongo and Grumeti game reserves in this village. As a result, the community had negative attitudes towards wildlife conservation compared to villages participating in Ikona WMA. As indicated in Chapter 2, community members in Rwamchanga village consider wild animals as the first enemy of their lives, and believe they contribute no benefits to the local community apart from increasing human-wildlife conflict in the village.

One of the driving forces for the establishment of community-based wildlife conservation in many countries is to ensure that communities play a significant role in protecting biodiversity loss outside PAs while maintaining the integrity and viability of particular ecosystems (Hulme & Murphree, 1999; Rotha et al., 2005; Suich, 2010). Many cases reported in the literature demonstrate positive contributions of CBNRM to improving wildlife conservation, as noted by scholars such as Boudreaux & Nelson (2011) in Namibia, Mbaiwa (2008) in Botswana, Taylor (2009) in Zimbabwe, and Bajracharya et al. (2005) in Nepal. Conservation success from CBC initiatives is often predicated on local support for conservation, which is strongly influenced by community members' perceptions and opinions of management and governance (Bennett & Dearden,

2013). Ikona WMA shows a number of indicators of success in contributing to improved wildlife conservation in the study area (see Chapter 3). Community members of Nyichoka, Robanda, and Rwamchanga villages reported increases of some wildlife species in the WMA. This resulted in increased opportunities to observe wild animals, including species such as leopards, cheetahs, and lions, which were rarely seen in the area before the establishment of Ikona WMA. In addition, community members reported declines of illegal activities, including poaching, grazing, charcoal burning, and uncontrolled bush fires, leading to the improvement of wildlife habitats to the extent that they attracted some migratory species, particularly the wildebeest, to become permanent residents in the area where such species were previously seen only during migration.

The progress Ikona WMA has made in contributing to improved conservation in the study area is attributed to increasing enforcement through the use of village game scouts who are trained and employed by Ikona WMA and work in collaboration with private tourist investors in Grumeti and Ikorongo game reserves. Ikona WMA has also succeeded in setting up rules and by-laws that guide resource use and restrict illegal activities in the WMA. For example, it was reported during the interviews with WMA administrators that there is a charge imposed (Tsh. 300,000 - equivalent to US \$200) for any village member found grazing their livestock in the WMA. According to the Ikona WMA Annual Report (2012), in 2011 there were 657 patrols in the WMA, of which 457 were conducted by VGS on foot and 200 by vehicles patrols. As a result of these patrols, 28 livestock-related arrests were made in Ikona WMA, and all who were arrested paid the agreed charge. Six people found in the WMA conducting illegal activities were taken to district court, while eight people were punished using traditional rules. This indicates effective enforcement of conservation rules and by-laws guiding communities on natural resource use in WMAs, and can be an indicator for Ikona WMA success.

Gibson and Marks (1995) argue that the most desirable outcome of community-based wildlife conservation is when conservation incentives work and local residents internalize conservation rules and choose not to hunt, instead enjoying new social infrastructures, jobs, and income offered by the programs. However, findings from community group discussions and interviews with key informants at the village level indicate that the majority of community members felt that the decline of illegal activities and the improvement of conservation in the study area was mainly attributable to increased

enforcement of conservation rules and restriction to natural resource access in the WMA. One village leader, when giving a general view about conservation impacts of Ikona WMA, commented that:

“...of course Ikona WMA has contributed to a decline of poaching in our area. You know village game scouts are patrolling the area daily; otherwise people would keep on hunting and grazing in the WMA because people gain little benefit from Ikona WMA...”

This implies that the benefits the community experiences might not be enough to motivate people to support conservation; rather, restriction and enforcement may account for conservation changes the community perceives in the study area. Similarly, Nepal & Spiteri (2011) noted that conservation incentives should create dependency between conservation and livelihoods in order to not only encourage support for conservation of natural resources, but to create a long-term commitment to wildlife conservation.

Ikona WMA has also had some success in conserving and promoting sustainable utilization of natural resources in the WMA through development of zoning schemes for photography safari and hunting zones. In photography safari zones, tourist hunting activity is not allowed, while quotas are allocated in the hunting zone each year as a way to control over-exploitation of the wildlife in the area. The Ikona WMA general resource management plan (GRMP) for 2011-2015 provides limits of acceptable use of resources in both the hunting and photography zones. The Ikona WMA GRMP indicates that only two permanent luxury tented camps of 30 beds each, and five public campsites are allowed in the photography zone. In the tourist hunting zone, only one company at a time is allocated a hunting block. The company is not allowed to develop more than one hunting camp, and is limited to seven vehicles in any tourist hunting safari. These conditions have been followed to a large extent, and indicate progress in conservation and the sustainable use of wildlife resources in the WMA. However, the increased protection and conservation efforts in the study area have resulted in a significant unintended outcome – a shift of illegal activities, particularly poaching, from outside Serengeti National Park, to inside the park (see Chapter 3). This suggests a need for effective patrols and protection of wild animals inside Serengeti National Park, and in other national parks where community WMAs have been established.

4.5.2 Community Participation and Involvement

Participation of community members in decision making and implementation of decisions is one of the important principles for successful implementation of CBC initiatives that aim to achieve improved conservation and local livelihoods (Thakadu, 2005; Gruber, 2010). With respect to community involvement in the process of establishing Ikona WMA in the study area, findings show that 193 out of 300 households surveyed in the three study villages indicated they were involved in the process of the establishment of Ikona WMA through various general village assemblies. In Nyichoka village, 106 out of 153, and in Robanda 80 out of 88 heads of households were involved. Only 7 out of 59 in Rwamchanga village agreed to be involved in the process (Table 16). Chi-square tests indicated a significant difference ($X^2(2) = 99.507, P < .000$) in the responses across the study villages regarding their involvement in the establishment of Ikona WMA. However, many of the respondents participating in Ikona WMA expressed the view that they had no opportunity to influence the initiation of the WMA; instead they were given information about the idea of the WMA which was already framed by central government, as implied in the following statement from one of the key informants at the village level when responding to the question regarding community participation in the process of Ikona WMA establishment:

“...we were involved in the establishment of Ikona WMA by having information shared with us about the idea already approved by the government. By then there was already a guide which stated equal sharing of WMA benefits among the members. I remember when we were developing our WMA constitution we were told that it must bind to the government WMA regulations and guide. So you can see there was no involvement of community at the initial stages of developing the idea...”

This finding demonstrates that, although community members were involved in the process of establishing the WMA in the study area, the whole idea of Ikona WMA and other WMAs in the country did not originate from communities, and was dominated by top-down decisions rather than from the communities (bottom-up), a condition which may compromise effective implementation. Similarly, Nelson (2007) noted in Tanzania that communities had limited influence over the design of the early community wildlife management projects, which were generally developed as part of a broader set of donor and government conservation objectives and investments. Further, Nelson & Agrawal

(2008) argue that most of the dialogue over wildlife sector reform emanated mainly amongst government personnel and their donor agency, conservation NGO supporters.

Table 16 Community involvement in the establishment of Ikona WMA

Community involvement		Village Name			Total
		Nyichoka	*Rwamchanga	Robanda	
Yes	Count	106	7	80	193
	Expected Count	98.4	38	56.6	193
No	Count	47	52	8	107
	Expected Count	54.6	21	31.4	107
Total	Count	153	59	88	300
	Expected Count	153	59	88	300

Chi-Square Tests $X^2(2) = 99.507, P < .000$

Note: $P \leq .05$ Significant, *Village not participating in Ikona WMA

With regards to community involvement in decision making and achieving improved livelihoods and conservation, Ikona WMA made some progress and communities were participating in various ways (Table 17). Many respondents during interviews and focus group discussions reported participating in decision making mainly through village representatives elected democratically. The village representatives worked with Ikona WMA and made decisions on various issues related to community development and wildlife conservation on behalf of the community members. However, community members reported not often being involved in gaining understanding of the progress of Ikona WMA, particularly about incomes and expenditures of various village development projects and conservation activities.

Participation of community members in conservation activities, such as patrols and protecting WMA boundaries, was mainly carried out by trained village game scouts (VGS) in the study area, while the majority of community members participated in wildlife conservation through providing information about illegal activities in the WMA to VGS or village leaders, by following the conservation rules guiding resource use in the area, and by playing a role in educating each other about wildlife conservation. In comparison, in Rwamchanga village the majority of community members in interviews and group discussions reported that they had not been involved in decision

making or any activities related to wildlife conservation (see Chapter 2). This suggests that community members participating in Ikona WMA were to some extent more involved and participating in wildlife conservation compared to communities not participating.

Table 17 Different ways communities participate in Ikona WMA

-
- Involved in electing village representatives who work with Ikona WMA management in decision making
 - Village game scouts (VGS) participate in wildlife conservation on behalf of community members
 - Participate by following conservation regulations and by-laws
 - Participate by providing information on illegal activities
 - Provide conservation awareness to others
 - Informed rarely about progress of Ikona WMA, particularly income & expenditure
 - No involvement/participation in wildlife conservation (Rwamchanga village)
-

Source: Key informants and group discussions

4.5.3 Community Power over Wildlife Resources and Decision Making

True devolution of power and responsibility from the central government to local communities, especially about decision making, control, and management of wildlife resources, is a key principle for successful implementation of CBNRM (Gruber, 2010). The interview with WMA administrators in the study area revealed that, to some extent, Ikona WMA has some power of decision making and planning. Ikona WMA, through its authorized association, has developed a resource management plan that provides guidance on implementing various conservation and development activities in the area. It also has the power to diversify sources of revenue (a good example was the launch of the Ikona WMA visitor information centre and introduction of the gate entry fee in 2012) as a way to increase Ikona WMA revenues. The association has little spending power over the revenues obtained from tourist investors as their spending depends on the central government WMA benefits sharing guideline.

In addition, the Tanzania Wildlife Act of 2009 and WMA regulations of 2012 provide power for a community authorized association to conduct tourism in a WMA through advertising their hunting quota, evaluating tenders, and negotiating with tourism investors, as well as entering into contractual agreements relating to the utilization of

wildlife resources and investments in the WMA under technical support from district government conservation experts (URT, 2012). This is also evidence; ensuring local communities have the power to participate in decisions related to their WMA, which was not there before the 2012 WMA regulations came out. The management and use of wildlife resources in community WMAs was limited to three years, but the new WMA regulations of 2012 grant more power for community authorized associations to manage and use wildlife resources for a renewable period of five years.

Although the right to use and manage wildlife resource in WMAs is still limited to local communities, this show of commitment by the government of Tanzania to build trust with community WMAs over use and management of wildlife resources is an indicator of progress. However, all decisions made related to investment and activities in a WMA must be first approved by the central government, while the major crucial decisions, such as allocation of hunting quotas, collection of revenue from tourism investors in WMA, and ownership of wildlife resources, remain the responsibility of the central government's Wildlife Division.

4.5.4 Community Benefits Sharing from Ikona WMA

Equitable and fair distribution of benefits among community members is an important condition for effective community-based organizations (Kellert et al., 2000; Gruber, 2010). Ikona WMA has attained some progress toward achieving equitable benefits sharing among the WMA members. The Ikona Annual Report (2012) and the interviews with WMA administrators and village leaders indicate that for the year 2011, 50% of total annual revenues obtained from tourist investors was distributed equally to all five communities participating in Ikona WMA as required by WMA regulations, which is used to support village social service development projects. In addition, the new WMA regulations of 2012 provide guidelines for benefit sharing associated with tourist hunting in the WMA which was not there before (Table 18), thereby introducing a significantly positive change in the legal and governance framework of WMAs in ways that enhance local rights and benefits.

Table 18 Benefit sharing guideline of tourist hunting in WMAs (government and WMA)

Tourism Hunting Fee Category	Tanzania Wildlife Protection fund (TWPF)	Tanzania Government Treasury (TR)	District Council (DC)	Wildlife Management Area (WMA)
Block fee	25%	0	0	75%
Game fee	25%	15%	15%	45%
Conservation fee	25%	30%	0	45%
Observation fee	25%	30%	0	45%
Permit fee	25%	60%	0	15%

Source: URT (2012)

4.5.5 Community Collaboration in Wildlife Conservation

Networks and partnerships are integral to building social capital, and serve as a catalyst to finding innovative strategies and solutions for natural resource management, and may help to support CBC plans and implementations (Gruber, 2010). Ikona WMA has made progress in creating cooperation with private international organizations and government conservation actors in supporting conservation in WMAs. A good example is that Ikona WMA currently has an effective day-to-day direct collaboration with Ikorongo and Grumeti game reserves in anti-poaching operations and protection of the WMA and surrounding game reserves. In addition, the Singita-Grumeti company (a private organization managing Grumeti and Ikorongo game reserves) creates job opportunities and a market for local produce, although most job opportunities were taken by outsiders due to the low level of education of the majority of community members in the study area (refer to Chapter 1).

The Ikona WMA annual financial report for the year 2011 (Ikona Annual Report, 2012), for example, indicates that the Mawala Trust (a private organization) provided Tsh 112,698,359.80 (equivalent to US \$70,436) to support various Ikona WMA activities, and WWF-America provided funds for construction of the Ikona WMA visitor information centre, which was launched in 2012 and is operating under Ikona WMA management. Ikona WMA also obtained technical support from the Frankfurt Zoological Society (FZS) and the district government, particularly during the establishment process and training of village game scouts (interview with WMA administrators), which has enabled the association to take off. All this indicates progress in the willingness and commitment of

Ikona WMA to work and collaborate with other stakeholders in order to achieve their two major goals of conservation and improving community members' livelihoods.

4.6 Challenges Affecting Successful Implementation of Ikona WMA

Although Ikona WMA has been in operation for less than ten years, the findings of this study revealed some indications of success in contributing to wildlife conservation and improved local livelihoods of the communities participating in Ikona WMA in comparison with the community not participating. However, like other CBC initiatives in Africa, Ikona WMA is constrained by a number of factors that affect successful implementation and achievement balance of the dual CBNRM objectives, each of which is addressed in the following sections.

4.6.1 Inadequate Involvement of Community Members

Despite the fact that each village has representative members in Ikona WMA, there was little involvement of local community members in decision making. Decisions were made by village representatives and WMA administrators without communicating those decisions to community members. It was reported by the community members during group discussions and interviews with village leaders that a recent amendment to the Ikona WMA constitution includes increasing the term of leadership from three years to five years. This was done without involvement of or consultation with community members, as indicated in the following comment by a key informant at the village level reflecting a concern of the majority of community members participating in this study:

“WMA leaders make decisions without community members' authority...before our WMA constitution allowed leaders to stay in power for three years, after which the community will elect new leaders and amend the constitution if necessary to do so, but now WMA leaders have amended the constitution and extended leadership duration from three to five years without participation of community members...”

This indicates a lack of or inadequate involvement of community members in decision making, contrary to WMA regulations and the Ikona WMA constitution which require all decisions made by WMA management to be shared with community members through their village representatives. The majority of community members interviewed and participating in group discussions revealed that instead of village representatives linking community members and Ikona WMA management, representatives worked for

their personal and WMA management interests as opposed to community interests. This affects the majority of community members who fail to know the decisions made and the progress of their organization. Similarly, Mfunda & Røskoft (2011) noted that in Serengeti National Park a lack of community participation in decision making was due to inadequate linkage between the Wildlife Division, District Councils, and village governments in planning and implementing CBC outreach projects.

A lack of regular feedback from Ikona WMA management to the community members through village representatives creates poor relationships between community members and Ikona WMA administrators. A good example, provided by a key informant in Robanda village and WMA administrators, was that WMA administrators failed to attend village council meetings when invited, and WMA social economic committees were chased away when trying to bring feedback to the local community in Robanda village, respectively. This indicates mistrust of their WMA administrators and poor relationships existing between the WMA management and the local community, a condition that may affect local support for the WMA.

At the village level, social development projects funded by Ikona WMA lack participation of community members in planning and implementation. As a result, these projects fail to meet community needs and interests, as well as hindering effective community participation in monitoring development projects. This was demonstrated in the following comment made by a focus group member during discussions about their involvement in decision making about village social development projects.

“...we are not involved in deciding what kind of projects we need; we see our road is bad, and access to water is a big problem in our area, but village leaders keep on spending WMA money to construct school classes only, and nobody cares about access to water...”

This is also evidence that, at the village level, leaders have given little consideration to prioritizing and addressing the immediate needs of the community members because of a lack of participation of community members in designing the types of social development projects they prefer, or those that are agreed upon by the majority of community members.

4.6.2 Insufficient Power in Crucial Decision Making

The Tanzania Wildlife Policy of 1998 (revised in 2007) devolved power to communities adjacent to PAs to manage and utilize wildlife resources through the establishment of WMAs. However, the degree of community authority for wildlife management remains limited. For example, the wildlife policy of 2007 and the Wildlife Act of 2009 still retain state ownership of wildlife resources, and thus the community authorized association lacks a sense of ownership and power over wildlife resources in the WMA. This supports the findings of Alcorn et al. (2002) that in Tanzania, the central government continues to retain the lion's share of power over natural resources, and is reluctant to transfer resource ownership to local communities. Ikona WMA also lacks power to collect revenues from tourism investors. Instead, the central government of Tanzania agency has been given that responsibility contrary to the WMA regulations of 2012, which require the community authorized association to collect revenues and remit fees to relevant government authorities, as indicated in the following statement of a WMA administrator when responding to the question regarding challenges affecting implementation of Ikona WMA:

“...we don't have power to collect our revenues from investors in WMA, and CITES (Wildlife Division agency) is responsible for collecting revenues from our investors...we only participate in negotiating and signing contracts with investors, but the final decision remains to the government...”

This is also evidence of top-down control over community benefits from wildlife resources. WMA regulations require all investments in WMAs to be centrally approved by the Director of Wildlife, and little influence on hunting blocks and quota allocation is granted to local communities. Due to this lack of power, Ikona WMA sometimes faces interference in its decision making from political leaders at district and national levels, as explained in the following comment from a key informant WMA administrator:

“...Ikona WMA is an independent community organization and we have the right to make our own decisions, but political leaders, especially from the district (Serengeti) and even at the national level, want to dictate and be the final decision makers for our plans. For example, WMA council can approve some sources of income and expenditures, but sometime the district authority interferes and disapproves our decisions...”

This suggests that, although communities have been given some power to plan and make decisions about their WMA, in practice Ikona WMA is not free to make its own

decisions and has limited power over important decisions. Similarly, Shauri (1999) noted that the wildlife policy in Tanzania fails to grant complete power to local communities over ownership and control of wildlife resources, and thus makes CBC unrealistic, as the state continues to retain control over wildlife resources. This also supports Kangalawe & Noe (2012) arguments that the limited power granted to local communities participating in WMAs, in particular the lack of control over WMA revenues and power of making crucial decisions about wildlife, makes the role of community WMAs in addressing rural poverty and improving local livelihoods unsustainable in the long run.

4.6.3 Low Level of Education and Qualified Staff

In the study area, more than 80% of the respondents at the community level had acquired only primary education (see Chapter 2). This suggests that low levels of education may prevent community members from participating in tourism activities and pursuing job opportunities available from Ikona WMA and other tourism investors. Community members also lack entrepreneurial skills that could help them to engage in tourism businesses and income-generating activities to improve their livelihoods. As well, no effective conservation education is provided to local communities. Mbaiwa (2004) argues that, because of this lack of entrepreneurial skills, instead of communities being managers or being in the forefront in developing community-based tourism, most of the participating community members become labourers and landlords who wait to receive money from investors.

Ikona WMA also lacks professional people who can provide technical support for their day-to-day activities. A good example was provided by the Ikona WMA committees responsible for planning, including the social services committee, financial committee, tourism committee, security and conservation committee, and disciplinary committee. These committees are comprised of village representatives elected from each village participating in Ikona WMA who mostly have no professional skills, leading to poor decisions, as illustrated in the following statement made by a key informant administrator when responding to the question regarding challenges affecting Ikona WMA:

“...a big problem is the low level of education of the majority of even my staff members, so when it comes to decision making it becomes very difficult for them to

come up with constructive ideas. Politics also interfere; even those who are educated make wrong decisions that do not favour development of Ikona WMA and communities as a whole...”

To a large extent, a lack of professional and skilled labour contributes to ineffective planning and decision making in Ikona WMA. The lack of professional skills and labour is partly attributed to the general resource management plan (GRMP) and constitution, which both emphasize recruiting staff from local communities, the majority of whom have a low level of education, to fill professional posts. Therefore, there was no consideration given to recruiting a few external professional staff to help with planning in collaboration with members of Ikona WMA administration. This lack of skilled labour poses a challenge for the effectiveness, performance, and outcomes of the WMA and its ability to fulfill its objectives.

4.6.3 Unequal Distribution of Benefits from Ikona WMA

Thakadu (2005) noted that people will conserve and manage resources only when they perceive that those resources contribute positively to their quality of life. Findings from the key informant interviews and group discussions in the study area show mixed perceptions about the sharing of Ikona WMA revenues among the village members (see also Chapter 2). In Robanda village, for example, the majority of community members expressed dissatisfaction with current sharing of Ikona WMA revenues due to the fact that much of that revenue was obtained from tourism investors concentrated in the WMA photography zone located in Robanda village. In addition, a large portion (72%) of Robanda village land (based on the village land use plan) is dedicated to the WMA, but the village has been receiving equal revenue shares with villages such as Nattambiso and Park Nyigoti, which contributed small amounts of land for wildlife conservation. This is a result of current WMA regulations that require equal sharing of revenues among Ikona WMA members. This created complaints and dissatisfaction of community members in Robanda village, as indicated in the following statement from a key informant in Robanda village:

“...you can't imagine Robanda is getting an equal share with Park Nyigoti and Natta villages, which contributed small amounts of land for conservation and have no tourism investors on their village lands. This is unfair, and each village should earn based on what they have contributed...”

In Nyichoka village, where there are no tourism investors, community members expressed satisfaction with the current equal benefit sharing policy. This suggests a mixed local community feeling about equal benefits sharing between the villages participating in wildlife conservation. This calls for the need for a benefit sharing formula or criteria that would be acceptable to all community members participating in Ikona WMA in order to build unity among members and motivate communities to support wildlife conservation.

In addition to the fact that much of the Ikona WMA benefits were directed at the community level, with minimal or no benefits directed to households or individuals, there was also unequal distribution of community services within the villages (see Chapter 2). Most of the physical structures, including school classrooms, clinics, and water holes, are concentrated in one part of the village. This leaves many members without services or unable to access those services, especially those who are at the edge of Ikona WMA. Similar findings were noted by Mbaiwa (2004) in Okavango Delta, Botswana, where poor distribution of benefits at the community level threatened the sustainability of CBNRM efforts. Without equal distribution of benefits at the village level, it will be difficult for community members, particularly those residing close to WMA boundaries, to realize conservation benefits and be motivated to support wildlife conservation in the study area. Further, dissatisfaction with the benefit sharing model was also expressed by WMA administrators who reported that they have been receiving little revenue and that much of that revenue, particularly revenues associated with tourism hunting in the WMA, were taken by the central government. This sentiment was expressed in the following statement by one WMA administrator:

“...what we are getting now is just peanuts; we are only receiving 65% of total revenue from photography fees and 45% of total revenue associated with hunting tourism fees, and the rest goes to the central government, so you can see we still lose much of our revenue from hunting tourism...”

This indicates the persistence of top-down control of community revenues, a feature likely to make WMAs less successful in management of wildlife resources and development of community interest in and support for conservation. Although the government of Tanzania, through WMA regulations of 2012, has improved benefits related to tourist hunting in WMAs, a large portion of revenues from game fees, as well

as the total conservation, observation, and permit fees, are collected by and remain with the central government (see Table 17), which indicates government control of the benefits associated with tourist hunting activities in WMAs. This supports the comments of Nelson & Agrawal (2008) that as long as central actors still capture benefits from commercialization of wildlife in Tanzania (through tourist hunting concessions), true devolutionary reforms are less likely to occur.

4.6.4 Inadequate Collaboration with other Conservation Stakeholders

Although small gains have been made for Ikona WMA to collaborate with Ikorongo-Grumeti private tourist investors in wildlife conservation, interviews with WMA administrators and conservation experts indicate insufficient direct collaboration and linkages with other conservation actors in the study area, including Serengeti National Park (SENAPA), Ngorongoro Conservation Area Authority (NCAA), Frankfurt Zoological Society (FZS), and Serengeti District Council. These groups could provide both technical and financial support to Ikona WMA to ensure that it is effectively contributing to both conservation and improved local livelihoods in the study area.

Insufficient support from other conservation actors in the study area has been partly due to Ikona WMA administration's failure both to seek technical and financial support and to communicate their needs. There is a need particularly for managerial skills, marketing, security, training more village game scouts, and to raise conservation awareness and entrepreneurial skills. This would contribute to increased wildlife conservation and improved local livelihoods. Gruber (2010) suggests that collaborative partnerships and networks are integral to building social capital, and serve as a catalyst to finding innovative strategies and solutions, and supporting implementation of CBC initiatives.

4.6.5 Insufficient Transparency, Accountability, and Financial Monitoring

Transparency and accountability of leaders are important elements in building community members' trust (Thakadu, 2005; Gruber, 2010; Lockwood, 2010). However, there was insufficient transparency of the Ikona WMA administration, particularly regarding the details of revenues and expenditures. It was reported during the interview with village leaders that the WMA revenues distributed to each village lacked details of

the actual amount Ikona WMA received from tourism investors. This has prevented community members from understanding the basis of their village share from Ikona WMA. In addition, there was no regular financial reporting on incomes and expenditures of Ikona WMA to the communities, as required by the WMA regulations. This was expressed by the majority of community members in the study area, as demonstrated in the following statement from one village leader:

“...we agreed that WMA administrators should provide progress reports including income and expenditures to the community members every three months. However, WMA administrators delayed so much they usually provided only annual reports. This makes it difficult for community members to follow up and know exactly the progress of Ikona WMA...”

Regarding accountability of Ikona WMA administration, five out of eight community group discussions conducted in the study area reported that the administration was not accountable to them, as most of the issues related to their organization were directed to the Serengeti District Office and Wildlife Division. A good example was the amendment of the Ikona constitution extending terms of village representatives from three years to five years. This was done between district officials and WMA administrators without consulting the community members. It was also pointed out by village leaders that WMA administrators were closer to district officials than to the communities, a condition that created negative relationships, as illustrated in the following comment from a village leader which reflects the feelings of the majority of community members:

“...there is not a good relationship between village leaders and WMA leaders; several times we invited WMA leaders to attend our general village assembly so they can hear complaints from community members about Ikona WMA, but they have never come to our meetings and our village representatives are not bringing any feedback to the community members. Surprisingly, WMA leaders consult more with the district office than with community members...”

This suggests that village representatives and WMA administrators fail to recognize that they are accountable to village members and should serve the interests of the community. As a result, many community members interviewed and participating in group discussions had a feeling of Ikona WMA being run by central government through the District Office, rather than by the community.

There was also insufficient monitoring of the village development projects funded by Ikona WMA at the village level in terms of whether the projects met engineering

structural requirements, the amount of money spent on a particular project, and whether the standard of the building reflects the actual amount allocated for the project, as explained in the following statement from one WMA administrator:

“...benefits accrued from WMA are distributed equally to each village participating in the wildlife management area, but at the village level there is no mechanism for accounting or monitoring expenditures, and to know whether the amount they received reflects the village development project...”

This implies that there is a lack of a system to follow up on various social development projects funded by Ikona WMA, a condition that may lead to financial leakage and the community being left with substandard social development projects.

Ikona WMA lacks an effective system to manage the operations of tourism investors, particularly for monitoring numbers of tourists and nights they spend in camps, thus preventing WMA administrators from knowing whether the revenues they have been receiving are an accurate reflection of what they were owed. A similar situation was noted by Thakadu (2005), who observed that local communities viewed government conservation agencies as institutions that deny their rights to utilize and enjoy their own resources. Thus, building mutual trust between partners is necessary for effective community wildlife management in the study area. In addition, community members pointed out that there was no effective auditing of Ikona WMA. The auditing was often carried out by the district auditor, who is not independent and can be easily influenced to serve the interests of Ikona WMA administrators and district leaders rather than community members. This was reported by a key informant at the village level when responding to the question regarding challenges of Ikona WMA, as indicated in the following statement:

“...Ikona WMA leaders often work with the district office, at the same time the district office is responsible to audit Ikona WMA. Do you think there is good and fair auditing?...”

This suggests a lack of trust of community members towards the district office, and a need for Ikona WMA to ensure that auditing is carried out by an independently registered auditor approved by Ikona WMA council in order to be more transparent and build the trust of community members.

4.6.6 Insufficient Conservation Equipment and Ecological Monitoring

Insufficient conservation equipment such as vehicles, weapons, and radios, which can facilitate protection and maximum patrol of Ikona WMA, poses challenges to conservation. In addition, village game scouts are not allowed to use guns to deal with and defend themselves against poachers, who sometimes use automatic weapons, as explained by a WMA administrator in the following statement:

“...we have trained our village game scouts, but we don't have guns to help them defend against poachers with strong weapons. They can only call police or TANAPA for assistance when facing such challenges...”

Although it is important for Ikona WMA to be allowed to own weapons, this would require a clear assessment of their capacity to store and use the weapons in a safe way to avoid misuse of guns for unintended purposes. Continuing to build the capacity of village game scouts is important to ensure that they have the appropriate skills to be allowed to use guns.

Ikona WMA lacks experts to conduct ecological assessments. The village game scouts, who are responsible for recording and observing changes in the WMA, do not have the skill or the appropriate data sheets or instruments to record the changes. Ikona WMA has been depending on ecological assessments based on periodic data from animal surveys in Ikorongo and Grumeti game reserves. Clear and periodical ecological monitoring is essential for Ikona WMA to ensure that their conservation objective is achieved. USAID (2009) noted that it is important for CBC to design ecological and resource monitoring to ensure that conservation goals are achieved.

4.6.7 Increase of Livestock, Wildlife, and Human Populations

Increasing livestock and human populations pose challenges in the study villages, including shortages of grazing and farm lands. As a result, land allocated for village forest reserves has been encroached upon for settlement and used for grazing, contrary to the village land use plans. Increased livestock numbers have also increased pressure and demand for wildlife resources, particularly in Ikona WMA. For instance, one WMA administrator reported that in the year 2011 alone, 28 huge herds of livestock were found grazing in Ikona WMA and more than 288 snares were found in the WMA. This indicates demands for grazing land and bush meat in the study area, which creates threats

to wildlife resources. Rentsch (2012) noted that, despite recent heavy investment in anti-poaching and efforts to improve detection rates for poachers, demands for bush meat remain high in Western Serengeti and are unlikely to be deterred by anti-poaching alone as households continue to search for cost-effective protein sources.

Insufficient and invisible beacons installed to mark Ikona WMA boundaries also might contribute to livestock grazing in the WMA and neighbouring Ikorongo and Grumeti game reserves. According to the Ikona WMA Annual Report for 2011, out of 126 beacons required in the WMA hunting zone, only 13 had been installed, indicating insufficient marking of WMA boundaries. Additionally, local community members, particularly those who live adjacent to Ikona WMA boundaries (for example, members from Nyigoti and Songambebe in Nyichoka village, and Machengere, Mereshi, and Momorogoro in Robanda village), complained that the beacons installed were too small to be visible, especially during the wet season when tall grasses emerge. Similarly, in Rwamchanga village, particularly community members from Kilimo A in the Nyasirori area and Maendeleo, expressed the same problem of difficulty in recognizing the Ikorongo and Grumeti game reserves boundaries. As a result, they found themselves crossing the border and grazing in WMA or in game reserves without being aware. This was reported in the following statement from a member of a group discussion in Nyichoka village:

“...there is no mark showing WMA boundaries, and sometimes people find they are grazing in WMA without knowing it...”

This suggests that, to ensure the protection and safety of Ikona WMA, there is a need for WMA administrators to raise awareness about the boundaries, and ensure that visible markers or beacons are installed to avoid encroachment in the WMA and conflicts with community members, especially livestock keepers in the study area.

Also, the success of conservation efforts in the study area has resulted in increased animal problems, especially elephants. This negatively affects communities' livelihoods, limits access to basic natural resources, especially fuel wood and grazing and farm lands, and creates conflicts and bad relationships between communities and park management, especially in Rwamchanga village (see Chapter 2). Efforts should be made by Ikona WMA and other wildlife conservation actors in the study area to ensure that wildlife

conservation provides alternative livelihood strategies to local communities participating in the WMA. In addition, Ikona WMA should ensure that individuals and household members experience substantial benefits from wildlife conservation, while compensation or consolation should be considered for community members who suffer from problem animals in order to cultivate and maintain community trust and interest in Ikona WMA.

4.7 Conclusions and Recommendations

The implementation of CBNRM and its outcomes varies from one place to another depending on context and location of particular areas (Rotha et al., 2005). This case study of Ikona community WMA in Western Serengeti, Tanzania demonstrated positive progress towards meeting some requirements for successful implementation of CBNRM identified by scholars and other observers (Gruber, 2010; USAID, 2009; Murphree, 2009), which should be recognized despite a number of challenges faced by Ikona WMA identified in this study. Community participation in decision making through village representatives, and involvement of village game scouts in wildlife conservation, are fundamental steps to ensure participation of local community members in Ikona WMA, which in turn leads to success in both livelihood improvement and conservation.

True devolution of power from central government to local community over control, ownership, and management of wildlife resources is a key principle of CBNRM to enable local communities to benefit, and to protect their interests and assets (Thakadu, 2005; Boudreaux & Nelson, 2011). The experience of Ikona WMA indicates that, although there is some progress toward devolution of power to local communities, to a large extent the WMA authority has limited power, particularly in crucial decision making over wildlife resources in the WMA. The central government of Tanzania, through the Wildlife Division, still retains power over ownership of wildlife resources, allocation of quotas, and collection of revenues generated in Ikona WMA. This demonstrates top-down control over community benefits from wildlife resources, which does not promote local community power – a key principle for CBNRM.

Adams & Hulme (2001) point out that CBNRM is characterized by the desire to integrate conservation with improvement of local livelihoods, because if they could be simultaneously achieved, the interests of both could be served (Berkes, 2004). On the

basis of the above discussion, the study shows Ikona WMA to be an effective protected area governance model that has demonstrated several valuable contributions to improving wildlife conservation and local livelihoods, although much improvement is needed to ensure sound conservation and local livelihood benefits. This finding contradicts the Nkhata & Breen (2010) study in Kafue Flats Zambia, where CBNRM efforts were largely unsuccessful in contributing to conservation and local livelihoods. However, much of the positive impact of Ikona WMA was based on improving wildlife conservation by reduction of illegal activities, increase of wildlife numbers, improvement of wildlife habitats, and increase in wildlife protection and the willingness of community members to provide information about illegal activities in the study area. Livelihood benefits experienced by communities participating in WMA were mainly improvements in social infrastructure, including construction of school classrooms, health clinics, teachers' houses, and construction of water dams locally known as "Marambo" for livestock, having little or no impact on household or individual levels of material well-being.

This study provides a number of recommendations that may help to ensure that Ikona WMA strengthens both conservation and livelihood benefits. First, broad level participation of community members in decision making and wildlife conservation is important to ensure that the voices of the majority of community members are heard. This can be achieved if the village representatives in Ikona WMA strengthen the link between the community, village councils, and WMA administration. In addition, Ikona WMA administrators and village representatives should promote joint discussions with the majority of community members, and consider their views and positions in village and Ikona WMA plans, while at the same time promoting active participation of local community members in the decisions affecting their lives.

Second, the Wildlife Policy, Acts, and WMA regulations should grant complete power to community WMA authority, including ownership and crucial decision making over wildlife resources in their respective WMAs, which must go along with enhancing local community skills related to wildlife conservation. Spiteri & Nepal (2006) noted that without fostering such ownership, conservation objectives and outcomes have little meaning to local people and in turn lead to negative consequences for biodiversity. In addition, Ikona WMA and other conservation actors in the study area should provide support by promoting conservation education in local communities, training WMA

administrators, providing security, and recruiting professional staff to work with Ikona WMA committees. This would strengthen local capacity and effective cooperation in wildlife management in the study area. Introduction of a conservation and environmental education committee in Ikona WMA could provide sustainable conservation education to its members and neighbouring communities. This would help to raise awareness about WMA boundaries, thus contributing to minimizing the pressure on wildlife resources and encroachment in the WMA.

Fostering equal distribution of conservation benefits at the village level is important to create fairness among community members, particularly those at the WMA boundaries who suffer most from problem animals compared to communities distant from Ikona WMA borders. In addition, there is a need to re-examine a benefit sharing formula that would be acceptable to all community members participating in Ikona WMA to ensure that all village members provide support to wildlife conservation. Further, Ikona WMA should ensure that individuals and household members experience benefits from wildlife conservation through introducing alternative income-generating activities that are environmentally friendly and micro-financing to empower the local community financially, and promoting cultural tourism which will contribute to self-employment and add income to individuals and households. Finally, compensation or consolation for community members who have suffered from wildlife should be considered in order to stimulate the interest of local communities in wildlife conservation in the study area.

Chapter 5

Conclusions

“Community-based natural resource management in Africa remains the viable option for an effective human stewardship of most of African landscape” (Murphree, M.W., 2009, p. 2553)

5.1 Introduction

This thesis focuses on the effectiveness of Ikona WMA in contributing to wildlife conservation and improved local livelihoods at community and household levels in Western Serengeti, Tanzania. To contribute to this overall goal, this study set three specific objectives.

- i) To examine local community members’ and wildlife conservation experts’ perceptions of livelihood benefits attributed to Ikona WMA at community and household levels.
- ii) To assess local community members’ and wildlife conservation experts’ perceptions of conservation impacts attributed to Ikona WMA.
- iii) To determine the success and challenges of implementing Ikona WMA as an example of community-based natural resource management (CBNRM) and to suggest areas for improvement.

This concluding chapter reviews the key findings based on the objectives of this study. It also provides recommendations, identifies contributions of the study to knowledge in the field, and suggests further research questions.

5.2 Summary of Key Findings

The study reveals that a majority of community members in the study area had a low level of education (82% reported having only primary education) and have limited access to financial resources, both of which impeded them from entering into various tourism opportunities or alternative income generating activities that could help to improve individual and household incomes. Spiteri & Nepal (2006) argue that a lack of education among community members can lead to local confusion and misunderstanding about the purpose and intentions of conservation initiatives such as community-based conservation (CBC). Employment opportunities in Ikona WMA are limited to a few individuals,

mostly village game scouts (VGS), while most jobs created by tourist investors in the WMA are captured by people who do not originate from communities participating in the WMA. This supports the findings of Emerton & Mfunda (1999) which show that employment in tourist-related enterprises is negligible in the Western Serengeti because most employees originate from outside the area.

Findings from this study indicate that community members participating in Ikona WMA recognized more benefits at the community level compared to those not participating. These benefits focused on improved community social services (e.g., construction of school classrooms, teachers' houses, water supply, and health clinics). However, no significant direct benefits to individual community members or households were recognized. The community social services, although important, may not be sufficient for community members, who previously had been heavily dependent on natural resources, to support wildlife conservation. This supports the argument of Igoe (2006) that for people who were previously heavily dependent on resources near protected areas (PAs), it is unlikely that these benefits will offset the livelihood cost of conservation and motivate communities to support conservation.

This study revealed varied, mixed, and sometimes conflicting perceptions among community members, WMA administrators, and wildlife conservation experts about the contribution of Ikona WMA to improving household incomes, access to natural resources in the WMA, and community services in the study area. Community members participating in Ikona WMA and wildlife conservation experts in the study area believed that no benefits from the WMA were accrued to individuals or households. However, Ikona WMA administrators believed there were indirect benefits at the household level, such as employment opportunities, elephant control to avoid damage to farms, community members' retention of household income for other family needs instead of contributing to village social development projects funded by Ikona WMA, and education scholarships for some students from the poorest families.

Further, in all three study villages, community members perceived conservation efforts as limiting access to basic resources such as fuel wood, grazing and farm lands, and occasional access to bush meat, while WMA administrators and conservation experts see that community members are allowed to access basic resources under special permits. The variation in community members' perceptions about access to natural resources and

community services was revealed also within and across the study villages. The diversity of perceptions found in this study supports the findings of Heck et al. (2011) that different conservation stakeholder groups have distinct perceptions, opinions, views, and expectations of conservation outcomes.

Findings of this study show that the majority of community members from the three study villages, WMA administrators, and wildlife conservation experts all had positive perceptions about the establishment of Ikona WMA in the study area (see Chapter 3). However it was interesting to find that, while the community not participating in Ikona WMA (Rwamchanga village) had positive perceptions about its establishment, the majority of community members in the village expressed negative attitudes towards wildlife, indicating that positive perceptions of community members about WMAs may not always influence attitudes towards wildlife and PAs. These findings oppose Allendorf (2007), who reports that positive perceptions of community members play a significant role in influencing positive community attitudes towards PAs.

As opposed to the prevailing literature on CBNRM in Africa (such as Gibson & Marks, 1995; Nkhata & Breen, 2010), which revealed that in some community conservation programs there has been no decrease in wildlife poaching rates compared to before inception of the programs, this study demonstrates success in reducing illegal activities, particularly bush fires, poaching, and the frequency of grazing in Ikona WMA. The majority of respondents, including conservation experts, indicated a decline in poaching, an increase of some wildlife species, and an improvement of habitats in the study area since the establishment of Ikona WMA (see Chapter 3). However, these positive conservation impacts have largely been attributed not to conservation incentives for local communities, but rather to the increase of restrictions to access of natural resources, to enforcement of conservation rules, and to the increase of wildlife protection in the study area. Furthermore, this study reveals that while community members and WMA administrators associate conservation impacts with Ikona WMA, the wildlife conservation experts in the study area had mixed perceptions, and attribute conservation changes observed in the area not to Ikona WMA exclusively, but also to other conservation interventions in the great Serengeti ecosystem.

Conservation success outside of the protected area has led to increased numbers and incidents of problem animals, which affect local community livelihoods.

In Rwamchanga village, for example, an increase in problem animals and conflicts over access to natural resources, especially grazing land and water in the conservation area, has led to a negative relationship between community members and Ikorongo and Grumeti game reserves. Similarly, Songorwa (1999) noted in Selous Game Reserve in Tanzania that an increase in wildlife in the area created more problems for community livelihoods than before the establishment of a community conservation program.

The findings of this study demonstrate that Ikona WMA has been effective in contributing to both conservation and local livelihoods, particularly at community level. It has been able to generate significant income from various fees related to tourism investments to support conservation activities and community social service development projects in the study area, a condition necessary for effective community-based conservation (CBC) (Adams & Hulme, 2001). This supports Baldus' (2009) argument that CBC is still a viable option to link the goals of conservation and improvement of local livelihoods. However, Ikona WMA presents greater positive conservation impacts than livelihood benefits to local communities, especially at the household level.

This study found that Ikona WMA has attained some level of involving community members in decision making through village representatives from the five member villages. However, many decisions are not communicated to the majority of local community members in the study area, a condition that indicates a weak connection between WMA administrators, village councils, and the community. At the village level, community members were not involved in planning and deciding on social development projects funded by Ikona WMA, and as a result some community social service projects failed to reflect local community priorities. This supports similar findings by Vedeld et al. (2012) from Mikumi National Park in Tanzania, where decisions about community projects also do not always reflect local priorities. This indicates low involvement of community members in decision making and a lack of full participation in designing and implementing community social development projects, a feature that fails to adhere to the principles of the CBC approach (Gruber, 2010).

The findings indicate little achievement towards devolution of power from the state to local communities, particularly over planning, spending, and income generation through diversifying sources of revenue. Power over ownership of wildlife resources and crucial

decision making, such as setting quotas and collecting revenues from tourism investors, is still dominated by the central government of Tanzania through the Wildlife Division.

In terms of benefit sharing, Ikona WMA has also ensured that each WMA member village receives an equal share of revenue obtained from tourism investors, which is an important condition for successful implementation of CBNRM (Gruber, 2010). Equal sharing of benefits is important to create equity and motivate village members to continue to support wildlife conservation (Thakadu, 2005). However, findings revealed that community members in Robanda were dissatisfied with equal benefits sharing of revenues from Ikona WMA (see Chapter 3).

Ikona WMA has made progress in collaborating with Ikorongo and Grumeti game reserves to protect wildlife and work with traditional leaders to enforce conservation rules. However, there is a weak connection between Ikona WMA and other conservation actors in the study area such as Serengeti National Park (SENAPA), Ngorongoro Conservation Area Authority (NCAA), and Frankfurt Zoological Society (FZS).

Findings of this study reveal that a major weakness of Ikona WMA is insufficient power of community members to own and control wildlife resources, to make crucial decisions about wildlife resources including quota allocation, and to collect revenues from tourism investors. In addition, the right to manage and use wildlife is limited to five years. As this power is retained by the central government, it indicates the persistence of top-down control over wildlife resources and community benefits, a feature that does not promote a sense of community resource ownership and flies in the face of the principles of CBC. This supports the findings of Murphree (2002) and others that most CBC in Africa lacks the critical ingredient for success, true devolution of authority and responsibility to local communities. Government agencies have retained ultimate power to shape objectives and control benefits in the WMA.

This study reveals a number of challenges constraining successful implementation of Ikona WMA. These include inadequate involvement of community members at the village level, low levels of education, and inadequacy of professional staff. In addition, unequal distribution of benefits at the village level, and insufficient support and cooperation from other conservation actors in the study area, such as SENAPA, FZS, NCAA, and the district council, are significant challenges. Further, insufficient financial transparency, monitoring of WMA activities and social service development projects at

the village level, lack of accountability of WMA administrators to local communities, increase of livestock populations, inadequate conservation equipment, and lack of or insufficient WMA boundary markers all represent significant challenges.

5.3 Recommendations

This study indicates notable achievements of Ikona WMA in contributing to improved conservation and local livelihoods at the community level. There are, however, still mixed perceptions across the villages and between community members, WMA administrators, and conservation experts concerning the success Ikona WMA has attained. This suggests some avenues for improvement and further research. Although this study is based in Ikona WMA, there are some lessons learned that can be applied to other WMAs in Tanzania and CBNRM initiatives elsewhere, as outlined below.

It is important to ensure that individuals and household members of the communities participating in wildlife conservation realize direct benefits to their livelihoods and to motivate their interest in wildlife conservation. This can be achieved by introducing alternative income-generating activities that are affordable and environmentally sound, such as beekeeping and raising indigenous chickens. Also, the introduction of micro-financing would enable community members to access financial resources and promote cultural tourism, which would contribute employment and income to individuals and households. These would go along with improving the educational level of local communities to help them capture opportunities that arise in their local environment.

Conservation benefits from CBC like Ikona WMA should go beyond monetary benefits and include access to basic natural resources that are crucial to support local community livelihoods. In addition, increases of livelihood benefits from wildlife conservation are likely to influence more positive perceptions and attitudes of community members towards wildlife conservation in the study area and elsewhere.

Fostering equal distribution of conservation benefits, especially community social service development projects at the village level, is important to create fairness among community members. It is equally important for residents living at the PA boundaries, who suffer most from problem animals, to be given priority for social services to develop positive perceptions and attitudes towards wildlife conservation.

The criterion used to determine equal revenue sharing among villages participating in Ikona WMA should be re-examined, particularly taking into account the amount of land each village has committed to wildlife conservation. This can be done by ensuring that all village members participating in Ikona WMA come together and agree on criterion for revenue sharing. This will help to reduce grievances among community members, and may motivate all members of Ikona WMA to support wildlife conservation.

Protected area managers and Ikona WMA administrators need to find ways to control problem animals, especially elephants, in the study area, and consider compensation or consolation funding for those who have been affected by this problem. This may help to improve negative perceptions and attitudes by the community towards wildlife conservation, to build community interest in wildlife conservation, and to foster good relationships between the community and protected area managers, especially in Rwamchanga village.

This study suggests that broad level participation of community members in decision making and wildlife conservation is important to ensure that the voices of the majority of community members are heard. This will ensure that community member' views, values, and positions are considered in village and Ikona WMA plans, while also promoting active participation of local communities in the decisions affecting their way of life. This can be achieved in the study area if the village representatives in Ikona WMA strengthen the links between village members, village councils, and WMA administrators. Also, village councils and the WMA administration can ensure that all crucial decisions made, such as stopping resident hunting, signing contracts with tourism investors, and constructing village social development projects, are communicated to the community members before their final approval for implementation.

It is important for other conservation actors in the study area, such as Serengeti National Park (SENAPA), Wildlife Division, Frankfurt Zoological Society, Serengeti district council, and private tourist investors, to strengthen collaboration with local communities to improve local community capacity by promoting conservation education, providing financial resources for conservation and local development, and providing technical advice and training of WMA staff members and village game scouts.

Increases of livestock populations in the study area present challenges to Ikona WMA. To reduce conflict with community members, especially pastoralists who

sometimes enter and graze unintentionally in the WMA, there is a need for Ikona WMA administration to ensure that boundaries are marked and are visible throughout the year. It is also important for Serengeti district council, in collaboration with village councils, to find mechanisms to reduce growing livestock populations in the study area to ensure the survival of wildlife resources.

The findings of this study (refer to Chapter 3) revealed that some game rangers accept bribes to allow illegal grazing in Ikorongo Game Reserve in Rwamchanga village, and occasional poaching in the WMA is organized in secret by some community members in collaboration with disloyal village game scouts. It is essential for WMA administrators and park managers to monitor village game scouts and rangers, respectively, to ensure they work according to their professional ethics and do not become part of the problem.

Serengeti National Park Management needs immediate attention against poaching in the national park through more intensive protection and enforcement of laws and regulations inside the park. This will help to avoid shifting illegal activities from surrounding PAs to inside Serengeti National Park and other PAs where community-based wildlife conservation has been established in order to ensure that wild animals remain safe both within and outside PAs.

The government of Tanzania through the Wildlife Division has to ensure that complete power is devolved to the local community over ownership and crucial decision making on wildlife resources under CBC. The government has to remain with the overseeing responsibility, providing technical support to the local communities along with building community capacity, instead of directly engaging with CBC activities.

5.4 Limitations and Contributions of the Study

There are two major limitations of this study. First, seven years of Ikona WMA operation in the study area might be too short to reveal changes in community livelihoods and conservation impacts that can be attributed to it. Second, since the study is based on a case study, Ikona WMA in the Western Serengeti, there are limited generalizations from the findings.

However, this study does add to the debate about whether CBC can contribute to both improved conservation and local livelihoods. In addition, it contributes an understanding of the way in which local communities interact with PAs in this particular context in

Tanzania. This study also contributes important information for Tanzania wildlife policy and decision makers, Ikona WMA administrators, and other conservation actors in the great Serengeti ecosystem that should improve wildlife conservation efforts and contribute to the successful implementation of WMAs in the country, and other CBC initiatives elsewhere.

5.5 Further Research Direction

Findings from this study raise further research ideas that can continue to build a greater understanding of wildlife conservation impacts and livelihood benefits attributed to community wildlife management areas in Tanzania and CBC initiatives elsewhere.

Further research ideas include:

- to assess and compare conservation impacts, and livelihood outcomes in different WMAs to determine best practices that can be adapted to WMAs in Tanzania and related CBC elsewhere;
- to explore alternate revenue sharing formulas that address the grievances among community members participating in Ikona WMA, including whether the size of land each village dedicated for wildlife conservation can provide more equitable revenue sharing among WMA members and whether a single revenue sharing formula can be applied to other community-based WMAs, or whether they need to be customized for each WMA;
- to explore whether benefits that communities accrue from wildlife conservation can have potential side effects, such as an increase in human immigration to a region or particular community, and an increase in livestock populations in and around a WMA and other PAs where community-based wildlife conservation has been initiated;
- to assess the effects of inequality in distribution of benefits, particularly social services development infrastructures at the village level, to wildlife conservation;
- to determine the best ways in which the majority of local community members participating in CBNRM can be involved so that effective representation of community voices can be achieved and a community's priorities can be met.

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Appendices

Appendix A. Key Informant Interview Guide Questions

Community participation

1. Are you aware of Ikona WMA?
2. How were communities involved in the process of establishment of Ikona WMA?
3. How did community members participate in the development and decision making of Ikona WMA?

Perceptions about the contribution of WMA to local livelihoods

4. What changes in livelihoods are attributed to the establishment of Ikona WMA? Examples?
5. What benefits at the community level were accrued from Ikona WMA?
6. What benefits at the household level did community members experience from Ikona WMA?
7. What natural resources did the community access through Ikona WMA?
8. What costs did the community experience from the establishment of Ikona WMA?
9. What is the general view about Ikona WMA and its contribution to livelihood benefits at the community and household levels?

Perceptions about the impact of Ikona WMA on wildlife conservation

10. How are communities involved in wildlife conservation? Examples?
11. What are the main conservation changes /impacts attributed to Ikona WMA over the past five years? Examples? Any costs?
12. What problems/challenges affected implementation of Ikona WMA?
13. What should be done to strengthen wildlife conservation and livelihood benefits from Ikona WMA?
14. What is the general view about the establishment of Ikona WMA and its impacts on wildlife conservation?

Thank you for your time and willingness to participate in the interview.

Appendix B. Focus Group Discussion Guide Questions

Group guide questions

1. Are the communities aware of Ikona WMA?
2. How were communities involved in the process of establishment of Ikona WMA?
3. What are the overall community perceptions, attitudes, and satisfaction of their involvement in the process of establishment of Ikona WMA?
4. How did community members participate in decision making for Ikona WMA?
5. How are communities involved in achieving livelihood benefits from Ikona WMA?
6. What are the benefits communities experienced from Ikona WMA in the past five years?
7. What livelihood benefits are attributed to Ikona WMA at the household level?
8. Are community members allowed to access any natural resources in Ikona WMA?
9. What costs do communities perceive are associated with the establishment of Ikona WMA?
10. What are the wildlife conservation changes/ impacts community members perceive attributed to Ikona WMA?
11. What does the community consider to be a problem affecting Ikona WMA in attaining its goals?
12. What is the community's opinion about Ikona WMA in contributing to wildlife conservation and improving local livelihoods?

Thank you for coming, for your time and willingness to participate in the discussion.

Appendix C. Household Questionnaire

Name of Village.....Sub-village..... Date.....
 Name of Research assistant.....

A: Demographic Data

This section asks you to please describe your personal particulars

1. Gender 1. Male 2. Female

2. How old are you?
 1. 20-29 years
 2. 30-39 years
 3. 40-49 years
 4. 50-59 years
 5. 60+

3. What is the highest level of school you attended?
 1. Primary school
 2. Ordinary secondary school
 3. Advanced secondary school
 4. Diploma
 5. University
 6. Other (specify).....

4. How long have you lived in the village? Number of years..... / Month

5. What are the main activities you do to earn a living from the following list?
 1. Livestock keeping
 2. Crops cultivation
 3. Employment in Ikona WMA
 4. Employment in government institution (specify).....
 5. Engage in petty trade
 6. Making charcoal for sale
 7. Thatching grass for sale
 8. Homemade beer brewing
 9. Others activities (specify).....

6. How many people are currently living in your household?

7. Are you aware of Ikona WMA? 1. Yes 2. No

8. Were you involved in the process of establishment of Ikona WMA? 1. Yes 2. No
 If no, skip question 9.

9. If yes, how were you involved in the process of establishment of Ikona WMA?
 1. Through village meetings
 2. Attended various seminars on WMA
 3. Participated in decision making through village leaders meeting
 4. Participated in demarcating WMA bounders
 5. There was no involvement
 6. Others (specify).....

B: Perceptions about Contributions of Ikona WMA in Improving Local Livelihoods and Wildlife Conservation

The following sections ask about the contribution of Ikona WMA in bringing conservation and livelihood benefits, starting with your opinions in these areas. Since we are interested in your opinions, there are no wrong answers. Please agree or disagree with the statements that follow according to the following scale:

Scale 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree

Quest #		1	2	3	4
10.	I think the establishment of WMA area was a good idea				
11.	I am involved in achieving livelihoods benefits				
12.	My community did not benefit from WMA for past five years				
13.	My household income has increased over past five years				
14.	I believe your household benefits financially from wildlife conservation (WMA)				
15.	There are more employment opportunity now than before WMA				
16.	I believe wildlife conservation has brought alternative sources of income				
17.	I think social services like (school, health care, access to water) have improved in your village over past five years				
18.	I think there is more to credits/loan in your village because of wildlife conservation				
19.	I believe it easier to access farm land now than before				
20.	I think the trend for problem animals has been reduced				
21.	I believe grazing area in your village are easily accessible now				
22.	I can access fuel wood, poles and thatching grasses easily as before				
23.	It is easier now to access bush meat than before				
24.	I think changes in livelihoods in your village has been attributed to wildlife conservation area (WMA)				
25.	There is more involvement in wildlife conservation now				
26.	I think there is more poaching in the area now than before				
27.	I think there is increase of wild animals around now				
28.	It easier to graze my animals now in conservation area				
29.	I think there is less bush fires now				
30.	I believe there more conservation education in your village than before WMA				
31.	I believe the WMA has achieved in conserving wildlife resources				

I would like to ask for more detailed explanation of some of your answers in Section B.

32. Please explain how are you involved in achieving livelihood benefits from conservation?
1. Involved in electing WMA village representatives
 2. Participate in understanding income and expenditures of conservation benefits
 3. Engage in small business in tourism centres
 4. Engage in cultural tourism business
 5. No involvement
 6. Other involvement (specify).....
33. What benefits has the community experienced from Ikona WMA over the past five years?
1. Construction of primary classes
 2. Construction of health centre
 3. Construction of teachers' houses
 4. Minimized community contribution for social development
 5. Construction of tourism visitors centre
 6. Construction of water ponds (Rambo)
 7. Construction/rehabilitation of village roads
 8. No benefits
 9. Other benefits (specify).....
34. How does your household benefit from wildlife conservation?

1. Employment
 2. Market of your agriculture products
 3. Access to credit/loan
 4. Increase of crops harvest due to reduced wild animals crop damage
 5. No benefits
 6. Minimized family contribution to social development
 7. Other benefits (specify).....
35. How are you involved in wildlife conservation?
1. No involvement
 2. Participate in protection and provide information on illegal events
 3. Provide conservation education to others
 4. Follow conservation regulations and by-laws
 5. Other (specify).....
36. What wild animal species are more easily seen now in your conservation area than before WMA?
1. Elephant
 2. Giraffe
 3. Buffalo
 4. Wildebeest
 5. Zebra
 6. Antelope
 7. Hyena
 8. Monkey
 9. Topi
 10. Other wild animals (specify)
37. What are the problems affecting the community in achieving livelihood benefits from wildlife conservation(WMA)
1. No involvement of community in the village development plans
 2. No monitoring of the village project funds
 3. Poor relationship with conservers and community
 4. Little conservation education to community
 5. No regular report of income and expenditures of conservation benefits
 6. No compensation for crop damage and people affected by wild animals
 7. Insufficient land for grazing and agriculture
 8. Other problems (specify).....
38. What should be done to ensure that the community continues to support conservation and benefits from wildlife conservation?
1. Conservation education to the community is important
 2. Community should access credit/loans
 3. Increase of job opportunities to the communities adjacent to wildlife conservation areas
 4. Village leaders should involve the community in designing village development projects
 5. Conservers should build good relationship with villagers
 6. Community should have access to bush meat at list once a month
 7. Be allowed to graze a few metres into the wildlife conservation area
 8. Be compensated for wild animal crop damage
 9. Support social services (education, health, and water) to communities surrounding the conservation area
 10. The village should be omitted from the WMA program
 11. Others (specify).....

Thanks for your participation

Appendix D. Research ethics certificate of approval

 University of Victoria	Human Research Ethics Board Office of Research Services Administrative Services Building PO Box 1700 STN CSC Victoria British Columbia V8W 2Y2 Canada Tel 250-472-4545, Fax 250-721-8960 Email ethics@uvic.ca Web www.research.uvic.ca	
	<h3>Certificate of Approval</h3>	
PRINCIPAL INVESTIGATOR Enock Makupa UVic STATUS: Ph.D. Student UVic DEPARTMENT: GEOG SUPERVISOR: Dr. Rosaline Canessa	ETHICS PROTOCOL NUMBER 12-132 ORIGINAL APPROVAL DATE: 11-Jul-12 APPROVED ON: 11-Jul-12 APPROVAL EXPIRY DATE: 10-Jul-13	
PROJECT TITLE: Conservation and Local Livelihoods in Western Serengeti, Tanzania: Community Perspectives on Ikona Wildlife Management Area RESEARCH TEAM MEMBERS: None		
DECLARED PROJECT FUNDING: IDRC (Canada - African Research Alliance)		
CONDITIONS OF APPROVAL This Certificate of Approval is valid for the above term provided there is no change in the protocol. Modifications To make any changes to the approved research procedures in your study, please submit a "Request for Modification" form. You must receive ethics approval before proceeding with your modified protocol. Renewals Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date. Project Closures When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.		
<h3>Certification</h3>		
This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria Research Regulations Involving Human Participants.		
 Dr. Rachael Scarth Associate Vice-President, Research		
Certificate Issued On: 12-Jul-12		

12-132 Makupa, Enock

Appendix E. Tanzania research permits



Tanzania Wildlife Research Institute

Head Office P. O. Box 661, Arusha, Tanzania
 Tel.: +255 (0) 27-2549571; Fax: +255 (0) 27-2548240
 E-mail: tawiri@habari.co.tz
 Website: www.tawiri.or.tz

Our Ref: TWRI/MWEKA/14/VOL.II/53

Your Ref:

Date: 17th October 2011


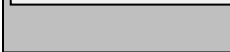
To whom it may concern

RE: RESEARCH CLEARANCE FOR MASURULI BAKER MASURULI AND ENOCK MAKUPA.

At its 37th Research Programme Committee (RPC) Meeting of TAWIRI Board held on 15th October 2011 in Dodoma, recommended research clearance of the above mentioned research scientistS researching on "Protected Area and Poverty reduction in Serengeti and Saadani National Parks".

With this letter we are kindly requesting you to assist the candidates accordingly.

Yours sincerely,

 RESEARCH INSTITUTE


Dr. Victor Kakengi
FOR: DIRECTOR GENERAL

TAWIRI is responsible for the co-ordination of all wildlife research in Tanzania.

Njiro W. R. C
 P. O. Box 661
 Arusha

Gombe W. R. C
 P. O. Box 185
 Kigoma

Kingupira W. R. C
 P. O. Box 16
 Utete, Rufiji

Mahale W. R. C
 P. O. Box 1083
 Kigoma

Tabora R. S.
 P. O. Box 62
 Tabora

Serengeti W. R. C
 P. O. Box 661
 Arusha



TANZANIA NATIONAL PARKS

OFFICE OF THE DIRECTOR GENERAL
P.O. BOX 3134, ARUSHA - TANZANIA

Ref. No. TNP/HQ/E.20/08B

Date 13/03/2012

Director General,
Tanzania wildlife Research Institute,
P.O.Box 661, Arusha,
TANZANIA

**RE: REQUEST FOR A FREE ENTRY PERMIT FOR MASURULI BAKER
MASURULI AND ENOCK MAKUPA**

This is in response to your letter Ref. No. TWRI/MWEKA/14/VOL.II/66 dated 08th March 2012 regarding the subject above.

I am pleased to inform you that, permission is hereby granted to the above mentioned Tanzanian research scientists to conduct wildlife research titled: **"Protected Area and Poverty reduction in Serengeti and Saadani National Parks"** from 09th March, 2012 to December 31st, 2012

They researchers are required to abide by all park rules and regulations, and should meet with Chief Park Wardens to introduce themselves before starting the study.

Yours Sincerely,
TANZANIA NATIONAL PARKS



Damari Samwel
For: **DIRECTOR GENERAL**

Copy: Chief Park Warden, Serengeti and Saadani National Parks

Serengeti District Council research permit

HALMASHAURI YA WILAYA YA SERENGETI

Mkoa wa Mara:
Tel. No. 2621426
Fax Na. 2621426



Ofisi ya Mkurugenzi Mtendaji(W),
Idara ya Kilimo/Mifugo
S. L. P. 176,
Mugumu – Serengeti

Unapojibu tafadhali taja:
Kumb Na SDC

23/03/2012

AFISA MTENDAJI KIJJI
ROBANDA, MBISSO, PARK NYIGOTI
NYICHOKA, MAKUNDUSI, RWAMCHANGA

YAH: KUWATAMBULISHA ENOCK MAKUPA NA BAKER MASURULI

Rejea mada tajwa hapo juu.

Nawatambulisha Bw Enock Makupa (Mhadhiri Chuo Kikuu cha Dodoma) na Bw Baker Masuruli (Mhadhiri Chuo cha Wanyamapori Mweka) ambao wanafanya utafiti katika maeneo yenu kuhusu mahusiano kati ya jamii na maeneo ya uhifadhi.

Wapeni ushirikiano, na msaada ili kufanikisha zoezi lao

Wenu



K.P.J Galikunga

MKURUGENZI MTENDAJI (W)
SERENGETI

Kny: MKURUNGEZI MTENDAJI
WILAYA YA SERENGETI

27/3/2012

Nakala

Afisa Mtendaji Kata

IKOMA

MANCHIRA

NATTA

KYAMBAHI

Appendix F. Descriptive Data and Factor Analysis

Table 1. Factor extraction and component loadings

<i>Rotated Component Matrixa</i>						
	<i>Component Loading</i>					
	1	2	3	4	5	6
I think establishment of Ikona WMA was a good idea	0.299	-0.066	0.185	-0.12	0.434	0.033
I am involved in achieving livelihood benefits from wildlife conservation	0.542	0.005	0.253	0.058	0.301	0.127
I think the community did not benefit from WMA in the past five years	-0.141	-0.053	-0.017	-0.217	-0.572	-0.025
I believe the household income has increased in the past five years	0.739	0.059	0.1	0.138	0.038	0.045
I think your household has been benefiting financially from wildlife conservation	0.682	0.06	0.136	0.182	-0.028	0.009
There are more employment opportunities now than before	0.555	-0.362	0.06	-0.072	-0.073	-0.205
I believe wildlife conservation has brought an alternative source of income	0.648	0.097	0.205	0.08	0.094	0.187
I think social services (like school, dispensary, water) have improved in the village in the past five years	0.386	-0.073	0.035	0.319	0.365	-0.436
I think there is more access to credit/loans in the your village because of wildlife conservation	0.32	-0.026	-0.009	0.004	0.205	0.77
I believe it is easier to access farm land in the village now than before the wildlife conservation area	0.16	-0.055	0.212	0.562	-0.168	-0.139
I think the trend of problem animals has been reduced now	-0.254	-0.114	0.261	-0.125	0.577	0.126
I believe grazing lands are easily accessible in the village now	0.186	-0.037	-0.074	0.715	0.035	-0.065
It is easier to access bush meat now than before	-0.049	0.556	0.093	0.099	-0.084	0.182
It is easier to access fuel wood, poles and thatching grasses now in the village	-0.006	0.178	0.068	0.58	0.28	0.181
I think changes in livelihood in the village are attributed to wildlife conservation (WMA)	0.287	0.154	0.566	0.037	-0.013	0.017
I believe there is much more involvement of the community in wildlife conservation than before	0.317	-0.15	0.61	0.227	0.052	0.172
I think there is more poaching in the area now than before	0.022	0.614	-0.297	-0.172	0.142	-0.125
I think there is an increase of wild animals around now	-0.087	-0.459	0.096	0.335	-0.253	0.132
It is easier to graze your animals in the conservation area	0.005	0.704	0.17	0.003	-0.036	-0.016
I think there are fewer bush fires now	-0.103	-0.589	0.121	-0.197	0.385	0.048
I believe there is more conservation education in the village than before	0.214	-0.015	0.545	0.165	0.339	-0.24
I believe Ikona WMA has succeeded to protect and conserve wildlife resources	0.056	-0.027	0.724	-0.071	0.191	-0.028

Table 2. Conservation and livelihood factors

<i>No.</i>	<i>Factors</i>	<i>Factor Loadings</i>
	Conservation Factors	
1	<i>Trends for Illegal Activities in WMA</i>	
	It is easier to access bush meat now than before	0.556
	I think there is more poaching in the area now than before	0.614
	I think there is an increase of wild animals around now	-0.459
	It is easier to graze your animals in the conservation area	0.704
	I think there are fewer bush fires now	-0.589
2	<i>Perception of Wildlife Management Area</i>	
	I think establishment of Ikona WMA was a good idea	0.434
	I think the community did not benefit from WMA in the past five years	-0.572
	I think the trend of problem wild animals has been reduced now	0.577
3	<i>Conservation Impacts</i>	
	I think changes in livelihoods in your village can be attributed to wildlife conservation (WMA)	0.566
	I believe there is much more involvement of the community in wildlife conservation than before	0.609
	I believe there is more conservation education in the village than before	0.545
	I believe having WMA has succeeded in conserving wildlife resources	0.724
	Livelihood Factors	
4	<i>Household Economy</i>	
	I am involved in achieving livelihood benefits from wildlife conservation	0.542
	I believe the household income has increased in the past five years	0.739
	I think the household has been benefiting financially from wildlife conservation	0.682
	There are more employment opportunities now than before the wildlife conservation area	0.555
	I believe wildlife conservation has created alternative sources of income	0.648
5	<i>Access to Natural Resources</i>	
	I believe it easier to access farm land in the village now than before the wildlife conservation area	0.562
	I believe grazing lands are more easily accessible in the village now	0.715
	It is easier to access fuel wood, poles, medicinal plants, and thatching grasses now in WMA	0.580
6	<i>Community Services</i>	
	I think social services (school, dispensary, water) have improved in the village in the past five years	-0.436
	I think there is more access to credit/loans in the your village because of wildlife conservation	0.769

Table 3. Livelihood factor mean

Descriptive Analysis									
<i>Livelihood Factors</i>				<i>Std. Dev.</i>	<i>Std. Error</i>	<i>95% Confidence Interval for Mean</i>		<i>Min.</i>	<i>Max.</i>
	Villages	N	Mean			Lower Bound	Upper Bound		
<i>Household Economy</i>	Nyichoka	153	1.94	0.712	0.058	1.82	2.05	1	4
	Rwamchanga	59	1.65	0.442	0.057	1.53	1.76	1	3
	Robanda	88	2.24	0.631	0.067	2.10	2.37	1	4
	Total	300	1.97	0.674	0.039	1.89	2.04	1	4
<i>Access to Natural Resources</i>	Nyichoka	153	1.86	0.629	0.051	1.76	1.96	1	4
	Rwamchanga	59	1.77	0.629	0.082	1.60	1.93	1	3
	Robanda	88	2.39	0.704	0.075	2.24	2.54	1	4
	Total	300	2	0.698	0.040	1.92	2.07	1	4
<i>Community Social Services</i>	Nyichoka	153	2.34	0.718	0.058	2.23	2.45	1	4
	Rwamchanga	59	1.76	0.494	0.064	1.63	1.89	1	3
	Robanda	88	2.64	0.628	0.067	2.50	2.77	1	4
	Total	300	2.31	0.718	0.041	2.23	2.39	1	4

Table 4. Analysis of variance across the villages based on livelihood factor mean

ANOVA						
<i>Livelihood Factors</i>		<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
<i>Household Economy</i>	Between Groups	12.665	2	6.332	15.287	0.000
	Within Groups	123.028	297	0.414		
	Total	135.693	299			
<i>Access to Natural Resources</i>	Between Groups	19.364	2	9.682	22.789	0.001
	Within Groups	126.185	297	0.425		
	Total	145.550	299			
<i>Community Social Services</i>	Between Groups	27.178	2	13.589	31.812	0.000
	Within Groups	126.868	297	0.427		
	Total	154.047	299			

Table 5. Livelihood factors – Multiple comparisons across the villages

Multiple Comparisons –Scheffe-test							
<i>Livelihood Factors</i>	<i>(I) Village Name</i>	<i>(J) Village Name</i>	<i>Mean Difference (I-J)</i>	<i>Std. Error</i>	<i>Sig.</i>	<i>95% Confidence Interval</i>	
						Lower Bound	Upper Bound
<i>Household Economy</i>	Nyichoka	Rwamchanga	.28849*	0.09863	0.015	0.0458	0.5311
		Robanda	-.30269*	0.08611	0.002	-0.5145	-0.0908
	Rwamchanga	Nyichoka		0.09863	0.015	-0.5311	-0.0458
		Robanda	-.59118*	0.10830	0.000	-0.8576	-0.3248
	Robanda	Nyichoka	.30269*	0.08611	0.002	0.0908	0.5145
		Rwamchanga	.59118*	0.10830	0.000	0.3248	0.8576
<i>Access to Natural Resources</i>	Nyichoka	Rwamchanga	0.09003	0.09989	0.667	-0.1557	0.3358
		Robanda	-.52798*	0.08721	0.000	-0.7425	-0.3134
	Rwamchanga	Nyichoka	-0.09003	0.09989	0.667	-0.3358	0.1557
		Robanda	-.61800*	0.10968	0.000	-0.8878	-0.3482
	Robanda	Nyichoka	.52798*	0.08721	0.000	0.3134	0.7425
		Rwamchanga	.61800*	0.10968	0.000	0.3482	0.8878
<i>Community Social Services</i>	Nyichoka	Rwamchanga	.57716*	0.10016	0.000	0.3307	0.8236
		Robanda	-.29649*	0.08744	0.004	-0.5116	-0.0814
	Rwamchanga	Nyichoka	-.57716*	0.10016	0.000	-0.8236	-0.3307
		Robanda	-.87365*	0.10997	0.000	-1.1442	-0.6031
	Robanda	Nyichoka	.29649*	0.08744	0.004	0.0814	0.5116
		Rwamchanga	.87365*	0.10997	0.000	0.6031	1.1442

* The mean difference is significant at the 0.05 level

Table 6. Conservation factor mean per village

Descriptive Analysis									
Conservation Factors		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
						Lower Bound	Upper Bound		
<i>Trends in Illegal Activities</i>	Nyichoka	153	1.8252	0.28974	0.02342	1.7789	1.8714	1	3
	Rwamchanga	59	1.7881	0.36793	0.0479	1.6923	1.884	1	2.75
	Robanda	88	1.6903	0.31485	0.03356	1.6236	1.7571	1	2.75
	Total	300	1.7783	0.31812	0.01837	1.7422	1.8145	1	3
<i>Perception of Ikona WMA</i>	Nyichoka	153	2.8497	0.74136	0.05994	2.7313	2.9681	1	4
	Rwamchanga	59	2.9237	0.68111	0.08867	2.7462	3.1012	1	4
	Robanda	88	2.5966	0.65151	0.06945	2.4585	2.7346	1	4
	Total	300	2.79	0.71363	0.0412	2.7089	2.8711	1	4
<i>Conservation Impact of Ikona WMA</i>	Nyichoka	153	2.6285	0.61252	0.04952	2.5307	2.7264	1	4
	Rwamchanga	59	2.0311	0.51274	0.06675	1.8975	2.1647	1	3.33
	Robanda	88	2.3958	0.51312	0.0547	2.2871	2.5046	1	3.17
	Total	300	2.4428	0.60835	0.03512	2.3737	2.5119	1	4

Table 7. Difference in community perception based on conservation factor mean

ANOVA						
Conservation Factor		Sum of Squares	df	Mean Square	F	Sig.
<i>Trends in Illegal Activities</i>	Between Groups	1.02	2	0.511	5.194	*.006
	Within Groups	29.2	297	0.098		
	Total	30.3	299			
<i>Perception of Ikona WMA</i>	Between Groups	4.89	2	2.446	4.929	*.008
	Within Groups	147	297	0.496		
	Total	152	299			
<i>Conservation Impact of Ikona WMA</i>	Between Groups	15.5	2	7.737	24.142	*.000
	Within Groups	95.2	297	0.32		
	Total	111	299			

Table 8. Conservation factors – Multiple comparisons per village

Multiple Comparisons –Scheffe-test							
Conservation Factor	(I) Village Name	(J) Village Name	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
<i>Trends in Illegal Activities in Ikona WMA</i>	Nyichoka	Rwamchanga	0.03703	0.04808	0.744	-0.0813	0.1553
		Robanda	.13482*	0.04198	0.006	0.0316	0.2381
	Rwamchanga	Nyichoka	-0.03703	0.04808	0.744	-0.1553	0.0813
		Robanda	0.09779	0.05279	0.182	-0.0321	0.2277
	Robanda	Nyichoka	-.13482*	0.04198	0.006	-0.2381	-0.0316
		Rwamchanga	-0.09779	0.05279	0.182	-0.2277	0.0321
<i>Perception of Ikona WMA</i>	Nyichoka	Rwamchanga	-0.07406	0.10795	0.790	-0.3396	0.1915
		Robanda	.25308*	0.09425	0.028	0.0212	0.4849
	Rwamchanga	Nyichoka	0.07406	0.10795	0.790	-0.1915	0.3396
		Robanda	.32714*	0.11853	0.023	0.0355	0.6187
	Robanda	Nyichoka	-.25308*	0.09425	0.028	-0.4849	-0.0212
		Rwamchanga	-.32714*	0.11853	0.023	-0.6187	-0.0355
<i>Conservation Impact of Ikona WMA</i>	Nyichoka	Rwamchanga	.59747*	0.08676	0.000	0.3840	0.8109
		Robanda	.23271*	0.07574	0.010	0.0464	0.419
	Rwamchanga	Nyichoka	-.59747*	0.08676	0.000	-0.8109	-0.3840
		Robanda	-.36476*	0.09526	0.001	-0.5991	-0.1304
	Robanda	Nyichoka	-.23271*	0.07574	0.010	-0.4190	-0.0464
		Rwamchanga	.36476*	0.09526	0.001	0.1304	0.5991

Table 9. Analysis of variance for each livelihood and conservation variable

ANOVA						
Household Economy		<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>Sig.</i>
I believe the household income has increased in the past five years	Between Groups	16.138	2	8.069	9.541	0.000
	Within Groups	251.182	297	0.846		
	Total	267.320	299			
I think the household has been benefiting financially from wildlife conservation	Between Groups	14.669	2	7.334	8.237	0.000
	Within Groups	264.461	297	0.890		
	Total	279.130	299			
I believe wildlife conservation has brought an alternative source of income	Between Groups	22.369	2	11.185	11.163	0.000
	Within Groups	297.577	297	1.002		
	Total	319.947	299			
There are more employment opportunities now than before	Between Groups	3.666	2	1.833	1.895	0.152
	Within Groups	287.214	297	0.967		
	Total	290.880	299			
I am involved in achieving livelihood benefits from wildlife conservation	Between Groups	25.012	2	12.506	13.388	0.000
	Within Groups	277.425	297	0.934		
	Total	302.437	299			
Access to Natural Resources						
I believe grazing lands are more easily accessible in the village now	Between Groups	54.260	2	27.130	28.661	0.000
	Within Groups	281.137	297	0.947		
	Total	335.397	299			
It is easier to access fuel wood, poles, and thatching grasses now in the village	Between Groups	4.326	2	2.163	2.880	0.058
	Within Groups	223.071	297	0.751		
	Total	227.397	299			
I believe it is easier to access farm land in the village now than before the wildlife conservation area	Between Groups	17.870	2	8.935	8.155	0.000
	Within Groups	325.410	297	1.096		
	Total	343.280	299			
Community Social Services						
I believe grazing lands are easily accessible	Between Groups	54.260	2	27.130	28.661	0.000
	Within Groups	281.137	297	0.947		
	Total	335.397	299			
It is easier to access fuel wood, poles, and thatching grasses now in the village	Between Groups	4.326	2	2.163	2.880	0.058
	Within Groups	223.071	297	0.751		
	Total	227.397	299			
Perception of Ikona WMA						
I think establishment of Ikona WMA was a good idea	Between Groups	31.622	2	15.811	16.084	0.000
	Within Groups	291.964	297	0.983		
	Total	323.587	299			
I think the community did not benefit from WMA in the past five years	Between Groups	42.554	2	21.277	17.689	0.000
	Within Groups	357.233	297	1.203		
	Total	399.787	299			

Trends for Illegal Activities						
It is easier to access bush meat now than before	Between Groups	0.960	2	0.480	2.641	0.073
	Within Groups	53.986	297	0.182		
	Total	54.947	299			
I think there is more poaching in the area now than before	Between Groups	3.568	2	1.784	3.436	0.033
	Within Groups	154.219	297	0.519		
	Total	157.787	299			
It is easier to graze your animals in conservation area	Between Groups	0.247	2	0.123	0.279	0.757
	Within Groups	131.420	297	0.442		
	Total	131.667	299			
I think there are fewer bush fires now	Between Groups	25.184	2	12.592	22.012	0.000
	Within Groups	169.896	297	0.572		
	Total	195.080	299			
Conservation Impact of WMA						
I believe there is much more involvement of the community in wildlife conservation than before	Between Groups	24.133	2	12.067	10.631	0.000
	Within Groups	337.104	297	1.135		
	Total	361.237	299			
I believe there is more conservation education in the village than before	Between Groups	12.615	2	6.307	5.413	0.005
	Within Groups	346.065	297	1.165		
	Total	358.68	299			
I believe having WMA has achieved protection of wildlife resources	Between Groups	18.597	2	9.298	7.298	0.001
	Within Groups	378.39	297	1.274		
	Total	396.987	299			
I think there is an increase of wild animals around now	Between Groups	2.216	2	1.108	0.903	0.407
	Within Groups	364.451	297	1.227		
	Total	366.667	299			
I think changes in livelihoods in the village can be attributed to wildlife conservation (WMA)	Between Groups	17.691	2	8.845	7.304	0.001
	Within Groups	359.679	297	1.211		
	Total	377.37	299			
I think the trend of problem wild animals has been reduced now	Between Groups	86.241	2	43.121	46.436	0.000
	Within Groups	275.796	297	0.929		
	Total	362.037	299			

Appendix G. Knowledge Mobilization and Community Action

Sharing of knowledge has been part of an ongoing process throughout this study under the Protected Area and Poverty Reduction project (PAPR). Before I started my graduate program at the University of Victoria - Canada, I had an opportunity to join the PAPR team from Canada, Ghana, and Tanzania for project sites reconnaissance in Tanzania. During the research site reconnaissance in Western Serengeti, I had an opportunity to participate in discussions with local community members from three study villages about community research areas they prefer in their local environment under the PAPR project. After I completed data collection in the study area in November, 2012, I had an opportunity to share brief findings of this study with village councils of the three study villages before detailed data analysis. Also, findings were presented at the 2013 Congress of the Humanities and Social Sciences held at the University of Victoria June 2-8, 2013. Some findings were shared at a PAPR International Conference held in Tofino, Canada, June 6-10, 2013.

Furthermore, in June, 2014, the key findings will be interpreted into Swahili and summarized to be distributed as printed material (reports and posters) to the study villages. Also, workshops will be conducted with WMA administrators, communities, and some conservation actors in the Serengeti ecosystem as part of sharing the knowledge gained from this study. In addition, the findings from this study will be communicated through national and international conferences and various academic institutions, including the University of Dodoma where the researcher is currently working. Further efforts will be made to publish these findings in national and international journals in order to disseminate the knowledge gained to the wider stakeholders.