Jafari Ramadhani Kideghesho

# Wildlife conservation and local land use conflicts in Western Serengeti Corridor, Tanzania

Thesis for the degree philosophiae doctor

Trondheim, November 2006

Norwegian University of Science and Technology
Faculty of Natural Sciences and Technology
Department of Biology

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# WILDLIFE CONSERVATION AND LOCAL LAND USE CONFLICTS IN WESTERN SERENGETI, TANZANIA

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A dissertation submitted for the Degree of Philosophy (PhD)

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## PREFACE

This work is an output of the collaborative project between the Sokoine University of Agriculture (SUA), the Norwegian Institute for Nature Research (NINA) and the Norwegian University of Science and Technology (NTNU). The goal of the project, funded by Norwegian Council for Higher Education's Programme for Development Research and Education (NUFU), was to build capacity for the newly established Department of Wildlife Management at the Faculty of Forestry and Nature Conservation at SUA. Besides, financial support from NUFU several individuals and institutions have contributed immensely to the completion of this work. My sincere thanks are extended to SUA Administration for granting me a four years study leave; the Department of Wildlife Management and Faculty of Forestry and Nature Conservation at SUA for support in logistics and; the Department of Biology at NTNU for effective training and hosting me in Norway. I wish to recognise an outstanding support from my supervisors, Professor Eivin Røskaft and Dr Bjørn P. Kalternborn, who tirelessly and earnestly guided me throughout the work, both in Norway and in Serengeti. My local supervisors, Professor Samwel L. Maganga and Dr Alexander N. Songorwa, gave similar support in Tanzania. *Ahsanteni Sana*!

Tanzania Wildlife Research Institute (TAWIRI) granted permission to conduct research in Western Serengeti while Tanzania National Parks (TANAPA) and Ngorongoro Conservation Area Authority (NCAA) granted me entry permission to Serengeti National Park and Ngorongoro Conservation Area, respectively. I wish to recognize support received from the management and staff of the three organizations during the entire period of my study. I am also grateful to Mr John Muya, the Serengeti Regional Conservation Project (SRCP) Manager, and his colleagues for hosting me and sharing with me their 'wealth' of field experience during the entire study period. I also wish to recognise the local people in Western Serengeti, who besides responding to questionnaires, they voluntarily spared their precious time to share with me their experience, knowledge and grievances about wildlife conservation issues.

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Trondheim 12.09.2006 Jafari Ramadhani Kideghesho

## LIST OF PAPERS

This thesis is based on the following five papers:

I. Kideghesho JR (Manuscript) Co-existence between the pre-colonial traditional societies and wildlife in western Serengeti, Tanzania: Its relevancy in the contemporary wildlife conservation efforts.

II. Kideghesho JR, Røskaft E, Kaltenborn BP (Manuscript) The environmental history and political ecology of wildlife conservation in Western Serengeti Corridor, Tanzania.

III. Kideghesho JR, Røskaft E, Kaltenborn BP, Mokiti TMCT (2005) Serengeti shall not die': Can the ambition be sustained? *International Journal of Biodiversity Science and Management* 3(1):150 -166.

IV. Kideghesho JR, Holmern T, Røskaft E, Kaltenborn BP and Songorwa AN (Submitted) The dilemmas of benefit-based approaches in Serengeti Ecosystem, Tanzania

V. Kideghesho JR, Røskaft E and Kaltenborn BP (In press) The factors influencing conservation attitudes in western Serengeti, Tanzania. *Biodiversity and Conservation*

## SUMMARY

The pre-colonial traditional societies in Western Serengeti were physically and spiritually connected to animal species and plants in their surrounding environments. This link contributed to sustainable use and harmonious coexistence. The religious affiliation and local management structures sanctioned some destructive behaviours and designated some species and habitats as sacred. Additionally, low human population and primitive technology posed low pressure on resources. Colonial regime interrupted the coexistence through introduction of new management structures. The exclusive, prohibitive and punitive actions perpetrated by colonial regime under 'fences and fines' conservation approach fomented conflicts and local resentment towards conservation policies. However, despite local resentment and conflicts, the economic and political reasons forced the post-colonial government to inherit these policies uncritically.

While the idiom 'Serengeti shall not die' has been a popular motto and ambition for decades, some forces had been working against it. These forces include: inefficient state-led enforcementn (due to shrinkage of government budgets in 1970s and 1980s); human population growth; rural poverty; globalisation of markets in animal products (e.g. rhino horns and ivory) and; local resentment towards the conservation policies. The reduction of the wildlife populations and habitats as a result of these forces, ruled out the efficacy of "fences and fines" approach in conserving wildlife. This prompted a need to search for alternative approach that would end this crisis.

The community conservation (CC) initiative, which emerged as a major paradigm of conservation work in late 1980s, was the most appealing option. Through provision of tangible economic benefits, CC sought to motivate local people to align their behaviours with conservation goals. This prescription was applied to Serengeti where two CC initiatives, Serengeti Regional Conservation Project (SRCP) and Community Conservation Service (CCS) were launched. Findings from this study indicate that the benefit based approaches implemented

under these initiatives are fundamentally flawed, a scenario that precludes their possibility to contribute significantly to conservation objectives.

Although attitudinal survey indicated that the benefit-based strategy increase acceptability towards conservation, this may not necessarily imply a change in behaviour. Poaching was still rampant in the villages under the projects. However, even if the strategy could lead to a change of behaviour among the beneficiaries, its impact to conservation would still be insignificant since only a small fraction of the communities benefit (i.e. 14 out of 126 villages). Furthermore, even within the project villages the minimal benefits granted are inequitably distributed and monopolised by local elites. The poorest members of the society are unable to enjoy these benefits because cash is required to access them (e.g. game meat, medical services).

Along with the benefits, the results indicated that the costs inflicted by wildlife to local people and some socio-demographic factors (education, wealth) have potential role in shaping conservation attitudes. Local communities experiencing fewer costs from wildlife conservation and those most educated were less likely to support protected areas. Those with more livestock were more negative, probably because the costs of prohibition from access to water and pasture in protected areas were more obvious to them. Conservation attitudes were more positive to Serengeti National Park than to the adjacent Game Reserves, a scenario that can be attributed to history and the age of the park. It was created some 50 years when population was low and land was still available. Furthermore, the majority of the villagers were, either too young, or were not even born when the Park came to existence. Therefore, they did not feel the pain of eviction, if there was any.

# INTRODUCTION

## Global conservation efforts, threats and status of wildlife species

Throughout history, human factors have been the major drivers for loss of biodiversity. These factors include species habitat destruction, species overexploitation, introduction of exotic species and pollution (IUCN 2006; Soule et al. 1979; WCMC 1992). Ninety-nine percent of the IUCN Red List[1] species are threatened by these factors (IUCN 2006). Conservation efforts aiming at halting these threats have historically focused on creation of the protected areas (PAs). Currently 104,791 protected areas covering a total area of about 20 million $km^2$ or 12.7% of the earth's surface have been created (Chape et al. 2005). This is an increase of 100% of the area under protection compared to the last decade when 9,869 protected areas covering about 9.3 million $km^2$ (equivalent to 6.3% of the earth's surface) existed (WCMC 1996 in Pullin 2002). Since the pronounced impact on species occur in the tropics, where the highest level of biodiversity is located, most of the conservation efforts are targeting these areas.

However, despite committing more areas under legal protection, pressures on wildlife habitats and species are still growing. Species are increasingly being threatened, endangered, and becoming locally extinct. The 2006 IUCN Red List indicates that of 5,205 species evaluated in 1996, 25% of all mammals and 11% of all birds were threatened (IUCN 2006). Recently, some 162 species of mammals and 181 of birds are critically endangered i.e. they are facing an extremely high risk of extinction in the wild (IUCN 2006).

Habitat loss is universally the greatest threat, impacting 86% of threatened birds, 86% of threatened mammals and 88% of threatened amphibians (IUCN 2006). Earth Policy Institute (EPI 2006) reports that, 50% of the collective geographical ranges of 173 species of mammals from around the world have diminished by 50%. This signifies a huge loss of breeding and foraging grounds for these species. The IUCN 2006 Red list indicates that other threats have relatively low impact on species. For instance, overexploitation affects only 30% of threatened birds, 33%

[1] IUCN Red List is the world's most comprehensive inventory of the global conservation status of plant and animal species

mammals and 6% amphibians while introduction of alien species affects 30% and 11% of threatened birds and amphibians, respectively. Pollution affects 29% while diseases affect 17% of threatened species of amphibians.

Even if the habitats in the core PAs are fully protected, the long-term survival of flora and fauna cannot be guaranteed. Anthropogenic pressures on adjacent lands and wildlife migratory corridors progressively transform the PAs into 'ecological islands' and, therefore, rendering the environment becomes to wildlife species. Reduction and fragmentation of the natural ranges of many game animals jeopardize their survival (Mwalyosi 1991; Newmark 1996; Ottichilo et al. 2001). Bennet (1997) outlines four deficiencies that disqualify the PAs as self-sustaining entities: (1) PAs do not represent all natural communities (2) most PAs are too small to maintain viable populations of all species and to maintain natural ecological processes (3) movement patterns of many protected wildlife species regularly cross PAs boundaries (4) PAs are not protected from adjacent land uses and may be degraded by processes arising in the surrounding landscapes.

Some scientific predictions and generalizations have attempted to estimate the negative impacts of ecological isolation. For example, Soule et al (1979) predicted that small reserves in East Africa were likely to lose 23%, 65% and 88% of their large mammals if they were isolated without intervention of scientific management for 50, 500 and 5,000 years, respectively. The risk is much less to large reserves. The loss was estimated at 6%, 35% and 73% in the respective intervals of periods. Likewise, extrapolations from estimates for habitat loss have led to the most widely quoted generalizations that, loss of 90% of habitat results in loss of half of the available species (WCMC 1992: Meffe & Carrroll 1997).

## A brief history of wildlife conservation in Africa

### Conventional Conservation Policies

The American Yellowstone model (popular as 'fences and fines' or 'fortress conservation' approach) through which colonial wildlife conservation policies in Africa were derived - conceptualised natives as a conservation problem. Hunting practices by natives were presented as cruel, barbarous and wasteful (Adams & McShane 1996; Lewis et al. 1990; Neumann 1998). This justified the prohibitive action against access to wildlife species of social and economic importance. Showing the ulterior motive behind these accusations, Neumann (1998) argues convincingly that, hunting of wild animals in Africa offered Europeans a symbolic dominance of the continent and important marker of social class within settler society. Therefore, pursuing it along with traditional hunting was undesirable, as it would imply putting African culture and resource management practices on equal footing with those of Europeans.

Essentially, the wildlife policies were designed to protect the interests of the whites, while grossly undermining those of the natives. The suitability of an area for a protected area depended on its unsuitability for alternative uses by Europeans. For instance, a report to the London-based Society for Preservation of Fauna and Flora (SPFF) of the Empire, rated Serengeti as an ideal place for a national park because it was unattractive to European miners and farmers due to insignificant mineral deposits, infestation of tsetse flies (*Glossina* spp) and erratic rainfall (Bonner 1993). In Zimbabwe, game laws were suspended to allow game eradication as a control measure against Trypanosomiasis, the livestock disease that interfered with settler economy (Murombedzi 2003). Despite this bias, clear evidence abounds that Europeans themselves were responsible for habitat degradation and decimation of wildlife species. In South Africa, for example, white hunters and the rapid expansion of white ranchers exterminated Quagga (*Equus quagga)* and blaubok (*Hippotragus leucophaea* ) (Adams & McShane 1996; Bonner 1993).

The post-colonial African countries maintained the colonial conservation policies and ideologies contrary to native expectations[2]. More protected areas were created at the expense of local livelihoods. Law enforcement was observed with more vigilance. For example, some countries such as Kenya and Zimbabwe went further by instituting a "shoot-to-kill" policy against the poachers (Bonner 1993). Two reasons made the choice of maintaining colonial policies inevitable: (1) wildlife resource was contemplated as important source of economic base for political power and resource for promised socio-economic development (Gibson 1999; Levine 2002) and, (2) the continuation of the flow of foreign aid packages depended on deep respect for the wishes of Europeans and Americans, including prominently international environmental organisations and their constituencies (Nelson 2003). This uncritical inheritance of colonial conservation policies endorsed continuation of local resentment toward the policies and conflicts between local people and conservation agencies.

**Failure of fences and fines approach**

Failure of fences and fines approach in conserving wildlife can be manifested by increasing human resentment towards wildlife policies and escalating negative impacts caused by human activities on wildlife areas and species. Surveys in the last two decades suggested that agricultural expansion, deforestation, and overgrazing had reduced the original wildlife habitats in Africa by over 65% (Kiss 1990 in Newmark & Hough 2000). Deforestation and hunting have left some species critically endangered or extinct. For example, once inhabited in 25 African countries, chimpanzees (*Pan troglodytes*) is now extinct in four and nearing extinct in many others (http://www.panda.org/wwf_/species/problems/habitat_loss). Activities of the refugees from the Democratic Republic of Congo, Rwanda and Burundi have reduced the population of 13 large herbivores[3] by 90% in Western Tanzania's Burigi-Biharamulo Game Reserves (TWCM 1991,

[2]Nationalist/freedom movements recognised colonial conservation policies as injustice and, therefore, pledged to remedy the situation after independence

[3]These herbivores are: Bushbuck (*Tragelaphus scriptus),* Eland (*Tragelaphus oryx),* Impala (*Aepyceros melampus)*, Lichtenstein's Hartebeest (*Alcelaphus lichtensteini),* Reedbuck (*Redunca redunca),* Roan Antelope (*Hippotragus equinus),* Sable Antelope (*Hippotragus niger)*, Sitatunga

1998). Local extinction of some large mammal species in Tanzania's major wildlife areas is attributed to increase of human activities (Miller & Harris 1977; Newmark 1996; Newmark et al. 1991).

Africa had bitter experience on poaching between 1970s and 1980s, when two of its charismatic species - black rhinoceros (*Diceros bicornis*) and elephant (*Loxodonta africana*) - faced a dramatic decline. The number of black rhinos in the continent dropped from 65,000 in 1970 to 2,400 in 1995 while that of elephants was reduced from 1.3 million in 1979 to 625,000 in 1989 (Adams & McShane 1996). Africa's lion (*Panthera leo*) population has also suffered from human impacts. It dropped from about a million in the pre-colonial era to 500,000 by 1950, then to 200,000 by 1975 (Myers in Frank et al 2006) and to less than 100,000 in early 1990s (Nowell & Jackson in Frank et al 2006). The most recent estimate is below 28,000 (Frank et al. 2006).

**The contributing factors to failure of fences and fines approach**

***Local resentment***

The political, social and economic costs of wildlife conservation fomented resentment toward conservation policies. Illegal activities, physical violence and/or vandalism (see Table 1) have been pursued deliberately to retaliate against conservation authorities, thus threatening the survival of wildlife. Makombe (1993:online) phrases this scenario succinctly: "People prevented from using their wildlife legally will tend to ignore it, *eliminate* it, or use it illegally, to the disadvantage of the resource and those who might develop and use it legally."

(*Tragelaphus spekei),* Topi (*Damaliscus korrigum),* Waterbuck (*Kobus ellipsiprymnus),* Warthog (*Phacochaerus aethiopicus)* and Zebra (*Equus burchelli*

**Table 1: Some examples on local resentment toward conservation policies in Africa**

| Area | Event | Local communities' response | Source |
|---|---|---|---|
| Simien N.P. (Ethiopia) | Imposed restrictions over access to firewood | Physical violence | IIED (1994) |
| Virunga N.P. (DRC) | Attempts to evict the local communities | Killing of 36 wardens | Machlis (1989) |
| Serengeti N.P. (Tanzania) | Eviction of Maasai pastoralists in 1940s | Physical violence; spearing of rhinos and setting fires with malicious intent | Neumann (1992) |
| Amboseli N.P. (Kenya) | Eviction of Maasai pastoralists in 1970s | Spearing of rhinos | Western (1984) |
| Etosha N.P. (Namibia) | Restriction of hunting imposed to Ovambo tribesmen during the colonial time | Marked freedom celebration in 1990 by cutting game fences and driving into the park armed with guns to hunt for meat | New Scientist 1991 (In IIED 1994) |
| Benoue N.P. (Cameroon) | Imposed restriction on land use and property damage | Encroachment and illegal hunting | Weladji & Tchamba (2003) |
| Maasailand (Kenya) | Livestock predation by lions | Poisoning and spearing of lions | (Frank et al. 2006) |

***Poverty***

Even if the law that prohibits certain practices and activities exists, a need to survive may prompt violation of this law. Poor people are compelled to adopt the coping strategies, set priorities and make economic choices that are ecologically destructive. Illegal hunting in Serengeti National Park, for example, is linked to income poverty (Loibooki et al. 2002). Inability to afford modern technologies and inputs required for more agricultural output leaves people with no option, but to open new farms in the wildlife sensitive areas such as protected areas, migratory corridors and dispersal areas.

***Human population growth***

Growth of human population raises demand for natural resources. Since these resources are prohibited, people obtain them illegally. Campbell and Hofer (1995) and Loibooki et al (2002) showed that there was a positive correlation between illegal hunting in Serengeti National Park and human population growth around the park. Hackel (1999:728) identifies three conservation problems associated with people settling or using new areas as a result of human population

growth: (1) disruption of ecological processes essential to maintain long-term biodiversity (for example, dispersal and colonisation might become more difficult as habitat is transformed to human use); increased hunting for home or market; and (3) increased pressure from local people to open protected lands for community use.

***Inadequate government budgets***

Besides resentments, poverty and demographic factors, the economic condition in many African countries constrains conservation efforts even further. The economic situation of many developing countries along with other overriding national priorities have often rendered the natural resources the least funded sector. For example, in Tanzania, only 1.2% (some US$52 million) of the national development budget was allocated from 1976 to 1981 for the entire sector i.e. wildlife, forestry and fisheries (Yeager 1986). The budget had continued to decrease gradually since then (See e.g. Table 2). In 1987 Selous Game Reserve, which is Tanzania's largest protected area, received only US$3/km$^2$ (Baldus et al. 2003). This is far low compared to amount required for effective control of commercial poaching. In 1980s the adequate amount was estimated to range between US$200 and 400/km$^2$ per annum[4] (Bonner 1993; Leader-Williams et al. 1990).

Table 2: Budget allocation to Department of Wildlife in Tanzania (US$000s)

| | 1982-85 | 1985-86 | 1986-93 | 1993-96 | 1996 |
|---|---|---|---|---|---|
| Recurrent | 12,989 | 5,630 | 2,178 | 190 | 320 |
| Development | 1,047 | 1,185 | 710 | 39 | 710 |
| Total | 14,036 | 6,815 | 2,888 | 229 | 1,021 |

Source: URT 1995

[4] Perhaps this figure is an overestimate. Jachman and Billiouw (1997) reported that US$82.2/km$^2$ per annum was required for law enforcement in the Central Luangwa Valley, Zambia.

The meagre financial resources allocated for wildlife sector have, therefore, been insufficient to cater for adequate staff, remuneration and equipment. For example, in Tanzania, while the ideal staffing ratio for game reserves is estimated at 1:25 (persons:$km^2$) (Severre 2000), the ratio has been 1:130 – i.e. 1438 staff patrolling 186,000 $km^2$ (Masilingi 1994; Severre 2000). According to Masilingi (1994), the wildlife Department in each administrative region of Tanzania was served by only one vehicle despite the poor roads and the big size of the regions[5]. Occasionally, lack of spare parts and fuel left these vehicles grounded. Other countries experience more or less similar situation. In Cameroon, for example, the staff area ratios for two protected areas viz. Dja Wildlife Reserve and Lobeke National Park were 1:84 and 1:200, respectively (Koulagna Koutou 2001). Moreover, in many countries, the wildlife personnel went without salaries for months, lacked uniforms and had inferior firearms compared to poachers (Bonner 1980).

**Searching for an alternative conservation approach**

The negative human impact on wildlife populations had prompted the perception that 'fences and fines' approach had failed to conserve wildlife. Over the last two decades, community conservation (CC) approach emerged as the most appealing strategy to address this problem (see e.g. Barrett & Arcese 1995; Berkes 2003; Gibson & Marks 1995; Songorwa et al. 2000). The approach is based on the premise(s) that "if conservation and development could be simultaneously achieved, then the interests of both could be served" (Berkes 2003:621) and "when wildlife pays, wildlife stays**"** (Pearce 1997:4). These catchphrases commensurate with the "use it or lose it" philosophy (Baskin 1994) underscoring that, the conservation efforts investing on biological solutions or repressive legislation whilst ignoring the socio-economic conditions of the people are doomed to failure. Barrow and Fabricius (2002:77) express this succinctly by stating that "ultimately, conservation and protected areas in contemporary Africa must either contribute to national and local livelihoods, or fail in their biodiversity goals." Central to many

[5] For example, Arusha region spanned some 80,168 $km^2$ , Tabora - 76,151 $km^2$, Rukwa -75,240 $km^2$, Shinyanga - 50,781 $km^2$ (Source: http://www.nbs.go.tz/abstract2002/landandclimate.pdf).

CC approaches, provision of benefits is seen as a pragmatic way of motivating local people to align their behaviours with conservation goals (Borrini-Feyerabend et al. 2002; Emerton 2001; Makombe 1993; Western 2001). Essentially, the strategy seeks to induce local people to "surrender access to, or curtail illegal offtake of, native species and their habitats" (Barrett & Arcese 1995:1074).

Despite being ambitious, the growing consensus in the academic literature reveals disappointing outcomes for most CC initiatives. Some of the reasons for this failure include wrong assumptions underlying these programmes (Barrett & Arcese 1995; Gibson & Marks 1995; Hackel 1999; Songorwa 1999); and limited budgets that make the initiatives too small to exert a reasonable influence over the forces threatening protected ecosystems (Wells & Brandon 1992). Other reasons are missing balance/link between the benefits and costs (Madzudzo 1997); lack of interests among the communities (Songorwa 1999); incompatibility between community development objectives and those of conservation (Berkes 2003); and gender insensitivity (IIED 1994; Songorwa 1999).

Sustainability of these programmes has also been questioned. Most of the programmes are donor-initiated and funded and lack sound strategies to survive in case of donor-pull-out (Songorwa 2004b; URT 1994). The benefits from the initiatives are also likely to be reduced or terminated in an event of population increase and low tourism earnings - due to ecological, political, policy and security factors (Barrett & Arcese 1995; ZimConservation 2004). Reduction or termination of the conservation benefits will likely undermine the conservation objectives on the basis of 'no benefits, no conservation.' Furthermore, use of conservation benefits as a basis for local support to conservation may risk the conservation objectives in case more profitable economic options emerge (Hackel 1999).

## Human-wildlife conflicts

The historical account of wildlife conservation given above presents conflicts over natural resources as the important recurring features in conservation areas. These conflicts are inevitable due to multiple, and very often incompatible interests held by various actors. Natural resources are subject to competition among the actors and among different land uses. According to Barlowe (in Kajembe et al 2003) this competition has impact among land resource supplies. He argues that, in the competition that takes place between individual operators and between uses, resources normally go to those operators and uses that offer the highest prices and enjoy the greatest prospects for their remunerative use. Incompatibility of land uses, and different combinations of interests and objectives of different stakeholders render this tendency operative, but not as smoothly and perfectly as it might The operators tend to assign different weights to the private and social benefits associated with alternative land uses, the tendency that generates the conflicts of interest (Kajembe et al. 2003).

The reasons for conflicts associated with the use of natural resources are soundly summarised by Kajembe et al (2003:334) as follows:

1. Natural resources are embedded in an environment or interconnected space where actions by one individual or group may generate effect far-site.
2. Natural resources are also embedded in a shared social space where complex and unequal relations are established among a wide range of social actors. As in other fields with political dimensions, those actors with greatest access to power are also able to control and influence natural resources decisions in their favour.
3. Natural resources are subject to increased scarcity due to rapid environmental change, increasing demand and their unequal distribution. Environmental change may involve resource degradation, overexploitation of resources, extensive land clearing or climate change. Increasing demand over resources have multiple social and economic dimensions, including population growth, changing consumption patterns, trade liberalisation, rural

enterprise development and changes in technology and land use. Resource scarcity may also result from unequal distribution of the resources among individuals and social groups or ambiguities in the definition of rights to common property resources. Homer-Dixon and Blitt (in Kajembe 2003:334) observes that "the effects of environmental scarcity such as 'constrained agricultural output, constrained economic production, migration, and disrupted institutions, can either singly or in combination, produce or exacerbate conflict among groups

4. Natural resources are used by people in ways that are defined symbolically. The forests, wildlife and water are not just material that people compete over, but are also part of a particular way of life (e.g. for a farmer, hunter, or pastoralist), an ethnic identity, and a set of gender and age roles. These symbolic dimensions of natural resources render themselves to ideological, social, and political struggles that have enormous practical significance .

**Ingredients of Conflicts**

Conflicts comprise of several ingredients. The major ones, often the most common in human – wildlife, are needs, perceptions, power and values. Table 2 below summarises these ingredients.

Table 2: **Ingredients of Conflicts**

| INGREDIENT | DESCRIPTION |
|---|---|
| **NEEDS** | Needs are things that are essential to our well-being. Needs are different from desires. The latter are things which we would like, but are not essential. Conflicts occur when one party believes that in order to satisfy his/her needs, those of an opponent must be sacrificed. Interest-based conflicts occur over substantive issues (e.g. money, natural resources, time); procedural issues (the way the dispute is to be resolved) and; psychological issues (perceptions of trust, fairness, desire for participation, respect). |
| **PERCEPTIONS** | People interpret reality differently. They perceive differences in the severity, causes and consequences of problems. Misperceptions or differing perceptions may come from: self-perceptions, others' perceptions, differing perceptions of situations and perceptions of threat. Perceptions on values, threats, causes and consequences may lead to decisions and actions that may undermine the interests and needs of other stakeholders. For instance, perception about local people's impact on resources may result into decision to gazette an area, evict people and/or prohibit access to resources. Likewise, local people may perceive conservation programme or other stakeholders as a threat to their current or future livelihoods and, therefore, |

| | |
|---|---|
| | seek some provocative means to mitigate their impacts. |
| **POWER** | How people define and use power is an important influence on the number and types of conflicts that occur. This also influences how conflict is managed. Conflicts can arise when people try to make others change their actions or to gain an unfair advantage. For instance, use of political, military, legal or economic power to deny local people access to land and other resources for advantage of elite class may result into conflicts. Power imbalance leads to unequal distribution of benefits and costs of conservation and, therefore results in conflicts. |
| **VALUES** | Values are beliefs or principles we consider to be very important. Values explain what is good or bad, right or wrong, just or unjust. Serious conflicts arise when people hold perceived or actual incompatible values or when values are not clear. Value disputes arise when one party refuses to accept the fact that the other party holds something as a value rather than a preference and, therefore, attempt to force one set of values on another one. |

**Conflict management**

As the negative impacts of conflicts over natural resources are increasingly becoming apparent, conflict management is being adopted as the most important component of conservation work. Failure or success in achieving effective conflict management relies on observance of the key principles for conflict management. Four general principles are applicable in addressing the conflicts prevailing in natural resources sector (Lewis in DSE 1998).

***1. Focus of underlying interests rather than positions***

Interests are people/institutions fundamental needs and concerns while positions are just proposals that are put forward to try to satisfy the interests. Worked on positions rather than interests

***2. Address both the substantive and procedural dimensions***

Most conflicts have substantive and procedural dimensions. Substantive dimension involve the interests that relate to tangible needs such as firewood, wildlife, non-timber forest products, game meat, grazing areas, arable land and security from problem animals. Procedural issues consist of such needs as being included in decision making when substantive issues are at stake, having their ideas and opinion heard and valued and being respected as a group.

***3. Involve all significantly affected stakeholders***

Failure to involve all significantly affected stakeholders in the establishment and design of protected areas, in decisions affecting the management of the area or, in developing solutions to conservation problems may lead to conflicts or limit the conflict resolution process. Failure to involve the key stakeholders reduces the likelihood of their interests and concerns to be known and considered. Conflicts are, therefore, likely since the stakeholders may not have an ownership of the outcome.

***4. Understand the power that various stakeholders have***

Power is critical element in conflict management. A group which feels powerless to influence the outcome through bureaucratic decision making process may choose to use illegal activity to meet their interests or leave the forum. Some power is real while some is perceived. Kinds of power which should be understood in addressing conflicts entail: power of position (authority, leadership), power of knowledge (having information); personal power (being personally forceful, persuasive); economic power (having financial resources); political power (having supportive constituency or access to leadership); legal power (having a good legal case, expert legal council, access to courts); coercive physical power (having police or military backing, weaponry) and; family power (being from a well connected family).

## CONCEPTUAL FRAMEWORK APPROACH

This study employs three scientific/academic approaches viz. conservation biology, environmental history and political ecology to understand the complex realities underpinning human-wildlife interactions in Africa. The three approaches offer a deep understanding on the way human species is connected to wildlife resource; the impact human inflicts on wildlife resource and vice versa. The study also seeks to understand the historical relationship between different actors and how this relationship has been shaped by the way the resource is accessed, controlled, managed and distributed.

### Conservation biology

As human impact on species and ecosystems increases, loss of biodiversity is becoming an apparent challenge to conservation community. The desire to face this challenge has given rise to development of conservation biology. Conservation biology is an interdisciplinary field that merges traditional fields of natural sciences (e.g. population biology and ecology) and social sciences (e.g. sociology, anthropology, economics, law) with a view of meeting three goals: to document the full range of biological diversity on earth; to investigate human impact on species, communities and ecosystems and; to develop practical approaches to prevent extinction of species, maintain genetic variation within the species, and to protect and restore the biological communities and their associated ecosystems (Primack 2002). The field is regarded as a crisis field, as it calls for immediate intervention in dealing with conservation problems even when the knowledge is insufficient (Meffe and Carroll 1997: Primack 2002). This is important as waiting for such knowledge may be worsen the situation..

Unlike the traditional resource conservation which was motivated by utilitarian, single-species issues, conservation biology targets the entire systems and all their biological components and processes. The field recognises the contribution that nonbiologists can offer to biodiversity conservation. The need to incorporate ideas and expertise from broad ranges of other fields is

prompted by the fact that much of the biodiversity crisis arises from human pressures. Meffe and Carroll (1997) argue convincingly that, because the need for conservation in the first place is the direct human intervention in natural systems, an understanding of humanistic viewpoints is vital for reducing present and future confrontations between human expansion and the natural world.

**Environmental history**

Beinart (2000) defines environmental history as the study of environment in a historical framework aiming at exploring the reciprocal relationship between human and natural forces in the examination of the human impact on the natural world. It, therefore, deepens our understanding of how humans have been affected by their natural environment through time and, conversely, how they have affected that environment and with what results (Oosthoek 2005)..

Historically, landscapes and natural resources have been subjected to changes due to a plethora of factors. These factors, among others, include human population growth, technological changes, market forces and policies. The impact of these factors have either been beneficial or detrimental to landscape and resources. Humans, on the other hand, have been affected by the changes and the way the landscapes and resources are managed. Past experience, gathered through historical analysis of these changes and impacts is essential in devising the effective management interventions.

**Political ecology**

Political ecology combines the concerns of ecology and political economy that together represent an ever-changing dynamic tension between ecological and human change, and between diverse groups within society at scales from the local individual to the Earth as a whole (Peterson 2000). It seeks to "understand the complex relationship between nature and society through a careful analysis of what one might call forms of access and control over resources and their implications for environmental health and sustainable livelihoods" (Watts (2000:257). The field offers

explanation on how exploitation, distribution and control of natural resources are mediated by differential relations of power within and amongst societies (Sheridan 1995). Many realities about human-environment interactions exist. The fact that these realities need to be questioned to encourage new thinking and practice has prompted adoption of this approach. This study uses political ecology as an analytical and theoretical tool to assess how nature is valued by different groups of actors.

Wildlife resource is contested by different actors having different interests, different values, perceptions and powers. Often the powerful actors have influence over the discourses on conservation and environment and development. Discourses are defined as a shared meaning of a phenomenon by a small or large group of people. The conservation discipline has two globally leading discourses viz. fortress conservation and community conservation.

The fortress conservation discourse (also called fences and fines approach), is based on the premise that wild species must be preserved by reserving areas and barring people from living within and using the resources from these areas. The needs and interests of local people are, therefore, ignored. The discourse conceptualises local people as threats and causes of land degradation and species extinction through encroachment and poaching. Africa is seen as the Garden of Eden and human species as its destroyer while preservation is seen as salvation (Nelson 2003; Svarstad 2006).

Unlike fortress conservation discourse, Community-based Conservation discourse focuses on achieving conservation objective by allowing local people to participate in the management of, and benefit from natural resources. The discourse, emerged after the perceived failure of fences and fines approach, works on the premise that successful long-term management of the protected areas can potentially be secured if local people participate fully in their conservation and derive tangible benefits from the resources therein. As Songorwa (1999, p. 2061) puts it succinctly, the focus of the discourse is "to change rural people's behaviours and practices and use those people and their new behaviours as a vehicle for achieving a conservation goal."

**Human-wildlife interactions**

The schematic model below (Figure 1) describes coexistence between actors and wildlife, development of conservation policies and protected areas, costs and benefits of conservation and influence they have on attitudes and behaviours of the actors toward wildlife. The major components of this schematic model and their linkages are discussed below.

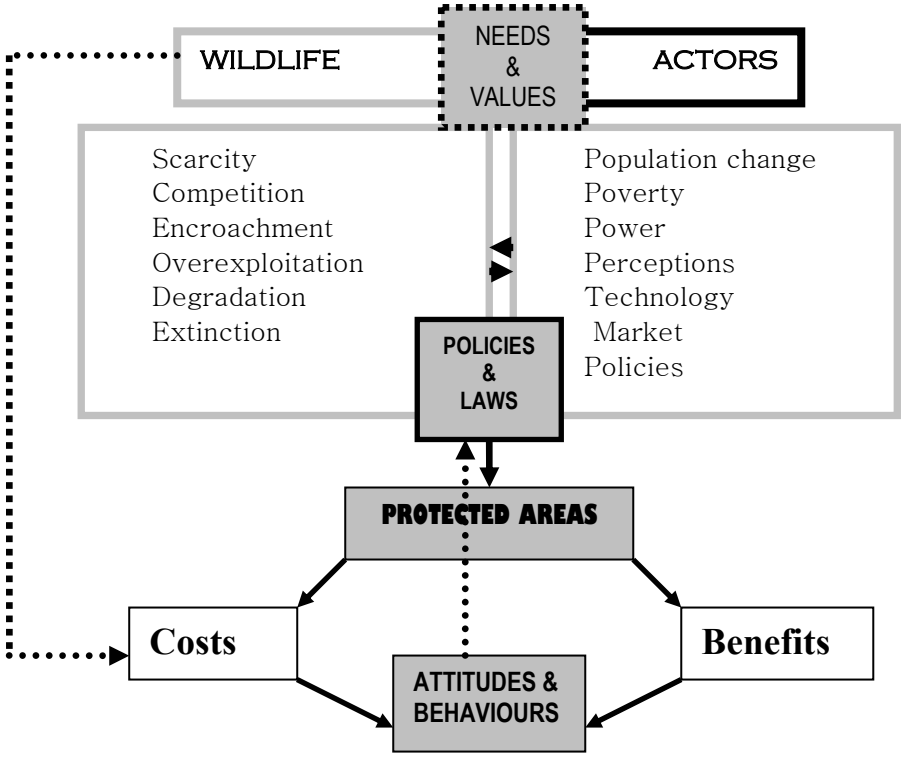


Figure 1: A schematic model showing the coexistence between actors and wildlife and how subsequent policies influence the attitude of some actors.

**Linkages and flows in the model**

***Actors***

Different actors utilise wildlife to satisfy their needs and sustain their values. Attitudes, behaviours and actions of different actors over resources are governed by a number of factors.

These factors also influence the relationship between the actors. Exponential growth of human population is one of these factors. This factor creates high demand and competition for arable and grazing land, medicinal plants, firewood, water resources, building poles and other resources. Meeting these demands leads to transformation and degradation of wildlife habitats, migratory corridors, foraging grounds and dispersal areas. This in turn disrupts the ecological processes that are essential in maintaining the long-term biodiversity. Population growth also increases demand for game meat and other animal products, a situation that may lead to resource depletion. Sometimes increased pressure from local people may force the government to open protected lands for community use at the expense of wildlife species.

Another critical factor influencing the behaviour, relationship and impact of actors on wildlife resources is poverty. Poverty may induce the actors to adopt the coping strategies, set priorities and make economic choices that are ecologically destructive. For example, illegal hunting and charcoal burning may be pursued for subsistence and a way of earning income. Opening new farms in the wildlife sensitive areas such as protected areas, migratory corridors and dispersal areas becomes the most feasible option for people who cannot afford modern technologies and inputs required for more agricultural outputs.

Perceptions and power also affect actors' behaviours towards other actors and natural resources. People interpret reality differently. They perceive differences in the values, threats, severity, causes and consequences of problems. These differences may come from self-perceptions and others' perceptions and may lead to decisions and actions that may undermine the interests and needs of other actors over resources. Power is also a crucial factor. The way people define and use power has influence on the number, types and management of the conflicts that occur. Conflicts emerge when people try to make others change their actions or to gain an unfair advantage. For instance, use of political, military, legal or economic power to deny local people access to land and other resources for advantage of elite class generate conflicts. Power

imbalance leads to unequal distribution of benefits and costs of conservation and, therefore, results in conflicts.

Behaviour and impact of actors over resources may change as a result of technology change, market forces and policies. Superior technology and availability of market may encourage overexploitation of wildlife species and habitats. A typical example is a dramatic decline of rhino and African elephants that occurred between 1970s and 1980s. Likewise, lenient and inappropriate policies may encourage overexploitation and resource degradation. For example, some policies may favour the economically profitable land uses that are ecologically destructive and, therefore, undermine conservation objectives.

***Wildlife***

Wildlife is a resource contested by several actors. The resource is renewable i.e. it is available for use on a continuing basis. However, this renewability depends on the intensity of use. High intensity of use (due to population increase, market forces, improved technology of harvesting and policy changes) may render it scarce. Scarcity leads to competition. A resource may be overexploited or depleted when the rate of harvesting exceeds the rate of regeneration. Likewise, wildlife species and populations are subjected to threats due to habitat destructions. Habitat destruction reduces their potential utility as shelter, refuge, dispersal and breeding grounds for wildlife. Hunter (2002:193) defines three forms of habitat destruction (viz. degradation, fragmentation and outright loss). While habitat degradation is "the process by which habitat quality for a given species is diminished", fragmentation "is the process by which a natural landscape is broken up into small parcels of natural ecosystems, isolated from one another in a matrix of lands dominated by human activities". Outright loss of habitats occurs when habitat quality is so low such that the environment is no longer usable by a given species. Traditional conservation practices have involved enactment of policies and laws aiming at halting the threats facing biodiversity.

### *Needs and Values*

Coexistence between actors and wildlife is derived through utilisation of the resource by the actors to satisfy their needs and the specific values they attach to this resource. Needs are things that are essential to our well-being. Needs are different from desires. Conflicts over needs arise when some actors disregard others' needs. In conservation, conflicts emerge when conservation is pursued against the needs and values of certain actors. Incompatible or unclear values generate conflicts. Conflicts also arise when one party refuses to accept the fact that the other party holds something as a value rather than a preference. Different actors value wildlife differently. A rural African may value a wild animal as a source of protein and for spiritual reasons. An American or European may value it for aesthetic reasons. A national government may see it as a source of foreign exchange. Yet, regardless of the values held by different actors, others may consider the animals as vermin which need to be eliminated. An attempt by the politically and economically powerful actors to win their interests at the expense of the weak foments conflicts. The weak often resist conservation policies through violation of law, sabotage and violence (IIED 1994; Machlis 1989; Neumann 1992; Western 1984; Frank et al 2006; Weladji & Tchamba 2003).

### *Conservation policies, laws and protected areas*

Although conservation is traditionally justified by ecological threats, sometimes these threats are not real. They emanate from the mere perceptions of the powerful actors (State, conservationists) and the intent of these actors to suppress the values of the weak in order to ensure that their values and needs are enhanced. These actors, by virtue of their powers influence the conservation policies and laws. Along with prohibiting local people from hunting, these policies have prescribed creation of wildlife protected areas as the most feasible strategy of conserving wildlife.

***Protected areas***

Protected areas are the main focus of conservation action. They fall under different categories depending on accessibility by the people. According to IUCN classification, the most restricted category is strict nature reserve followed by national park. The strict nature reserves allow the scientific studies only, while scientific studies and non-consumptive tourism such as game viewing are allowed in the national parks. In the Serengeti ecosystem, tourist and resident hunting is allowed in the game reserves, game controlled areas and open areas. However, the game reserves are more restrictive unlike the latter two categories, where in addition to licensed hunting other land uses such as settlements, cultivation; livestock grazing and beekeeping are allowed. Entry into game reserves without permission is prohibited by law (URT 1974). The Ngorongoro Conservation Area is a multiple use area where non-consumptive tourism is conducted along with pastoralism. Despite their ecological and economic importance, protected areas inflict social and economic costs to adjacent local communities.

***The costs and benefits of protected areas***

Creation of wildlife protected areas leads to two outcomes, costs and benefits. The major question, and often the source of many conflicts in conservation has been – 'who pays for wildlife conservation and who benefits from it'. The costs induced by wildlife conservation include opportunity cost of land and other resources (e.g. medicinal plants, water, firewood etc) and direct social and economic costs such as crop damage, livestock depredation, wildlife related accidents. The benefits include consumptive and non-consumptive forms of utilisation. Often, the costs and benefits of conservation are unevenly distributed among the actors. This may lead to conflicts or limit the effective conflict resolution. The magnitude of the costs and benefits of protected areas and, therefore, conflicts depends on the category of protected area (see classification above). The costs tend to be more significant in the most restricted protected areas.

***Attitudes and behaviours towards conservation***

Both the costs and benefits influence the attitude and behaviours of the actors toward conservation and the level of conflicts and their management. The attitude concept, when properly defined, has three components: one dealing with behaviour – or rather the intentions to carry out a specific behaviour (such as supporting or resisting an action); a cognitive or knowledge component; and an affective component dealing with normative beliefs and emotions. Increasingly, understanding of the attitudes of different actors is regarded as essential means of evaluating public understanding, acceptance and the impact of conservation interventions (see e.g. Gillingham and Lee 1999; Holmern 2002; Holmes 2003; Infield 1988; Infield and Namara 2001; Kalternborn and Bjerke 2002; Kalternborn et al 1999.

Positive attitudes are likely when the wildlife-related benefits are high and the wildlife-induced costs are low and vice versa. When the attitude of the actors result in behaviours that undermine the conservation objective, amendment of the existing laws and policies or enactment of the new ones may be necessary. A general rule in the contemporary conservation policies is that an incentive to conserve, and to tolerate wildlife-related costs, among the local communities is a function of economic gain – short of that may lead to illegal use and/or active destruction of the resource (See e.g. Emerton, 2001; Neumann, 1992; Wells and Brandon, 1993; Western, 1994).

## THESIS OVERVIEW

### Rationale

The increase of human demands on natural resources, attributed mainly to population growth and poverty, prompts more conservation efforts to mitigate the problems of overexploitation and habitat loss. Traditionally, these efforts have entailed creation of protected areas and guarding them through a militaristic strategy. Unpopularity of this strategy among the local communities and further deterioration of natural resource base had inspired a new paradigm in conservation work. This paradigm advocates use of the benefit-based approaches as a strategy of achieving a win-win scenario. However, earlier evaluation of this paradigm had indicated some disappointing outcomes. Putting these problems and issues in proper perspective calls for tracing of the historical and political evolution of the wildlife conservation policies. While the growing pressures in natural resources and ecosystem could be a function of plethora of environmental, socio-economic and political factors, only scant information is available in the western part of Serengeti. This thesis, comprised of five papers, seeks to address the current information gaps. This information may be useful in improving the conservation policies and strategies in Tanzania and other developing countries.

## Study area and communities

### *Study Area*

Serengeti Ecosystem, situated between latitudes $1^0$ 28' and $3^0$ 17' S and longitudes $33^0$ 50' and $35^0$ 20' E, spans a total area of about 30,000 $km^2$ in northern Tanzania (Figure 2). It is a highland savannah region with thorn tree woodlands and plains ranging from approximately 900 to 1,500 metres above the sea level. Average annual rainfall ranges between 500 and 1200 mm declining towards the Park boundary and increasing towards Lake Victoria (Campbell & Hofer 1995). Thirty species of ungulates and 13 species of large carnivores have been recorded in the area while avifauna exceeds 500 species (Emerton & Mfunda 1999).

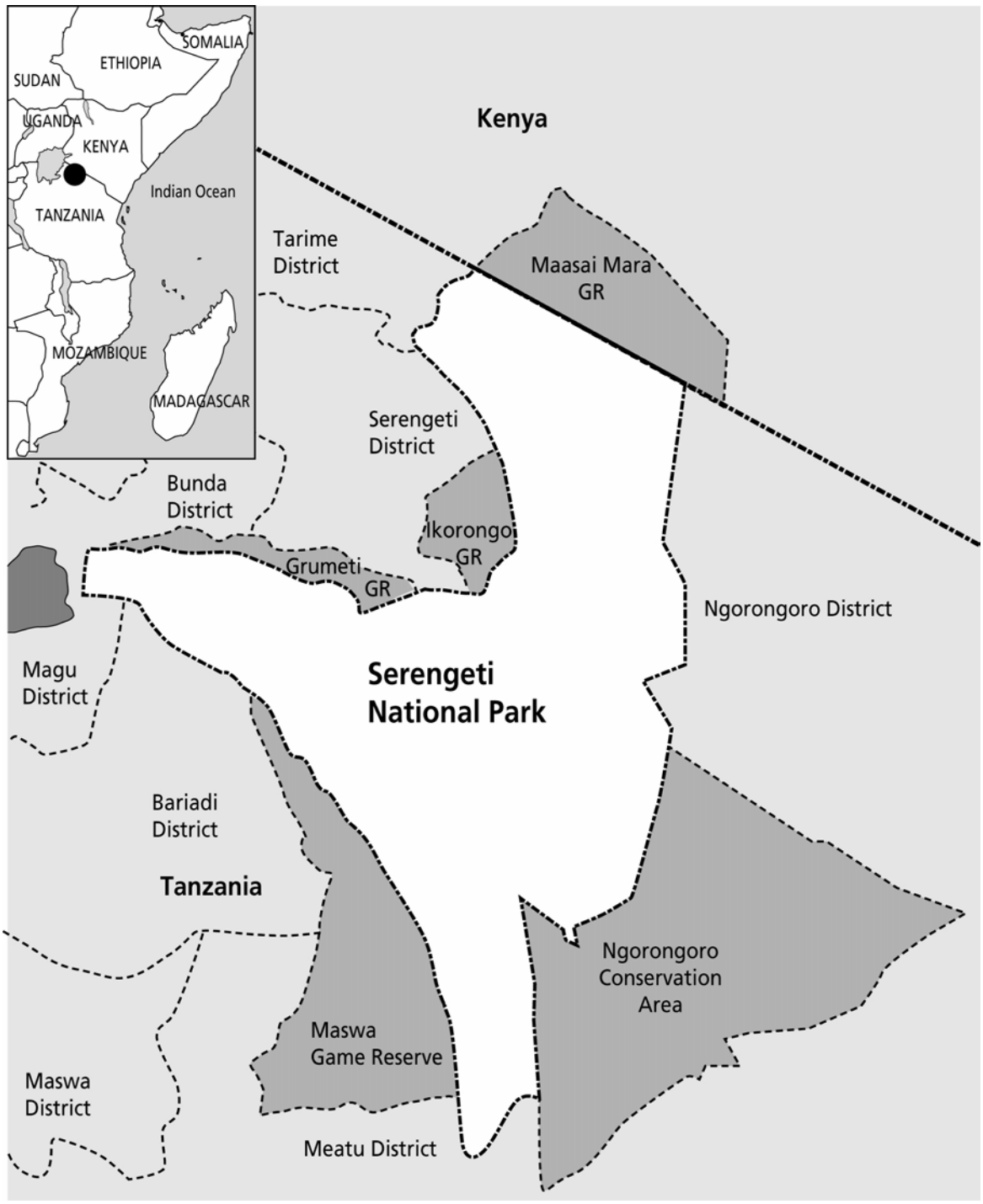


Figure 2: Serengeti National Park, adjacent protected areas and districts

The ecosystem is composed of a network of protected areas (Figure 2) falling under different management regimes. Serengeti National Park (14,763 $km^2$) falls under the jurisdiction of Tanzania National Park while the Ngorongoro Conservation Area (8,288 $km^2$) is managed by NCA Authority. Ikorongo (563 $km^2$), Grumeti (416 $km^2$), Maswa (2,200 $km^2$) and Kijereshi Game Reserves (65.7 $km^2$) along with Loliondo Game Controlled Area (4,000 $km^2$) and Ikoma Open Area are under the Department of Wildlife of the Ministry of Natural Resources and Tourism. Kenya's Maasai Mara National Reserve (1,368 $km^2$) is managed by Narok County Council. UNESCO designated Serengeti, both as a Natural World Heritage Site and a Biosphere Reserve in 1981 (UNESCO 2003).

The Western part of Serengeti is ecologically significant as a buffer zone for SNP and a corridor for wildlife species migrating between Serengeti and Maasai Mara in Kenya. These species include some 1.4 million wildebeest (*Connocahetes taurinus*), 0.2 million zebra (*Equus burchelli*) and 0.7 million Thompson's gazelle (*Gazella thompson*) (Norton-Griffiths 1995).

***Study Communities***

The western Serengeti is highly diverse in terms of ethnicity. Over 20 tribes live in the area, the major ones being Ikoma, Sukuma, Kurya, Ikizu, Natta, Isenye, Zanaki, Zizaki, Ngoreme, Taturu and Jita. Agropastoralism plays a major role in the livelihoods of these tribes. The major crops are maize, cassava, millet and sorghum as food crops and cotton as a cash crop. Livestock include cattle, goats and sheep.

Generally, people are poor with average annual income earned through agropastoralism ranging from US$150-200 (Johannesen 2002). This amount is far below the Tanzania's per capita income of US$280 (WB 2003). In order to supplement this meagre income, communities pursue off-farm activities such as illegal hunting and charcoal burning. The impacts of these activities on the ecosystem and natural resources are positively correlated with human and livestock population growth (Campbell & Hofer 1995; Kauzeni 1995; Loibooki et al. 2002). The combined

human population for six districts in western part of Serengeti is 2.01 million (87.1/km$^2$) and annual growth rate is beyond average national rate of 2.9% (URT 2002).

Wildlife conservation imposes huge economic and social costs to people living in western Serengeti. Further to opportunity costs of land, wildlife inflict losses on crops (Emerton & Mfunda 1999; Walpole 2004), and occasionally kill/wound livestock and humans (Kideghesho, unpublished data, 2004).

## SUMMARY OF RESULTS

### Paper I: Co-existence between the pre-colonial traditional societies and wildlife in western Serengeti, Tanzania: Its relevancy in the contemporary wildlife conservation efforts

The pre-colonial traditional societies in Western Serengeti were physically and spiritually connected to the plants and animals in their surroundings. Wildlife species were utilised to cater for subsistence, trade and various non-food use needs. The rational use of these resources was guaranteed through tribal rules and laws. For instance, observance of the condition, sex and age of the animal, locality and season was obligatory for all hunters. The beliefs and taboos served to regulate behaviours of the hunters. For example, a belief that a person who kills animals indiscriminately would remain poor foreclosed this habit. The bush meat was also restricted in important social events like wedding, rituals and by mothering women. The council of elders called *'Ritongo'* supervised the functioning and enforcement of all rules, including those governing hunting and daily life.

Ritualistic and religious affiliation with certain wildlife species (totemic species) and their habitats symbolised a clan or a tribe. This species offered the species and habitats protection against wanton destruction. Examples of totemic animals among the clans of Ikoma and Natta tribes were: elephant *(Loxodonta africana),* lion *(Panthera leo)*, spoted hyena *(Crocuta crocuta),* leopard *(Panthera pardus* and bushbuck *(Tragelaphus scriptus).* Others were Ostrich *(Struthio camelus),* leopard tortoise *(Geochelone pardalis)*, cobra (*Naja haje),* green mamba *(Dendroaspis angusticeps),* python *(Python spp),* and puffadder *(Bitis arietans)*. Further to animals, the cultural

events provided an incentive for protection of particular plant species and sites. Trees like desert date (*Balanites aegyptiaca*), Bastard or false marula (*Lannea schuenfurthii*) and cape ash (*Ekebergia capensis*) were protected because in Ikoma tribe circumcision (‘*ghusara’)* was done under these trees. Some sites were designated for rituals and, therefore, unauthorised human activities were sanctioned in these sites.

**Paper II: The environmental history and political ecology of wildlife conservation in Western Serengeti, Tanzania**

The paper uses the environmental history and political ecology approach to understand the wildlife conservation issues in Western Serengeti during the colonial and post-colonial regimes. It presents the history and impacts of human activities on wildlife species and habitats and analyses the political economy, actors and their politics and conflicting representations of the resource.

The paper shows a clear power imbalance and, therefore, unequal access to wildlife benefits, that existed during the colonial and post-colonial regimes. It shows the role of propaganda in promoting the interests of the powerful actors (state, conservationists) and suppressing those of the weak (local inhabitants). For example, the local people were falsely accused of barbaric slaughter of wildlife. This imbalance had prompted resistance against conventional conservation policies from local people. This resistance persisted even after political independence, since no radical changes were adopted to address the native rights that were obliterated by the colonial conservation policies. This resistance and the inefficient state-led enforcement due to country’s economic crisis of 1970s and 1980s inspired adoption of community conservation initiatives. However, these initiatives have been fundamentally flawed, due to a number of reasons. The outcomes have rather been contradictory and disappointing.

**Paper III: Serengeti shall not die: Can the ambition be sustained?**

The paper appraises the validity of the ambition carried in a popular book "Serengeti shall not die" (Grzimek & Grzimek 1960) by discussing the factors (or forces) threatening the ecological integrity and conservation objectives of Serengeti ecosystem. These factors are population growth (human and livestock), poverty, illegal hunting, habitat destruction and diseases. Measures to mitigate these threats, and therefore sustaining the ambition, had included provision of adequate conservation status (e.g upgrading of protected areas from lower to higher categories), law enforcement, community conservation and benefit based approaches. The flaws exhibited by these strategies are pointed out.

**Paper IV: The dilemmas of benefit-based approaches in Serengeti Ecosystem, Tanzania**

The seeks to contribute to conservation literature and enrich understanding on efficacy of the community conservation (CC) approaches - a strategy adopted in response to perception that the "fences and fines" approach had failed to conserve wildlife. The study uncovered the following flaws exhibited by the current benefit-based approaches:

***There is inadequate commitment to CC:*** Law enforcement received higher priority than CC in terms of budget allocation. Furthermore, some wildlife managers were pessimistic about the ability of CC strategy to achieve conservation goals.

***Amount of the benefits is too minimal:*** Communities received too minimal benefits which could neither offset the direct costs inflicted by wildlife nor outweigh the returns from the ecologically damaging land/resource uses.

***The forms of the benefits are inappropriate:*** The benefits did not focus on the immediate/felt/non-pecuniary needs of the people. Further the *non-rivalrous* and *non-excludable* nature exhibited by communal benefits, could not reward the individual behaviours i.e. they encourage the problem of free riders or cheaters. The criminals (e.g.

poachers) and non-victims of conservation-induced costs enjoy the benefits just like those paying the price of conservation

***Powerful actors interfere with benefit sharing programmes:*** by virtue of their financial power, some actors interfere with the mechanisms set to enable the local people to access the resources legally. By suppressing the interests of local people those of the powerful actors are enhanced. For instance, an investor - Grumeti Reserve Funds - made several attempts to frustrate community hunting, a move that was interpreted as a strategy of ensuring that more wildlife population was available for non-consumptive tourism close to his five star hotel.

***Accessibility to benefits are limited by poverty and exclusion from the projects:*** Poor people could not access the benefits that required some cash. For instance, lack of money made some people to forgo the low priced game meat and healthy services from the dispensary donated by conservation authorities. Furthermore, the approaches were operating in a few villages, thus excluding the majority from the benefits.

**Paper V: The factors influencing conservation attitudes in western Serengeti, Tanzania**

The results indicated that the level of conflicts, participation in community conservation project+, inadequate pasture, lack of water, diseases, wealth and education were important in shaping peoples' conservation attitudes. Basing on the tested hypotheses it was found that: (1) local communities experiencing more costs from wildlife conservation are less likely to support protected areas; (2) local communities who receive the benefits from conservation initiatives are more positive to protected areas (2) conservation attitudes are more positive to Serengeti National Park than to the adjacent Game Reserves.

# DISCUSSION

Wildlife conservation in Serengeti, like in other parts of the world, has often depicted a conflictual relationship among various actors seeking to satisfy their interests. The more visible conflict has often involved powerful actors (e.g. state, conservation agencies etc.) and weak actors (e.g. natives/local people). For convenience, this discussion is framed on three phases: pre-conflict phase (Paper I), conflict phase (Papers II & III) and conflict resolution phase (Papers IV & V).

### *Pre-conflict phase*

This can be described as the phase of harmonious coexistence between the pre-colonial traditional societies and wildlife. As results reveal, consumptive utilisation and religious affiliation were important markers of human-wildlife coexistence. Religious and traditional knowledge (in form of beliefs, taboos and practices) reduced vulnerability of wildlife species and habitats against human-induced threats. Some of the positive effects of this knowledge and beliefs are still obvious in western Serengeti to date. For example, previous studies have indicated that elephant and bushbuck are less targeted by illegal hunters (e.g. see Campbell & Hofer 1995). Therefore, although these practices and behaviours were not consensual conservation practices, as they neither existed because of their conservation effects nor did they evolve as an adaptive strategy (Alvard 1998; Berkes et al. 2000) they had proved to be beneficial to conservation.

The minimal conflicts in the pre-colonial traditional society can be attributed to four factors. One, the traditionally enacted rules and regulations that governed the sustainable utilisation of wildlife were socially acceptable by all members. Two, people paid much allegiance to local institutions (such as *Ritongo*) which enforced these rules and regulations. Three, supply of resources was higher than demand and, therefore, precluded the need for competition, and lastly, low human population and inferior technology had less impact on wildlife populations and

habitats. Introduction of new management structures and institutions under colonial regime ended this phase.

***Conflict phase***

This phase commenced following centralisation of wildlife by colonial regime, introduction of alternative values/uses and new social structures for controlling access to natural resources. By ending the traditional customary rights (over wildlife) and disrupting the traditional management systems, wildlife became a liability among the local people. Because of the incompatibility of the interests and values, the whites (powerful actors) could only meet their interests through obliteration of the native rights. Conservation was, therefore, pursued at the expense of native interests. A militaristic strategy was employed to ensure implementation of prohibitive and punitive policies against the natives. These policies, popular as 'Fortress Conservation' or 'Fences and Fines' approach, suffocated the traditional economies and skills of the previously self-sufficient rural residents.

The choice of the Tanganyika government to maintain the colonial conservation policies after independence can be attributed to political ideology and direction of the economy that was adopted. The government embraced socialism (ujamaa) policy and believed in public ownership and control of potentially productive resources as the way to prosperity. The wildlife-based tourism, as a promising economic sector, paved the way to achieving the government ambition of providing social services (education, health and water) for the entire nation free of charge. The notion that wildlife had to benefit the entire nation overlooked the huge costs borne by local people living adjacent to protected areas. This situation results into "Olsonian commons" in which the benefits are dispersed (flow to majority) while the costs are concentrated (affect only few people) (Low 1997). It differs from Garrett Hardin's "Stiglerian commons" where the benefits are concentrated while the costs are dispersed (Hardin 1968).

Local resentment that characterised the colonial and postcolonial regimes cannot be surprising for people who were forcefully evicted and locked out from resources they considered to be their historical birthrights. Furthermore, habitat improvement perpetuated by creation of protected areas, and consequently an increase of wildlife populations may have furthered local intolerance following exacerbated property damage and risk to human life, the losses that are rarely compensated. While local resentment was traditionally dealt with by law enforcement, the strategy had proved to be inadequate. The economic downturn between 1970s and 1980s that rendered the natural resources sector seriously under-funded (see e.g. Baldus 2003; Yeager 1986), and therefore inefficient-state led enforcement, was the main impetus for a change of conservation policies or paradigm shift. Escalating pressures on wildlife species and habitats was interpreted as failure of 'fortress conservation' or 'fences and fines' approach to conserve wildlife.

Even if the sector could adequately be funded, the paradigm shift was indispensable since it was unlikely that conservation would prosper under chronic poverty and rapid human population growth. Poverty tempts violation of law in order to survive and/or adopting economic options that are incompatible with conservation. In western Serengeti, most of the illegal hunters came from the poor households with few livestock (see also Loibooki et al. 2002). Human population growth, on the other hand, implies more demand for land and other resources. For example, Previous studies in Serengeti have indicated a positive correlation between population growth and increase of illegal hunters within 45 km zone in the west of Serengeti National Park (Campbell & Hofer 1995; Loibooki et al. 2002).

***Conflict resolution phase***

This phase emerged in response to perceived failure of 'fences and fines' approach. It is a phase where the human factor was recognised as an integral component for success of wildlife conservation. This recognition, which commanded popularity as important international agenda

in 1980s (Brundtland 1987; IIED 1994; IUCN 1980; McNeely 1984; UNEP/CBD 1992; Wells & Brandon 1992), was adopted to address the crisis situation in Serengeti. The establishment of Serengeti Regional Conservation Project (SRCP) and Community Conservation Service (CCS) was a milestone to this end. The initiatives aimed at motivating people to align their behaviours with conservation goals.

Results of this study indicate that the two Community Conservation (CC) initiatives were fundamentally flawed. Failure of conservation benefits to offset the direct costs of conservation and opportunity costs of alternative uses along with failure to address people's felt and immediate needs may diminish the value of wildlife resource to recipients and, therefore, weaken the incentive for conservation. Low commitment to CC strategy among the wildlife managers in achieving the conservation objectives may have contributed to this situation. Furthermore, lack or inadequacy of certain ecological, social and economic conditions limited the possibility of CC benefits to outweigh the returns from alternative land uses (Child 1996; Little 1994; Murphree 1996; Songorwa et al. 2000)

Inequitable distribution of the CC benefits caused by the nature of the benefits granted, the political, and socio-economic situations may diminish the intended local support to conservation. For instance, by failure to reward individual behaviours, where culprits and non-victims benefit from CC initiatives, there will be no incentive to support conservation. Similarly, the people who cannot access the benefits due to poverty or any other reasons may not see the logic of supporting conservation. Instead, this may lead to sabotage and inter-community conflicts as happened in some villages of western Serengeti.

The recent conservation interventions in Serengeti and prevailing political and economic conditions may contradict the CC initiatives and, therefore, prompt scepticism among the local people regarding the future access and control of the benefits. For example, forceful eviction implemented in the year 2000 following government decision to upgrade the previously Game Controlled Areas to Game Reserves as a measure of according adequate conservation status to the

areas was interpreted as returning to unpopular 'fences and fines' approach. The intervention had therefore exacerbated rather than reducing hostility toward government and its conservation agencies. These dilemmas may be interpreted as failure of CC initiatives in meeting conservation objectives.

The attitude survey indicated that the benefit provision had impact on conservation attitude among the local people in Western Serengeti. However, available data on illegal activities suggest that change of attitude may not necessarily lead to behaviour change. The villages, which were participating in SRCP, had also a higher number of illegal hunters (TANAPA reports on law-enforcement). Furthermore, even if the current benefits could instil the positive conservation behaviour, success of conservation would still be unsound given the small portion of communities receiving the benefits (only 11% of the villages). It is unrealistic to expect a reasonable local support by changing the behaviour of this small fraction.

## MANAGEMENT IMPLICATIONS

The reasons for failure of the exclusive, prohibitive and punitive policies implemented under the 'fences and fines' conservation approach are obvious in a situation where people are denied their legitimate traditional rights over land and resources from which they derive their livelihoods. Local resentment and violation of law in order to survive are more likely in such a situation. Adoption of the benefit based strategy, as a response to this failure, has worked against the desired outcome i.e. motivating people to align their behaviours with conservation goals and improving the relationship between conservation authorities and local communities. Inadequacy of the benefits and inequitable distribution reduce incentives to observe sustainable behaviour. Furthermore, the ecological, social and economic factors of the area forestall the possibility for current wildlife-related benefits to outweigh the returns from the profitable land uses, which are ecologically destructive. Sustainability of the current benefits is also questionable due to heavy dependence on donors and tourism – the sources that are unpredictable.

The choice of government and its conservation agencies to revert to redundant 'fences and fines' approach through eviction and heavy investment in law enforcement prompts a scepticism about plausibility of benefit based strategy. This also challenges the government/conservation agencies commitment over 'the principle of local support' - stating that "protected areas cannot survive without support of their neighbours" (Brockington 2002:411). If the conservation agencies still believe in benefit based strategy, as a key to achieving this principle, the flaws identified in this study should be adequately addressed. The solutions should seek to meet three criteria considered to be important drivers for local people to support conservation: (1) the resource must have a sufficient value (2) the proceeds must be well enough distributed and (3) future access and control must sufficiently be guaranteed (De Merode et al. 2003; Gillingham & Lee 1999; Madzudzo 1997).

It is worth admitting that a recent eviction from the Game Reserves was a step backward in achieving the objectives of Community Conservation. This has somehow tarnished the image and credibility of the government and its agencies and, therefore, exacerbated negative attitudes and hostility towards protected areas. Deliberate efforts are, therefore, necessary to convince the victims and other local people that the government and conservation agencies are trustful, committed and have genuine plans for them. However, restoring credibility alone may not be adequate in guaranteeing the quality habitats and healthy wildlife populations. So long the adjacent communities are characterised by abject poverty and their population is growing swiftly, destruction of wildlife will continue regardless of law enforcement efforts. Tackling these problems is, therefore, a more realistic way of addressing the ecological problems facing the ecosystem. While rigorous population control policies in these areas are imperative, poverty reduction strategies seeking to create more opportunities that will divert human pressures away from wildlife species and habitats should be developed. The current benefit-based strategies are flawed in meeting these challenges.

The solutions for above problems should be sustainable enough (rather than short-term) to accommodate more challenges likely to emerge as a result of wildlife population growth. Improved habitat conditions following creation of Game Reserves in western Serengeti is ecologically positive, but socially costly. This is because more wildlife implies increased crop damage, livestock depredation, wildlife-related accidents and opportunity costs (when problem animals force people to forgo their social and economic activities). This presents a challenge to protected areas management.

As a part of the solution, it may be worth to trace some potentials that indigenous (or pre-colonial) management structures can offer to contemporary conservation efforts. Although conventional conservation policies had weakened most of these structures, not all hope is lost. Some positive effects from these structures (in form of beliefs, taboos and practices) can still be traced to date and contribute substantially in regulating overexploitation of species and habitats. Encouraging such structures, as long as they do not cause habitat degradation and species depletion, may provide an incentive for conservation and complement the current management strategies in minimising the conservation-induced conflicts. Unlike economic-incentives, which are often costly, too minimal and sometimes unreliable, cultural benefits may be more affordable, reliable and sustainable forms of incentives. No donor support is required to sustain them.

The loyalty that people pay to traditional institutions like *Ritongo* can be employed to minimise the problem of illegal hunting and encroachment to protected areas. However, the practicality of this will require incentive in form of local empowerment economically, politically and legally. If effectively implemented, this strategy may be cost-affective and since it is likely to command more social acceptability, it can minimise the existing conflicts over resources. A combination of scientific and traditional monitoring methods may provide important political incentive (empowerment) for strengthening community conservation approaches. However, it is worth noting that, not all pre-colonial practices are useful. Some may be destructive to resources. If cultural incentives are to be provided vigilance is essential to regulate some people who may

abuse this provision to meet their ulterior motives. Trips to protected areas should be regulated along with monitoring the activities. If laxity is allowed, some people may take advantage of the provisions to conduct illegal activities such as hunting.

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# Paper I

# CO-EXISTENCE BETWEEN THE PRE-COLONIAL TRADITIONAL SOCIETIES AND WILDLIFE IN WESTERN SERENGETI, TANZANIA: ITS RELEVANCY IN THE CONTEMPORARY WILDLIFE CONSERVATION EFFORTS

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**Abstract**

This paper seeks to show how the pre-colonial traditional societies in western Serengeti coexisted with wildlife and whether this coexistence can still be of relevancy to contemporary conservation efforts. The following questions are examined: (1) How did traditional societies in Western Serengeti relate to their environment? (2) What motivations inspired this relationship? (2) How effective were traditional institutions in ensuring continuity of this relationship? (3) Which factors were responsible for erosion of this relationship? (4) What are the potentials and limitations of adopting the traditional practices as a way of furthering the contemporary conservation efforts? The relevancy of the traditional practices in the contemporary conservation efforts can be realised through their contribution in regulating the overexploitation of resources; complementing the current incentives aiming at diffusing prevailing conflicts between conservation authorities and communities; minimising the costs of law enforcement and; complementing the modern scientific knowledge in monitoring and responding to ecosystem processes and functions. The practical constraints in adopting the practices may include methodological complications of acquiring indigenous knowledge; prevailing historical conflicts; human population growth; poverty and lack of appreciation among the conservation planners and managers. The paper concludes by emphasising the need to address the current constraints in order to achieve effective taping of the existing potentials.

**Key words:** Western Serengeti, Tanzania, pre-colonial traditional societies, wildlife conservation, totemic or sacred species, taboos, indigenous knowledge, sustainable utilisation.

## INTRODUCTION

The question of whether the pre-colonial traditional societies conserved and managed resources sustainably is often contested. The proponents attribute conservation among these pre-colonial societies to the previously existed structures in form of beliefs, ceremonies, customs and taboos (Akama 1998; Colding & Folke 2001; Murombedzi 2003; Simbotwe 1993; Wamalwa 1991). Colding and Folke (2001, p. 584) describe social taboos as the ”invisible systems of local resource management and biological conservation.” They feel that these institutions, however, receive minimal recognition despite their central role in guiding human conduct toward the natural environment. Murombedzi (2003) argues that much evidence of pre-colonial conservation practice has been obliterated by colonial conservation practices. He cites Kalahari and Moremi Game Reserves (Botswana), Mavhuradonha, Matopos and Gonarezhou National Parks (Zimbabwe), Mamili National Park (Namibia) and Hluhluwe and Umfolozi National Parks (South Africa) as examples of areas in Southern Africa, which were protected under different pre-colonial regimes. Some authors have argued that local land users were forced to adopt economic priorities and choices that were ecologically damaging because colonialists sidelined their indigenous environmental knowledge and long histories of successful adaptation to sometimes harsh and unpredictable environments (Walter 2005; Wamalwa 1991).

Despite their contribution in enhancing conservation, examples abound showing that not all mythical values are beneficial to conservation. Some may lead to extinction of species. Becker and Ghimire (2003) cite example from Guatemala where mythical values have promoted the survival of Resplendent Quetzal (*Pharomachrus mocinno*) while in Madagascar Aye aye (*Daubentonia madagascarensis*) has been driven to the verge of extinction because local people believe that they are evil creatures. Examples like these abound in African cultures. In Tanzania, for instance, many tribes associate spotted eagle owl (*Bubo africanus*) with superstition. Along with retaliation for livestock depredation in Kenyan Maasailand, ritual killing pursued by young

Maasai (*Morans*) for the purpose of proving their manhood (*Olamayio*) has also been cited as a contributing factor to a recent precipitous drop of lion populations (Frank et al. 2006).

Further, even those mythical values encouraging sustainable behaviours and practises that promote survival of species, may not necessarily be conservation-oriented, as Berkes et al (2000, p.1254) put, "Biodiversity conservation is not necessarily the objective of the practice but a consequence of it." To qualify as conservation-oriented interventions they have to develop in ecological situations in which the long-term benefits outweigh the short-term benefits (Alvard 1998). Most of the behaviours neither existed because of their conservation effects nor did they evolve as an adaptive strategy. Alvard (1998, p. 64) argues that "in order to identify conservation, it is necessary to demonstrate intent on the part of the actor or design via natural selection." Therefore, sustainable harvest and dietary prohibitions (food taboos) cannot serve as evidence of conservation without prior intent to do so. Sustainable harvest (non-depletion scenario) may be a function of low human population growth and primitive technology (Alvard 1998; Cunha & Almeida 2000; Songorwa et al. 2000). On the other hand, despite being tabooed, some species are still vulnerable to human impact, as they are not necessarily maintained because of their conservation effects. Individuals frequently invoke "exception rules" to allow themselves to eat otherwise a tabooed species. For example, in Cameroon some 29 species were found to be entirely or partially prohibited, to avoid loss of the child by pregnant women or disease or deformation of the newborn. However, these applied to few consumers only and, therefore people could hunt and sell tabooed species to persons unaffected by the taboo (Roe et al. 2000).

In religions modern to Africa, some species are also prohibited. For example, bush pigs (*Potamochoerus* spp.) and warthogs (*Phacochoerus aethiopicus*) are prohibited for Moslems. Although this reduces hunting pressure on these species, the practise may not be regarded as conservation action. Even the Moslems themselves do not ascribe this prohibition to

conservation. Nor do they avoid it for anticipating some future benefits from the species. They may, therefore, show less concern in case anybody or natural catastrophes destroy these species.

Cunha and Almeida (2000) define environmentalism to include both a set of practices and an ideology. From this definition they derive three scenarios that tend to be blurred by using a single term to cover them all. First, the presence of ideology without practices – a case of lip service to conservation. Second, the situation in which both sustainable practices and cosmology are present. In this case, which the authors refer to as 'cultural conservation', values, taboos on food and hunting, and institutional or supernatural sanctions provide the instruments for them to act according to this ideology. A third scenario involves presence of cultural practices without ideology – in which people adhere to cultural rules governing the use of natural resources sustainably despite lack of explicit conservation-oriented ideology (refer Moslems case above).

Whether the traditional practices were conservation-oriented or not, the importance for knowing them, notably the different ways in which indigenous people value, use and affect biodiversity cannot be overlooked. As Braatz et al (1992, p. 26) put, "Assessing biodiversity in relation to past and present land and resource use offers opportunity for maintaining and restoring biological diversity in threatened areas." This important aspect has long been neglected in planning of many conservation areas. The most probable reason is that the interaction of local people with their environment and their knowledge on this environment were long terminated by colonial regimes, which conceptualised local people as environmental threats. Since this knowledge is transmitted orally and never documented its accessibility to conservationists had been limited, given a rift that had long existed between conservationists and natives. As this knowledge is currently gaining currency following realisation of its importance in conservation of biodiversity and its perceived potential role in enhancing co-management (Berkes 2003; Moller et al. 2004), the need to understand how local communities interacted with their environment in the past is imperative. This may provide an entry point for application of this knowledge to

complement the current management strategies. This paper seeks to show how the pre-colonial traditional societies in western Serengeti coexisted with wildlife and other natural resources. The following questions are examined: (1) How did traditional societies in Western Serengeti relate to their environment? (2) What motivations inspired this relationship? (2) How effective were traditional institutions in ensuring continuity of this relationship? (3) Which factors were responsible for erosion of this relationship? (4) What are the potentials and limitations of adopting the traditional practices as a way of furthering the contemporary conservation efforts?

## METHODS

### *The study area*

Serengeti Ecosystem, covering a total area of about 30,000 $km^2$, is a highland savannah region with thorn tree woodlands and plains ranging from approximately 900 to 1,500 metres above the sea level. It is located in the northern part of Tanzania in East Africa between latitudes $1^0$ 28' and $3^0$ 17' S and longitudes $33^0$ 50' and $35^0$ 20' E. Average annual precipitation ranges between 500 and 1200 mm declining towards the Park boundary and increasing towards Lake Victoria (Campbell & Hofer 1995). The ecosystem contains one of the highest diversity and concentrations of large mammals in Africa. This is comprised of thirty species of ungulates and 13 species of large carnivores (Sinclair 1979; Sinclair & Arcese 1995). The area is also inhabited by over 500 bird species (Emerton & Mfunda 1999; Sinclair & Arcese 1995).

The ecosystem is protected through a network of protected areas (Figure 1): Serengeti National Park or SNP (14,763 $km^2$), Ngorongoro Conservation Area (8,288 $km^2$), Ikorongo (563 $km^2$), Grumeti (416 $km^2$), Maswa (2,200 $km^2$) and Kijereshi Game Reserves (65.7 $km^2$). Also included are the lowest categories of protected areas such as Loliondo Game Controlled Area (4,000 $km^2$) and Ikoma Open Area (600 $km^2$). Kenya's Maasai Mara National Reserve (1,368

$km^2$) is also part of the ecosystem. UNESCO designated Serengeti, both as a Natural World Heritage Site (WHS) and a Biosphere Reserve (BR), in 1981 (UNESCO 2003).

The Western part of Serengeti - a focus of this study - is ecologically significant as a buffer zone for SNP and a corridor for wildlife species migrating between Serengeti and Maasai Mara in Kenya. These species include some 1.4 million wildebeest (*Connocahetes taurinus*), 0.2 million zebra (*Equus burchelli*), and 0.7 million Thompson's gazelle (*Gazella thompson*) (Norton-Griffiths 1995). The area is diverse in terms of ethnicity with over 20 tribes, the major tribes being Ikoma, Sukuma, Kurya, Ikizu, Natta, Isenye, Zanaki, Zizaki, Ngoreme, Taturu and Jita. The major livelihood strategies pursued by these tribes are cultivation (largely maize, cassava, millet and sorghum for food and cotton for cash) and livestock husbandry (cattle, goats and sheep). Additionally, people subsist on off-farm activities such as illegal hunting and charcoal burning (Campbell & Hofer 1995; Loibooki et al. 2002).

***Data collection***

This study employed the key informant interview technique to obtain insights about the traditional values, use and management systems of natural resources. Given the type of information that was required in this study, the majority of the interviewees were elders. The choice of elders for interview was based on the fact that, having lived in the area for long time and having participated in several cultural events, they had the first-hand information and knowledge on the environment, culture, norms, beliefs and practices of the society. The elders with this knowledge were identified through assistance of village government leaders. They were consulted and requested to take part in the discussion.

Nine elders whose ages were above 60 years including one lady volunteered to share with the researcher, their knowledge and experience about human-environment interactions in the pre-

colonial times. Of these, two were former employees of the park and the old lady was a widow of one of the tribal leaders. Interviews and discussions were conducted at different times and localities. This provided opportunity for cross-checking of the consistency of information and, therefore, improvement of reliability and validity of the data. The interview allowed a free flow of ideas and information. The questions were framed spontaneously and probing was done to gather as much detail as possible.

The discussions were tape-recorded and transcribed after the sessions. Additionally the field assistant jotted down the key points given during the discussion. The discussions were conducted in Kiswahili (the language spoken by majority of Tanzanians). The analysis involved categorising, collating and filtering the data in order to identify and extract dominant themes as identified in both the questions asked and the responses provided. More information was obtained from the village leaders, the former Member of Parliament for Serengeti constituency and two officials from Serengeti National Park.

## RESULTS

### Sacred species and sites in western Serengeti

The spiritual affiliation and totemic links guided the relationship between humans and nature. This inspired enforcement mechanisms (taboos or '*emeghilo*'), some with positive effects on nature conservation. The myths and taboos were observed without being questioned and challenged. The elders in western Serengeti consider these taboos as effective, efficient and socially acceptable resource management systems. According to them contemporary systems are greedy, full of unnecessary commotion and a source of unsustainable use of the resources.

Ikoma, Kurya and Natta ethnic groups are divided into several clans called '*Ebhehita'*. Each *Ebhehita* had an animal that it recognised as supreme i.e. totemic or sacred ('*Oghusengera*')

(Table 1). The fact that these animals symbolized a clan or a tribe, and thus had ritualistic or religious value to the community, gave them an immunity against wanton destruction even if they inflicted some economic and social costs. A totemic or sacred species that happened to get into human premises was accorded a benevolent welcome with special foods including milk and meat. This continued until when an animal left the place.

**Table 1. The wild animal species sacred to waikoma and wanata of Western Serengeti**

| Clan (Ebhehita) | Sacred animal or part | Scientific name | Ikoma/Nata name |
|---|---|---|---|
| All waikoma | Elephant | *Loxodonta africana* | Achoghu or Anchogu |
| All waikoma | Elephant tusk | *N.A.* | Machaba bowari |
| Wahikumari (k) | Green mamba | *Dendroaspis angusticeps* | Kumari |
| Abharanche (k) | Python | *Python spp* | Abhosoti |
| Some Abharanche(k) | Lion | *Panthera leo* | Aka |
| Abhaghetigha (k) | Puffadder | *Bitis arietans* | Magho |
| Some Abhaghetigha(k) | Spoted hyena | *Crocuta crocuta* | Kikwo ahiti |
| Some Abhaghetigha(k) | Ostrich | *Struthio camelus* | Anungu |
| Abhamwancha (k) | Puffadder | *Bitis arietans* | Marakanyi |
| Abhahimurumbe (k) | Cobra | *Naja haje* | Murumbe |
| Abasaye (abamwancha) (n) | Leopard | *Panthera pardus* | Angwei |
| Abasaye(n) | Leopard tortoise | *Geochelone pardalis* | Akuru |
| Abasaye (abamwancha) (n) | Hyena | *Crocuta crocuta* | Ahiti |
| All wanata & waikoma(n, k) | Bush buck | *Tragelaphus scriptus* | Angabi |

k= Ikoma clan; n=Nata clan

Though not observed with higher vigilance than before, the totemic species are still being held in great respect and veneration. Hunting of sacred species requires observance of the well-defined traditional rituals. Killing or wounding a sacred animal is considered a gross violation of a customary rule, which may lead into severe penalty. In case this happens a ritual called '*Herana'* has to be performed immediately in order to appease the spirit and therefore cleanse the *Ebhehita* and the entire tribe from presumably bad omens (called '*Aring'a'*). *Aring'a* may entail disease

outbreaks, deaths, severe droughts, pests and loss of livestock. *Herana* involves organising a feast in which domestic stock is slaughtered along with preparation of local brews and varieties of food. Each household from the *Ebhehita* is obliged to pay a fine exceeding a daily household budget, even if a perpetrator does not belong to that household. These communal fines which befall all members of the *Ebhehita* inspire collective responsibility in caring for the sacred animal. A perpetrator is perceived as irresponsible and a public nuisance, an embarrassing attribute.

Further to specific species revered by each 'E*bhehita'*, elephant ('*Achoghu*' or '*Anchogu'*) is sacred to the entire Ikoma tribe. It receives full protection. Elephants are believed to be the deceased Chiefs. In the past, apart from performing *Herana*, killing an elephant involved mourning for seven days, just as it happens to humans in Ikoma culture.

The social taboos also cater for plants and habitats. Different cultural motives inspire this. For example, circumcision ('*ghusara')*, in Ikoma tribe provides an incentive to protect some tree species such as *Balanites aegyptiaca* (common name: desert date, ikoma name: Mrogoro or Mduguyu mtundu), *Lannea schweinfurthii* (common name: Bastard or false marula; ikoma name: omusari) and *Ekebergia capensis* (common name: cape ash; ikoma name: omisembito).. *Ghusara* occurs during the dry seasons under the shade of these trees, thus justifying their protection.

Specific sites set aside for rituals are sacred and all human activities such as settlements, fishing, firewood collection, cultivation and livestock grazing are excluded. Furthermore, access by menstruating women and contamination of the area with human wastes (urine and faeces) is prohibited. Examples of these sites are Gateku watershed and Bangwesi hills (for the entire Natta tribe), Ng'abati Hill (the entire Ikoma tribe), Kemarishi Hill (waserabati clan), Ngoombe (Abamuriho clan), Kiratага Hill (abagikwe clan) and mochwuri Hill (abarumarancha clan).

***Machaba Bowari: Ikoma peoples' sacred elephant tusk and wildlife conservation laws***[43]

Of particular interest to all Ikoma people is a special respect accorded to elephant tusks called *'Machaba Bowari.'* Male and female *Machaba*, are kept in Ng'orisa (the western part) and Rogoro (the eastern part), respectively. However, the story of female *Machaba* is rarely told. According to elders *Machaba* has been in Robanda Ikoma for about two centuries and, therefore, none of the elders is as old as *Machaba.* Their ancestors got it from a famous sorcerer who lived in Olduvai Gorge. The elders ascribe to past victories that the tribe won during the wars against other tribes. To date the Ikoma society still strongly believe that *Machaba* can pre-empt the bad omens (*'Aring'a'*). A reverence to elephants by Ikoma people is also attributable to *Machaba.* Although colonial and post-colonial legislation prohibited possession of government trophies, '*Machaba'* have remained under the control of Ikoma people for decades. Elders claimed that, attempts to confiscate Machaba by the colonial (German and British) and post-colonial governments proved futile following unusual events that characterised these attempts (Summarised in Table 2 below).

**Table 2. Attempts to confiscate Machaba (sacred elephant tusk) by different regimes**

| Year of attempt | Regime | Unusual event associated with confiscation |
|---|---|---|
| 1907 | German | Soldiers from Fort Ikoma could not cross the bridge in River Grumeti with Machaba as the bridge overflowed. This happened during the severe drought period |
| 1936 | British | A 35 km trip from Robanda to Serengeti Game Reserve headquarters took four days with a car after several breakdowns. For three mornings consecutively, Machaba was found outside the armoury where it was locked the days before. |
| 1972 | Post-colonial government | Three vehicles that carried Machaba and its guardian switched off on their way to Mugumu Police Station. The problem was fixed after harassing Machaba's Guardian who supplicated to Machaba. In Mugumu a new generator belonging to Police Force knocked after putting Machaba in a room which was set for confiscated trophies. |

Source: Narration from elders in Western Serengeti (2003 & 2004).

In order to avoid inconvenience from the law enforcers the Ikoma elders were advised to apply for a certificate of ownership. In 1990, the former Member of Parliament for Serengeti, Mr Simon M. Mongate, requested it from the former Minister for Land, Natural Resources and Tourism. The certificate of ownership No. A 05342 was issued on January 31, 1990 accompanied by a letter SDC/NRG.10/12/48. The certificate is currently kept in the village government office.

## Pre-colonial hunting and use of wildlife resources

### *Use of wildlife resources*

Wildlife in Western Serengeti catered for both pecuniary and non-pecuniary motives. Pecuniary motives entailed obtaining meat for household use and items for barter trade. Sukuma, an agropastoralist tribe living in Southern Serengeti participated in this trade. They reciprocated cereals for wildebeest tails and oils extracted from the lions. Wildlife and its derivatives provided a variety of non-food benefits such as raw materials for manufacturing household items and substances to cater for witchcraft, protection and medicinal purposes (Table 3). Hunting also served for training purposes, as a recreation activity and a marker of status. It was considered as a skilful and professional activity and the society accorded high respect to a good hunter.

Table 3. Non-food uses of wildlife species along the WSC

| Wildlife species | Part/Product used | Uses/Purposes |
|---|---|---|
| Lion | Mane | Making helmets for male dancers during the ceremonies such as initiation |
| Lion/Lionesses | Pellets | For making amulets (something worn as a charm against evil). It is believed that a witch or enemy, refrain from a person wearing it. |
| Small antelopes (Duikers, Suni, Steenbok, Reed bucks and Gazelles | Skins (Ebisero) | Making mats for kid rearing or sits for adults especially women<br>A container in which the grinding stone sit during the preparation of grain flour.<br>Making the drum coverings that are used by dancers in ceremonies;<br>Used in the past to make traditional skirts which were worn as underwear by women<br>Used for making men's wallets |
| Big antelopes e.g. Topi etc. | Skins (Ebisero) | Used in the past for making traditional beds for adults and mats for drying the grains (millets, finger millets).<br>Used in the past for making traditional bags for storage and carrying grains, the sleeping mats and the arrow Quivers |
| Small antelopes (Duikers, Suni, Steenbok, Reed bucks and Gazelles | Hollow Horns (Chahembe) | Used to store protective charms against harmful effects from sorcerer's magic. Are worn on trousers or short pants. |
| Swifts (Ebikoryambura) | Meat (Chanyama) | It is believed that anyone who eats either grilled or cooked meat will improve his/her racing ability, hence enduring athletes. |
| Ostrich (Anungu) | Down feathers (Chasingori) | Used as ornaments-put on/worn round helmets or perched on rings around upper arms by men in traditional dances. |
| Ostrich (Anungu) | Fat oil (Amaguta) | Used as laxatives and Used by expectant mothers to speed up delivery |
| Big antelopes | Tail skins (Ebirasi vyemekera) | Making handles for machetes (Pangas), knives, spears |
| Big antelopes | Tail hairs | Making snares (Emeheto) for birds such as starlings etc.<br>Held by traditional elders' to keep flies away and as symbol of elderly in the society (Eghise) |
| Elephant (Anchogu) | Ivory (Tusks) | Making traditional dancing rings worn during the ceremonies. It is on these rings where ostrich down feathers are perched. |
| Eland/Roan antelope | Hollow horns | Used as whistles (Ebheture) in traditional ceremonies. |
| Small birds | Down/flight feathers | Ear cleaning materials (sticks) |
| Gallous birds | Spurs | Protective cover on which powerful herbs are put and worn as amulets |
| Porcupine (Ekisabo) | Pines (Chasaboh) | To remove pierced thorns on person's legs |
| Gnu (Asamakiri) | Tails (Emekera) | Used in a barter trade with Sukuma during the famine periods who reciprocated cereals; also served as bride prices (dowries) a long time ago. |

***Regulatory mechanisms for wildlife hunting and utilization in western Serengeti***

The traditional norms and values of hunters were built around mythology through which the activity was organized, planned and controlled by lineage elders which formed the council of

elders called '*Ritongo*'. *Ritongo* had a responsibility of overseeing the functioning and enforcement of all rules, which were set for the benefit of the tribe including those governing hunting and daily life (Table 4). Hunters were well alert against contravening the rules, which guided their profession.

To date, despite a ban on hunting, *Ritongo* is still a powerful institution in western Serengeti enforcing the rules aiming at reforming the socially unacceptable behaviours such as theft, witchcraft, disobedience and other social vices. Stern disciplinary measures against the perpetrators include taking traditional oath '*kihore*'. It is believed that *Kihore* may result into undesirable consequences such as death and insanity. The elders forming *Ritongo* are believed to be talented such that they can speak directly to the Gods of their tribes and forecast the fate of any events. *Ritongo* elders perform a religious rite called *'Likula'* in order to protect the society from natural disasters. The rite lasts for eight to 12 days and occurs after every eight years. Essentially, for Kurya and Ikoma people, *Ritongo* is more powerful than the formal court. In formal courts cheating is not uncommon, something which rarely happens in *Ritongo*. Therefore, *Ritongo* still plays a central role in regulating the lives, culture, behaviours and traditional values and norms of the people in Western Serengeti.

The utilisation arrangements that prohibited accumulation or storage of game meat for future use is tied to migration of Ikoma people to their present localities in western Serengeti. Historically the tribe originated from the Sonjo ethnic group found in Loliondo area in eastern Serengeti. Its members are believed to have been moving following the wildebeest migration. They settled in Naabi Hill, in a shrubland dominated by *Grewia bicolar* (Common name: White raisin; Ikoma name: Mkomo). The name Ikoma was derived from these shrubs. Latter the groups moved to Robanda, Natta and Isenye. The group which settled in Robanda retained the name "Ikoma" while those settled far in the west, acquired new ethnic status viz. Natta and Isenye. The

group that remained in Naabi Hill joined other tribes following relocation by the British colonial government in 1950s when the Serengeti National Park was established.

**Table 4. Laws and rules that ensured rational use of resources among the societies in Western Serengeti**

| |
|---|
| *Hunting was limited to meat for household use only; Accumulation or storage for future was considered to be morally wrong.* |
| *Taboos ('emeghilo') restricted people from killing an animal before finishing the previous hunt* |
| *All members of the community shared the meat ('okomussa'). This kept the number of hunters in the society minimal* |
| *Hunting or touching an animal revered (sacred) to a particular clan ('oghusengera') was prohibited* |
| *Taboos restricted killing or hunting an animal found at a water catchment area* |
| *Hunting was prohibited for an animal found giving birth* |
| *When found fighting, only one animal was allowed to be killed* |
| *Friendly non-edible wild animals was protected through taboos ('emeghilo')* |
| *Hunting was mostly targeted to adult and male animals* |
| *Killing of young, pregnant or lactating animals was prohibited. When happened to be trapped they were set free* |
| *Some animals could not be hunted unless the permits were obtained from the tribal chiefs* |
| *Hunting of certain species were limited to specific seasons only to give them room for breeding* |
| *Shot animal was followed until he was found* |
| *A belief that a person who kills animals indiscriminately will remain poor as he will never own livestock* |
| *A bushmeat can not be used in functions such as wedding, rituals and by mothering women* |
| *Abandoned young animals who lost their mothers were taken home to the lactating goat or cow* |
| *An animal that has sought a refuge in homestead could not be killed* |
| *Different clans have different preferences for bushmeat e.g. abarumarancha and abasaye (eland), abakigwe (zebra) and abangirate (fish). This reduced competition and therefore ensured sustainability of the resource* |
| *Medicinal and fruit trees were protected* |
| *Setting fires was a serious crime that amounted to heavy fines* |
| *Firewood for cooking and heating was limited to dry trees only* |
| *Most of the forests were sacred and nobody was allowed to enter and harvest any resource* |
| *Trees species were allocated specific use(s) depending on availability, durability and workability* |

## Erosion of traditional management systems

The elders in western Serengeti blamed colonialism for divorcing them from their heritage and, therefore, undermining their physical and spiritual life. Their proprietorship, user-rights and practices were outlawed on grounds of causing decimation of wildlife. Legal hunting was made technologically and financially unattainable. The introduced hunting licensing system was too expensive for local people to afford and occasionally issuance of the license to natives required the governor's consent. Furthermore, although the indigenous weapons were banned, natives were prohibited from owning rifles. Disproving the claims implicating traditional hunting to decimation of wildlife, an elder wondered, "How could inferior weapons as a bow and arrow be more destructive to animals than guns and lorries." White people hunted by lorries and guns.

According to elders, creation of protected areas furthered these restrictions. The 'shamba la Bibi' (Swahili words for queen's farm) concept made an entry and livestock grazing in the protected areas a trespassing. Fuelwood collection became wood theft. Access to sacred sites, which felled in the protected areas, was also prohibited, thus detaching people from their spiritual affiliations. For instance, Kemarishi Hill located inside the Serengeti National Park became inaccessible for members of Waserabati clan who used to go there annually for 'pilgrimage'. Creation of national parks and game reserves had involved relocation of people to other places. The distance, therefore, became another factor that limited access to these areas. Prohibition of hunting, access to sacred areas and other cultural activities limited the amount and quality of knowledge which elders transmitted to the young generations.

Along with prohibitive laws, new institutions such as formal education and western religion in which people were taught to denounce their culture, beliefs, practices and knowledge were introduced. Through these new institutions, the natives' ways of living were regarded as barbaric and their replacement by civilised ways considered inevitable.

## DISCUSSION

Pre-colonial coexistence between human and wildlife can be described through resource utilisation patterns, management and indigenous knowledge systems. Although these practices, which were enforced through religious beliefs and taboos, were not necessarily the consensual conservation interventions (Alvard 1998; Berkes et al. 2000), they may be useful in enhancing conservation of biodiversity. However, some practices, may not be as effective as they used to be in the past due to social, economic and policy changes. This section presents some potentials and constraints of traditional practices and systems in the contemporary conservation efforts.

### Some potentials

#### *Regulating overexploitation of resources and habitat loss*

There is substantial literature indicating the importance of traditional practices and systems (taboos and religious affiliations) in checking resource overexploitation and habitat destruction. For example, according to Colding & Folke (1997, 2001), of the 70 specific taboo species identified, 21 were listed in the World Conservation Union (IUCN) redlist book of threatened species. Of these, four were endemic and five were keystone species. In Western Serengeti, low vulnerability of elephant (*Loxodonta africana*) and bushbuck (*Tragelaphus scriptus*) to decimation by humans is attributed to totemic link with these species. Elephant, which is hunted for meat in some parts of Tanzania (personal experience) and other African countries (Hart & Smith 2001; Strieker 2002), is not hunted for that purpose in Western Serengeti (e.g. see Campbell & Hofer 1995). The species however, suffered rampant poaching for trophy in 1970s and 1980s. According to Ikoma elders, the Kurya people and other tribes, which do not revere to this species, were responsible for this problem (Ikoma elders, pers. comm.). Likewise bushbuck is the least hunted species with annual offtake of 5.0% compared to other species such as buffalo *Syncerus caffer* (19.5%), warthog *Phacochaerus aethiopicus,* (24.4%), topi *Damaliscus korrigum*

(20.5%), impala *Aepyceros melampus* (28.7%), giraffe *Giraffa camelopardalis* (29.6%) and eland *Taurotragus oryx* (30.9%) (see Campbell & Hofer 1995). Although taste is attributed to low preference for this animal, most of the communities associate its minimal offtake with its totemic importance to most clans within the tribes of Western Serengeti such as Sukuma, Natta, Ikoma, Issenye, ngoreme and Ikizu.

***Alternative incentive and conflict resolution***

Given the disappointing outcomes of the economic incentive strategy in meeting conservation goals (Barrett & Arcese 1995; Gibson & Marks 1995; Songorwa 1999), the pre-colonial traditional practices and systems may be potential in complementing this strategy and achieve the desired results. The economic incentives have erroneously being considered as a panacea for motivating people to align their behaviours with conservation goals and, therefore, diffusing the tensions between conservation authorities and local people. Contribution of other incentives to this end, including cultural and spiritual values, have been neglected (Barrett & Arcese 1995; Colding & Folke 2001; Gibson & Marks 1995; Infield 2001).

Examples abound to illustrate how important the cultural values can be to local people. In Uganda's Mount Elgon National Park, for instance, Bagisu community were ready to forgo all other resources from the park but not smoked bamboo shoots (*Arundinaria alpina*). Scott (1998, p. 49) quoted a local government official as saying, "You [park authorities] can take away whatever you like, but you can't take away our bamboo." The bamboo shoots are essential to biannual circumcision ceremonies, powerful spiritual events to Bagisu people. In Kilimanjaro, Tanzania, the *Wagweno* tribe perform ritual sacrifice of goats and sheep in a sacred forest (*Kwa Mrigha*) to communicate with their ancestors where they make supplications against social and ecological crisis and even complain against injustices perpetrated by other members of the society (pers. observation). Paying attention to these non-pecuniary values - so long they do not

degrade the habitats and deplete the species - may provide a powerful link between the communities and protected areas and, therefore, minimise the prevailing resource use conflicts for the benefit of conservation.

Besides complementing the economic incentives, which may often be too minimal to offset the conservation costs (see e.g. Emerton & Mfunda 1999; Norton-Griffiths 1995), cultural incentives may be more affordable, reliable and sustainable forms of incentive. Unlike economic incentives, cultural incentives do not rely on external funding. Economic incentives on the other hand rely on donors, tourism and safari hunting. Vulnerability of these external sources may lead to termination or reduction of the benefits and, therefore, reduce the incentive to support conservation. If the donor pulls out and market for tourism is obstructed by factors such as political instability, terrorism, natural catastrophes and policy changes, the economic incentive may cease.

***Minimising the costs of law enforcement***

As revealed in results, the life of the people in Western Serengeti is still regulated by elders' council, *Ritongo*. The influence of this institution can be an opportunity for minimising an endemic problem of illegal hunting in the area. However, workability of this will require an effective incentive mechanism. Economic, political and legal empowerment of the villagers and their local institutions is imperative. Poverty reduction will reduce illegal activities in the protected areas while power of decision making will restore a sense of ownership. Legal empowerment may involve dealing with criminals (illegal hunters). For instance, *Ritongo* can be empowered to impose penalties against culprits for the benefits of the respective villages. The penalties may involve assigning the criminals to do productive activities for society such as digging the boreholes, making roads and bricks for building schools, village offices or dispensary. In case of fines, villages should retain the money to cater for development needs.

Contribution to village developments may motivate the villagers, as potential beneficiaries, to expose the culprits. If effectively implemented, this strategy may be cost-affective and may minimise the existing conflicts between conservation authorities and local communities.

***Complementing the modern scientific knowledge***

Of recent, scientific, social and economic reasons have prompted an increasing interest over the indigenous knowledge among the conservation biologists, ecological anthropologists, ethnobiologists and other scholars. The knowledge - defined as " a cumulative body of knowledge, practices and beliefs, evolving by adaptive processes and handed down through generations by cultural transmissions" (Berkes et al 2000, p. 1252) - is esential tool for monitoring, responding to, and management of ecosystem processes and functions with special attention to resilience. The knowledge had also received political attention internationally as a valuable resource for biodiversity conservation through the *World Conservation Strategy* (IUCN 1980), and Brundtland Commission's *Our Common Future* (WCED 1987) and the Earth Summit (UNCED 1992).

Combination of scientific and traditional monitoring methods is considered as a form of political incentive (empowerment) for strengthening community conservation approaches (Berkes 2003; Moller et al. 2004). Furthermore, the knowledge enables the indigenous resource users to critically evaluate scientific predictions on their own terms and test sustainability using their own forms of adaptive management. The knowledge is essential in complementing conventional scientific knowledge as Moller et al (2004:online) put, "complementing objectivity with subjectivity." Science strives to be objective (excluding people and feelings) while traditional knowledge explicitly includes people, feelings, relationships, and sacredness.

**Some practical constraints**

Literature on efficacy of indigenous knowledge offers huge hopes to conservation success. Suggestions are being made on reviving the abandoned practices, taboos and beliefs. While this sounds good, the social, economic and political realities in Serengeti (and possibly many other parts of Africa) may limit its application. Some of the practices may not be feasible today while some may work only after addressing some existing constraints.

***Methods of acquiring indigenous knowledge may be complicated***

As stated earlier, the indigenous knowledge was handed down through generations by cultural transmission. Folklore or storytelling, continuous observations, practising and attachment on natural resources were the major means of taping this knowledge in the past. The situation today, however, hinders effectiveness of these means. To acquire the knowledge, adequate time is required for recipient (youth) to interact with the elders and resources. This may be difficult, as most of the resources are located inside the protected areas where conventional legislation prohibits entry. Furthermore, formal education utilises most of the time, which could be used to acquire the knowledge. Primary school begins at the age of seven and lasts for seven years. This is compulsory and, thereafter, a pupil may continue with secondary school and colleges for four to eight years, often in boarding schools away from the place of birth.

Besides formal education, Christianity - another influence of colonialism, had also undermined the indigenous knowledge and the ways local people coexisted with natural resources. The new Christian churches in the area and those who embraced this new faith denounced the traditional ceremonies, rituals and taboos. Association with these cultural activities was regarded devilish. Christianity is still expanding through introduction of new sects with elements of fundamentalism (popular as *Walokole*). Given the increased influence of Christianity in the area, reverting to traditions may be next to impossible.

***Prevailing conflicts***

Even if the formal education and Christianity had to be non-factors, the historical resource use conflicts that still prevail in Serengeti to date may forestall some attempts to re-introduce indigenous knowledge. Pain memories of the involuntary relocation and loss of access to land and resources are still fresh among the communities. Attempts to incorporate their knowledge and practices into conservation policies may inspire unachievable demands. For instance, people may demand returning to their ancestral burial sites in the National Park and Game Reserves or may demand the right to hunt some species as a part of enhancing their culture, knowledge and skills. Implementation of these demands may be difficult given the high human population growth. Their implementation will be tantamount to degazetting the protected areas.

***Population growth and change of demands***

Primitive technology, low human population, high wildlife population and, therefore, low demand made some traditional practices feasible in the past. Today, if allowed, these practices may lead to resource depletion. For instance, ritual killing of lion, considered to be important cultural practice for Maasai youth (Moran) is attributed to a dramatic decline of lion population in the Kenyan Maasailand (Frank et al. 2006).

Similarly, while hunting was previously limited mainly to subsistence needs, today the need for income has emerged as important reason (Campbell et al. 2001; Holmern et al. 2002). Given the difficulty of ascertaining the sincerity of the hunters and monitoring, permission to carry out ritual hunting may be employed to meet other ulterior motives. Furthermore, given the socio-economic changes, it is unlikely that the old habits that ensured sustainable utilisation of resources such as sharing of meat will be observed.

***Poverty***

Poverty is another major constraint that may limit the practicality of using the traditional practices in enhancing conservation. Even if the elders' councils - *Ritongo* – will be legally empowered and willing to curb illegal hunting this may prove difficult if they will be working amid the poor people compelled to hunt in order to survive. The elders, being a part of the society, may feel uncomfortable to enforce the law against such people. The likelihood is that, the logic will prevail. The previous experience illustrates this scenario. During the British colonial era, Ikoma Chief who through indirect rule was endowed with great institutional power was reluctant to deal with the problem of illegal hunting and threats directed to wildlife staff by Ikoma hunters (Neumann 1998). He did not yield even after his salary was withheld.

***Lack of appreciation among the conservation planners***

Despite the significant potentials that can be derived from the traditional practices in conservation, conservation planners and managers in many parts of the world, Tanzania not exceptional, have paid little attention to these practices (Barrett & Arcese 1995; Colding & Folke 2001; Infield 2001). Colding and Folke (2001, p. 584) contend, "many resource habitat taboos have functions similar to those of formal institutions for nature conservation in contemporary society but have not been sufficiently recognised in this capacity."

## CONCLUSIONS

Despite the suppression of the traditional resource management practices through introduction of new structures and systems, not all hope is lost as some positive effects of these practices (in form of beliefs, taboos and practices) can still be traced to date. Understanding of indigenous knowledge, values and practices may provide an opportunity for using them to complement the current strategies seeking to address the conservation problems such as resource overexploitation, conflicts and limited budget for law enforcement. Although some constraints may not make

these practices as effective as they used to be during the pre-colonial era, these potentials may still contribute immensely in the contemporary conservation efforts. While it is imperative for conservation planners and managers to understand, recognise and tape these potentials, they should also strive to overcome the constraints reducing the efficacy of these practices. The problems of poverty, human population growth and prevailing conflicts should be addressed along with empowering the local institutions in conservation. There is a need for attitude change among the conservation agencies. The prohibitive laws should be relaxed to allow the uses, which are not destructive as a way of providing a link between the local communities and protected areas and, therefore, incentive for conservation. However, monitoring mechanisms are essential to check misuse of the provisions.

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# Paper II

# THE ENVIRONMENTAL HISTORY AND POLITICAL ECOLOGY OF COLONIAL AND POST-COLONIAL WILDLIFE CONSERVATION IN WESTERN SERENGETI REGION, TANZANIA

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ABSTRACT
Serengeti, one of the world renowned wildlife areas in the world, has attracted the attention of several actors seeking to meet different and often incompatible interests. The politically powerful actors have often succeeded at the expense of the weak. The later have, therefore, adopted ecologically destructive activities as a way of resenting the policies or earning their living. Some interventions have been adopted to address these dilemmas but have been unsuccessful. This paper uses environmental history and political ecology to understand wildlife conservation issues in Western Serengeti during the colonial and post-colonial regimes. It is framed into five empirical questions: (1) What motivated the conservation policies and practices pursued by colonial and post-colonial regimes? (2) Which strategies were adopted in pursuing these policies? (3) How did implementation of conservation policies influence behaviours of the marginalised actors, and with what results? (4) How did the regimes respond to challenges generated by these behaviours and how effective were/are the responses? (5) What inferences and reasonable speculations can be drawn from these responses? In conclusion the paper offers some recommendations to address the identified challenges.

**Key words:** Western Serengeti, Tanzania, political history, environmental history, wildlife conservation, natives, colonial conservation, and post-colonial conservation.

# 1. INTRODUCTION

## *1.1 Background*

Political, social and economic dimensions have long influenced the wildlife conservation policies and legislation in Africa. Essentially, wildlife resource has emerged as important political and economic commodity (Gibson 1999). The Berlin Conference of partitioning Africa in 1884 gave the European colonialists power to impose the dominance of their myths, values and ideas over natural resources. They were able to define a resource, threats and dictate on management strategies. Often the powerful stakeholders define a resource in a way that will match up with their values and interests (Kaltenborn et al. 2002). They also determine how a resource in question should be conserved and utilised, a scenario leading to unequal distribution of costs and benefits.

The enacted colonial conservation legislation extinguished the natives' customary rights over access and ownership of natural resources and barred them from formal debate on issues pertaining to these resources. Their practices were deemed wasteful, barbarous and cruel (Adams & McShane 1996; Neumann 1996; Neumann 1998; Rangarajan 2003). The reality that game hunting was a ritualized act for marking class status among the whites and offered Europeans a symbolic dominance of the continent prompted this false accusations (Neumann 1998). African practices were intolerable as their approval would mean putting African culture and their resource management strategies on equal footing with those of Europeans (Neumann 1998). This scenario is in line with the general consensus held that European colonisation in Africa was not only limited to humans, but also to nature as well (Nelson 2003; Neumann 1998).

Because of their economic power, the Westerners have continued to influence the natural resources management in Africa to date. Most of the conservation interventions are being imported from West and acceptance by the African governments is conditional, as failure to do

so may jeopardise their eligibility for grants and loans necessary for development programmes (see e.g. Nelson 2003). Therefore, Western conservation ideologies are still dominant in Africa. The interventions that have sought to redefine the conservation policies in view of addressing natives' customary rights have proved ineffective, thus deepening the conflicts and resentment towards conservation policies.

Challenges of managing and conserving wildlife in Africa are growing in line with rapid increase of human population and rural poverty. This translates into increasing environmental scarcities. Both environmental history and political ecology have a role in addressing these emerging dilemmas. History serves as a bridge connecting the past with the present and pointing the road to the future while political ecology uncovers the relationship between political economy and ecological concerns. Very little is documented about the environmental and natural resources history and politics of conservation in Western Serengeti. Yet, the minimal information available in literature is very scattered. In addressing this deficiency this paper is framed into five empirical questions: ((1) What motivated the conservation policies and practices pursued by colonial and post-colonial regimes? (2) Which strategies were adopted in pursuing these policies? (3) How did implementation of conservation policies influence behaviours of the marginalised actors, and with what results? (4) How did the regimes respond to challenges generated by these behaviours and how effective were/are the responses? (5) What inferences and reasonable speculations can be drawn from these responses?

## *1.2 Meaning of 'Environmental History' and 'Political Ecology'*

### 1.2.1 Environmental history

Beinart (2000) defines environmental history as the study of environment in a historical framework aiming at exploring the reciprocal relationship between human and natural forces in the examination of the human impact on the natural world. It, therefore, deepens our

understanding of how humans have been affected by their natural environment through time and, conversely, how they have affected that environment and with what results (Oosthoek 2005)..

Historically, landscapes and natural resources have been subjected to changes due to a plethora of factors. To a great extent, these factors are anthropogenic (Walker 2005) and they include, among others, the human population growth, technological changes, market forces and policies. The impact of these factors have either been beneficial or detrimental to landscape and resources. Humans, on the other hand, have been affected by the changes and the way the landscapes and resources are managed. Past experience, gathered through historical analysis of these changes and impacts is essential in devising the effective management interventions. Political ecology offers valuable contributions to understanding these problems.

### 1.2.1 Political ecology

Political ecology is defined differently by different people. For the purpose of this paper, Watts's definition is adopted: a field seeking to "understand the complex relations between nature and society through careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods" (Watts 2000:257). It analyses the political economy, actors and their politics and conflicting representations of the environmental resources (Blaikie 1999). Essentially, political ecology "Analyzes power relationships among actors in the way decisions are made and benefits are shared; interprets events with reference to behaviours of actors in pursuit of their own political agendas" (Berkes 2003:624). Political ecology incorporates the following elements (adopted from Svarstad 2006):

(i) *Actor perspective:* analyses of what groups of actors, what perceived interests and further perceptions on a conflict

(ii) Focus upon the production and roles of *discourses and narratives*: social constructivist influences. Discourses are ideology or major arguments given to legitimize views and strategies while narratives are views on how a particular environmental problem came to be

(iii) Aspects of *natural resources/environment* are investigated, and with natural science methods

(iv) Focus on *power* (in truth constructions and in influence and opportunities of various actors to achieve their aims)

(v) Focus on the *political economy* of the resource uses

(vi) Focus on the *role of institutions*

(vii) Employ the *historical knowledge* to understand a conflict as well as the situation and changes in natural conditions

(viii)Focus on how a phenomenon or conflict is displayed across *various scales* from the local to the global

Different actors with different and incompatible values and interests contest for limited environmental resources. Each actor defines a resource differently to suit his/her values and interests. Similarly, the management interventions for such a resource are viewed differently. This scenario makes the conflicts inevitable. At the ground level local people have traditionally and, continue to depend on resources to pursue their livelihoods. At the top levels, the international community (donors and conservation organisations) targets the resources in developing countries to sustain their interests and values. These actors, by virtue of their economic power, impose the conservation interventions of their choice in developing countries, whose governments have to adopt uncritically as failure to do that may risk their access to loans and grants (Nelson 2003). Importance of natural resources at the national level is derived from its role in generating foreign currency.

Sometimes environmental threats or problems are deliberately exaggerated in order to legitimize the actions or strategies aimed at meeting the interests of the powerful actors. Blaikie (1999:133) contends that, "Environmental issues do not only become so (if at all) because of ontologically real changes in nature, but because they are constructed by social processes, successfully represented and launched." Susskind (in Blaikie 1999:133) expounds this by arguing:

> 'These involve amongst others discovering the issue, naming it, and establishing the basis of the claim; presenting the claim, by commanding attention, and legitimating the claim; and then finally contesting other counter claims, by invoking action, mobilizing support, leading to successful strategies such as networking, developing technical expertise, and opening policy windows.'

The point of departure of conservation process in Africa has often based on the above criterion. The natives are accused of depleting the resources through their unsustainable practices. The problem is publicised both locally and globally through mass media, conferences and international conventions. The governments take actions by formulating policies and enacting the laws to halt the problem. The natives (perceived as 'threats') are locked out from access to, and any policy debate pertaining to these interventions. Protected areas are created and authorities are legally mandated to use militaristic strategy to ensure that the resources are protected against the claimed misuse by the natives.

Criminalisation of natives' land and resource use (e.g. arable land, grazing land, game meat, medicinal plants, firewood etc) and infringement of their customary rights over ownership and management of these resources compel them to adopt economic choices that are ecologically destructive. Furthermore, despite the stringent law enforcement conducted by protected areas staff, lack of alternative livelihoods makes violation of law in order to survive

inevitable. Retaliatory response (in form of sabotage and violence) against prohibitive and punitive policies also emerges (Neumann 1992; Neumann 1998; Western 1984).

## 2. METHODS

### *2.1 The study area*

Serengeti Ecosystem, spanning a total area of about 30,000 $km^2$, is situated in the northern part of Tanzania in East Africa between latitudes $1^0$ 28' and $3^0$ 17' S and longitudes $33^0$ 50' and $35^0$ 20' E. It is a highland savannah region with thorn tree woodlands and plains ranging from approximately 900 to 1,500 metres above the sea level. Average annual rainfall ranges between 500 and 1200 mm declining towards the Park boundary and increasing towards Lake Victoria (Campbell & Hofer 1995). Thirty species of ungulates and 13 species of large carnivores have been recorded in the area while avifauna exceeds 500 species (Sinclair & Arcese 1995).

The ecosystem is composed of a network of protected areas falling under different management regimes. Serengeti National Park (14,763 $km^2$) falls under the jurisdiction of Tanzania National Park (TANAPA) while the Ngorongoro Conservation Area or NCA (8,288 $km^2$) is managed by NCA Authority (NCAA). Ikorongo (563 $km^2$), Grumeti (416 $km^2$), Maswa (2,200 $km^2$) and Kijereshi Game Reserves (65.7 $km^2$) along with Loliondo Game Controlled Area (4,000 $km^2$) and Ikoma Open Area are under the Department of Wildlife of the Ministry of Natural Resources and Tourism. Kenya's Maasai Mara National Reserve (1,368 $km^2$) is managed by Narok County Council. UNESCO designated Serengeti, both as a Natural World Heritage Site and a Biosphere Reserve, in 1981 (UNESCO 2003).

The Western part of Serengeti - a focus of this study - is ecologically significant as a buffer zone for SNP and a corridor for wildlife species migrating between Serengeti and Maasai Mara in Kenya. These species include some 1.4 million wildebeest *Connocahetes taurinus,* 0.2

million zebra *Equus burchelli* and 0.7 million Thompson's gazelle *Gazella thompson* (Sinclair & Arcese 1995). The area is diverse in terms of ethnicity. It has over 20 tribes, the major tribes being Ikoma, Sukuma, Kurya, Ikizu, Natta, Isenye, Zanaki, Zizaki, Ngoreme, Taturu and Jita. Agropastoralism plays a major role in the livelihoods of these tribes. The major crops are maize, cassava, millet and sorghum as food crops and cotton as a cash crop. Livestock include cattle, goats and sheep. Additionally, people subsist on off-farm activities such as illegal hunting and charcoal burning.

### *2.2 Data and sources of information*

A combination of methods was employed in this study:

**(i) Community meetings:** Between July and August 2003 one community meeting was held in each of the six villages: Park Nyigoti and Nyichoka (Serengeti district); Mariwanda and Nyatwali (Bunda district); Mwabayanda and Kijereshi (Bunda district) where some 50 villagers attended (N=300). An additional meeting was held with 20 people who were evicted from Nyamuma area, adjacent to Ikorongo Game Reserve. The meetings, arranged with the village government officials, sought to gather information on villagers' perspective on the process of wildlife conservation. Further to information obtained, the meeting proved to be useful in establishing rapport between the researcher and the communities. The agenda items for discussion were written on flip charts in form of questions seeking to solicit information regarding the history of human-wildlife interface, current issues and vision.

**(ii) Resource/land use/historical maps:** The participants in the above meetings were also requested to sketch a land/resource use map of their respective villages, which was used to clarify some issues raised in discussion along with probing for more specific issues including environmental and land use changes. An elder conversant with the history of the area assisted

by other elders was requested to sketch a map showing how the area looked like 30 years ago focusing on land uses, resources, infrastructures.

**iii) Document analysis and literature studies:** Different reports, letters, minutes, policy and legal documents, papers and books were used as a source of data and information on the area's conservation issues. These documents complemented other methods in providing information about the history, actors, politics and ecological events associated with wildlife conservation in Serengeti and Tanzania in general.

**(iv) Focus group:** The sessions aiming at providing further insights on attitudes, perceptions and opinions (Mikkelsen 1995) of the villagers were conducted with ten women in the six study village (N=60) and eight pastoralists from Mariwanda village. Using the village registers, the village officials and a key informants assisted in selection of the participants. Selection was based on the location of participants' homes in order to ensure an even geographical coverage of the village. With the company of a village official and key informant, the selected participants were visited in their homes, briefed on the focus group sessions and invited to attend. The good rapport established with the villagers in the previous village meetings, the company of the village official and key informant, inspired acceptance of the invitation, with exception of the few, who declined due to unavoidable grounds (e.g. attending the sick relatives). Replacement was made to those who declined. The prevailing relationship with the conservation authorities was also seemingly to have motivated people to accept an invitation as they saw it as an opportunity for their voices to be heard. The sessions took place some two to four days after invitation was made. During the sessions the discussion was kept on track by asking a series of open-ended questions meant to stimulate discussion. Participants were encouraged to talk freely and anonymity was guaranteed. The discussion was tape recorded and transcribed after the session. Additionally, the field assistant jotted down the key points given

during the discussion. The sessions lasted for one to two hours and were conducted in Kiswahili (the language spoken by majority of Tanzanians).

(v) Key informants: These were frequently consulted for specific knowledge (Mikkelsen 1995) and clarification of issues that emerged in the aforementioned methods. These involved community elders, government leaders, wildlife staff, former and current Members of Parliament for Serengeti and former employees of the park.

## 3. THE KEY ASPECTS OF WILDLIFE CONSERVATION DURING THE COLONIAL ERA (1890-1961)

Colonial conservation arrangements in Serengeti resembled those of other parts of Tanzania and Africa. Allegations that depicted natives' mode of hunting as cruel, barbarous and wasteful justified banning of Africans' customary rights over wildlife along with ending their traditional management strategies. The colonial conservation policies popular as *"Fences and Fines"* approach became dominant, creating ideal condition for serious conflicts. This section examines important features of colonial conservation policies in Serengeti: misperceptions of uninhabited landscape, criminalisation of modes of African hunting and establishment of protected areas.

### *3.1 Western perceptions of 'uninhabited wilderness'*

Dr Oskar Boumann, a German explorer, was the first European to set a foot in Serengeti in 1892 on his way to Burundi as an agent of the German Anti-Slavery Committee. His compatriots who followed him built Fort Ikoma, which served as the German administrative centre until it fell under the British in 1917. Boumann's arrival in Serengeti coincided with *Enkindaaroto* (a time the Maasai refer to as "the destruction"). At this time great rinderpest epidemic and severe drought killed virtually all Maasai cattle, causing hunger and serving as a

predisposing factor for epidemic diseases like smallpox. Competition for dwindling resources triggered wars that furthered deaths to Maasai (Adams & McShane 1996). Describing this situation**,** Baumann wrote:

> "There were skeleton like women with the madness of starvation in their sunken eyes, children looking more like frogs than human beings, 'warriors' who could hardly crawl on all fours, and apathetic, languishing elders. ... They were refugees from the Serengeti, where the famine had depopulated entire districts, and came as beggars to their tribesmen at Mutyek who had barely enough to feed themselves. Swarms of vultures followed them from high, awaiting their certain victims. Such affliction was from now on daily before our eyes..." (*http://www.ntz.info/gen/).*

Despite Boumann's observations Westerners' perceptions over African landscapes as open and uninhabited persisted. Using Serengeti case, Adams and McShane (1996:48) provide a succinct explanation against these perceptions:

> "…. rinderpest and smallpox epidemics eliminated all animals and humans – some Maasai remained on the plains, but too few to influence the landscape. The bush flourished in the absence of livestock and wildlife to graze the plains and the lack of seasonal fires set by the Maasai to encourage the growth of new grass. Since tsetse favour dense bush over grassland, with the influence of man removed, the ecosystem developed in a way that heavily favoured wildlife – all of which are immune to nagana (trypanomiasis), a disease spread by tsetse - over cattle, which have no such immunity."

Essentially, Westerners contributed largely to *Enkindaaroto,* which modified the landscape to a condition they referred to as open and uninhabited. Great epidemic of rinderpest may have been viruses introduced with cattle brought to Africa by the British from Russia in 1884 or it may have been introduced around 1889 with zebu cattle brought from India to Eritrea to feed Italian troops (Ehrlich & Ehrlich 1985).

The Western conception of ‘uninhabited wilderness’ was mainly used to justify restrictive, prohibitive and punitive conservation policies against what they called ‘human invasion’. These policies involved outlawing hunting and creation of protected areas.

### *3.2 Criminalisation of African hunting practices*

One of the salient features of the colonial conservation policies was transfer of proprietorship and user-rights of resources from the natives to the State. The German rule enacted the first wildlife law prohibiting hunting in 1891 (URT 1998), in which hunting by Africans was classified as poaching and militaristic strategy was used to enforce the law. Prohibitive mechanisms were set to lock the natives from using the wildlife resource. These mechanisms entailed introduction of licensing system and banning the use of indigenous weapons in hunting. The expensive license fees, the mandatory condition set for natives to secure governor’s consent before issuance of the license and the law prohibiting the natives from owning rifles barred them from hunting important species like antelopes, buffalo (*Syncerus caffer*) and hippo (*Hippopotamus amphibius*). The only species they could hunt without a license were those that European settlers considered as vermin. These included bush pigs (*Potamochoerus* spp.), warthogs *(Phacochoerus aethiopicus)*, porcupines (*Hystrix* spp.), and monkeys (*Cercopithecidae* spp.). The 1900 convention also encouraged killing of lions (*Panthera leo*), leopards (*Panthera pardus*), wild dogs (*Lycaon pictus*) and spotted hyena (*Crocuta crocuta*) on similar grounds.

While campaigns were being intensified to end cruel, wasteful and barbarous African hunting in order to evade a risk of game depletion, Serengeti was increasingly becoming Europeans’ favourite hunting destination for the big game. The first European hunters included J.A. Hunter, S.E. White and R.J. Cuninghame. White and Cuninghame reported huge concentration of wildlife populations ‘especially lions although they saw no elephants’ (Amin

et al 1984:130). Crusade of native rights over wildlife was passed over to the British Administration that succeeded Germans in 1920 following their defeat in the World War I. Allegations against natives continued. However, a few Europeans were impartial and decried publicly the huge threat white hunters was posing to wildlife. For example, in a series of letters to *The Times* (London) in 1928 and 1929, Dennys Finch Hutton protested the 'orgy slaughter' in the Serengeti conducted by hunters (he called 'licensed butchers') on motorised vehicles (Adams & McShane 1996).

One of the outcomes of prohibitive hunting laws was emerging of destructive hunting technique by using wire snares. With minimal risk of being arrested by rangers, the technique became widespread. According to elders the technique was first used by Europeans in Kenya and introduced to Serengeti after World War II. The Italians who enlisted in the Germany Army during the World War I (1914-1918) were interned by the British administration in the prisoners of war camps at Nanyuki, Embakasi and Magadi. They were assigned to work in factories as craftsmen, technical and civil workers. High concentration of wildlife species around the camps, inspired hunting for meat. Being prisoners, Italians had no firearms. Therefore, they trained camp servants (who were Kenyans) the use of wire snares. Hunting became a regular practice and Africans did virtually the entire operations from setting wire snares, inspecting them to processing the carcasses.

In western Serengeti, the British Administration allowed some Germans and Italians who were engaging in mining of gold in Kiabakari, Buhemba, Nyigoti and Kilimafedha to resume their activity on condition that they shun politics. This privilege was, however, extinguished and the Germans and their allies were repatriated following the end of the World War II (1939 – 1945). The gold deposits left by the Germans attracted the small-scale African miners including the Kenyans who formerly worked in Italians camps. The Kenyans introduced the use of wire snares in Serengeti, the technique, which has remained popular to date.

Colonialists also used wildlife law to punish and discipline a person whom they happened to differ with. Despite severe penalties imposed on illegal hunters, the British administration observed some tolerance to local Chiefs. The indirect rule endowed them with great institutional powers. They had control of customary laws (which they were able to manipulate for personal benefits), the communal lands and chiefdom police. This scenario is epitomised by the immunity against colonial prohibitive laws that Chief Mohamed Makongoro Matutu of Ikizu enjoyed over years until he squabbled with colonial officials. The Chief hunted wildlife for cash, the operation that was facilitated by his small car, a lorry and a tractor. The Chief's cabinet identified the rich cattle owners who could buy the meat on the basis of a loan. The debtors were compelled to sell some of their cattle to repay the loan.

A 1958 boundary dispute between Ikizu and Isenye chiefdoms terminated Chief Makongoro's powers and privileges. A senior colonial official sent from Musoma district to mediate this conflict, ruled against Chief Makongoro. This disappointed the Chief, who brought the official to the disputed area by his car. He drove away, stranding the official in Isenye. The colonial office in Musoma, upset by behaviour and arrogance displayed by Makongoro, ruled out to punish him. Some few days later the Chief was arrested, prosecuted and imprisoned for contravening laws prohibiting hunting and illegal possession of firearm. It was later reported that he became sick and died in the prison, the event Ikizu people interpreted as deliberate killing of their Chief by colonialists. Wildlife, being central to this death, exacerbated peoples' apathy and resentment towards wildlife policies. It was also said that the relationship between Makongoro and the colonialists began to turn sour a year before following his open support to freedom movement campaigns. This made the Chief to be rated as a "dangerous person."

### *3.3 Creation of wildlife protected areas*

In 1985 the German colonial administration declared the territorial land, whether occupied or not, to be crown land i.e. all lands in the territory were declared the property of the German Emperor. These lands were alienated on a freehold basis to German settlers for agricultural and ranching purposes. The current Ngorongoro Conservation Area was used for ranching by two settlers. For the period, which Tanganyika was under German administration, no comprehensive statutory instrument was made to manage wildlife except a fragmented 1907 decree enacted to protect the Serengeti-Ngorongoro wildlife. The British Administration enacted a Game Preservation ordinance in 1921 (URT 1995).

The British administration viewed wildlife as a source of economic revenues or direct benefits through use of resources: recreation, resident hunting and wildlife viewing (URT 1995). The regime enacted the first comprehensive wildlife conservation legislation, the Game Preservation Ordinance of 1921. Pursuant to the provision of ordinance, Serengeti was declared a partial Game Reserve in 1921 and later elevated to a full one in 1929. Natives knew these areas pejoratively as 'Shamba la Bibi (Queen's farm) as all wildlife were symbolically and legally declared the property of the Queen of England. In 1951 the area under protection was expanded and upgraded to a status of a National Park. The London-based Society for Preservation of Flora and Fauna of the Empire (SPFFE) spearheaded the idea of National Parks. In 1930 SPFFE sent Major Richard Hingston to the Eastern and Southern Africa colonies to investigate the potential for developing a nature protection programme (Adams & McShane 1996; Bonner 1993). Hingston's report contained the following observation:

> "The unique fauna of Africa must be preserved ... its disappearance would be a crime against posterity … "though the animal life should be persevered, yet it must not be allowed to injure man or to interfere with his cultivation and possessions." … This dual objective - preserving nature while not inconveniencing man – could be accomplished

> "only by placing man and animals in two permanently separate compartments; in other words only by establishing National Parks" (Quoted in Bonner 1993:168).

This excerpt, however, was advocating eviction rather than safeguarding the interests of the natives as it is seemingly to suggest because there was no idle land for the National Parks. Nine parks were proposed in the five colonies including Tanzania's Serengeti, Kilimanjaro and Selous (Adams & McShane 1996). The proposals accorded the highest priority to the interests of the Europeans. The suitability of an area as a National Park was justified by its unsuitability for alternative uses by the Europeans. Serengeti was found ideal for National Park because its insignificant mineral deposits, infestation with tsetse flies and scant rainfall made it unattractive to European miners and farmers (Bonner 1993).

Relocations of the natives in favour of the protected areas were justified on the grounds of 'saving the interests of the Empire.' No consultation was sought from the natives who had to bear the social and economic costs of the process. The western Serengeti elders recalled a number of relocations from the park: From Naabi Hill to Banagi River in 1950s, Mochatongarori to Romoti River in 1960s and from Romoti River to their present areas. A Taturu elder in Bunda District lamented that 'After taking wildlife which we considered to be *our second cattle,* they then grabbed the land and everything in it.' Essentially, protected areas furthered criminalisation of African land uses practices: Fuelwood collection became wood theft while entry and livestock grazing was tantamount to trespassing. People lost access to sacred groves, which were located inside the gazetted areas. For example, by being inside the park, Kimerishi Hill was out of reach for rituals and supplications by ikoma people. Also important training for youth which used to take place in these sacred areas were curtailed, thus denying them an opportunity to acquire knowledge and skills related to their culture and environment.

## 4. CHALLENGES AND DILEMMAS THAT FACED COLONIAL CONSERVATION POLICIES AND INTERVENTIONS ADOPTED

Implementation of the colonial conservation policies prompted three major challenges. These were minimal support from the colonial government, local resentment and a fear of decolonisation of wildlife conservation as Tanganyika was heading toward its political independence.

### *4.1 Insufficient support from colonial government*

Colonial administrators in Tanzania opposed the recommendation of creating National Parks on grounds that it was conflicting with native rights and, therefore, it could risk the colony's political stability (Neumann 1992). For example, A. E. Kitching, a senior colonial official, criticised this recommendation for being inconsiderate to native interests. He observed, 'The recommendations appear to me to be so wrong in principle as to make any detailed examination unnecessary' (Quoted in Neumann 1992:89).

Despite criticisms, Hingston's recommendations provided a basis for agenda of the 1933 London Convention on wildlife. All signatories (including Tanzania) were required to investigate the potentials of implementing the recommendations. Tanzania remained adamant for seven years, a situation that inspired serious criticisms and accusations that the colony was the worst offender in encouraging slaughter of game by the natives (Neumann 1996). These pressures paved the way to the first Game Ordinance that gave the governor a mandate to declare any area a National Park. The 1940 Fauna Preservation Ordinance Cap. 302 repealed the 1921 Ordinance. Serengeti National Park was established in 1940 but remained a 'park on paper' until 1951.

### *4.2 Natives' resentment toward colonial conservation policies*

Two major factors triggered local resentment toward conservation policies. One was loss of rights over wildlife, which meant divorcing the natives from species of importance for commercial network, subsistence economy, social relations, and political and cultural life. Natives were also denied an important coping strategy against uncertainties such as drought and diseases. As stated earlier, the colonial law approved killing of species, which European settlers deemed to be vermin. Natives regarded this approval as infringement of their cultural and spiritual life. Most of these species were considered to be totemic or sacred by some tribes and clans. For example, lion was sacred to the Abharanche clan, leopard to the Abhasaye and Abhamwancha and hyena to the Abhasaye and Abhaghetigha.

Natives' reaction to these prohibitive laws involved violating them. For example, the Ikoma hunters vowed to resume hunting and threatened to kill the wildlife staff by poisoned arrows should they attempt to stop them. The local Chief was sympathetic to hunters and, therefore, was unco-operative in halting this problem. This reluctance made the provincial commissioner for the region to acknowledge that the problem was uncontrollable (see also Neumann 1998). A strategy of withholding the Chief's half-salary to pressurise him to reveal the culprits proved futile and, eventually, the government returned his full salary.

Another form of local resentment was violence to protest creation of protected areas. However, this resentment was more pronounced to the Maasai who were moved to the east of the park in 1950s. Initially they were allowed to remain in the park on grounds that their mode of land use and life styles were compatible to wildlife conservation. Maasai depend strictly on livestock (cow, sheep and goat) and do not eat game meat. In 1954 the government dishonoured its regular promises that the Maasai rights would not be obliterated (see e.g. Bonner 1993). This triggered retaliatory response that involved spearing of rhinos, setting fires with malicious intent and physical violence (Neumann 1992).

In addressing this conflict, most of the committees, scientific reports, books and verbal statements from influential personalities were more biased to wildlife than people. For example, the then Serengeti park manager stated overtly, 'The interests of fauna and flora must come first, those of man and belongings being of secondary importance' (Quoted in Neumann 1992:90). Lee Talbot, an ecologist from the American Committee for International Wild Life Protection (ACIWLP), insisted that Maasai presence in the park would diminish the value of the area for wildlife and, therefore, risk the interests of the white tourists (Bonner 1993). Luis Leakey, a palaeontologist argued, 'the Maasai had no legal right to remain in Serengeti and, if any, should not be greater than the best interests of the rest of the people … of the world' (Quoted in Bonner 1993:174).

Of all advocates for Serengeti, Bernhard Grzimek emerged the most prominent personality in this war. Grzimek was invited by the Board of Trustees to carry out an aerial count of the plain animals in the Serengeti; to plot their main migration routes; and to advise on the proposed new boundaries of the park. With the animal censuses conducted by plane, they laid the groundwork for modern nature conservation work at Serengeti National Park and for Frankfurt Zoological Society's global nature conservation programme (Ole Kuwai, personal comm. 2004).

Western Serengeti elders described Grzimek as a person who loved animals more than humans and, therefore, who felt that wildlife should be conserved at all costs. Some authors express similar view (Adams & McShane 1996; Bonner 1993; Nelson 2003). According to Bonner (1993), Grzimek was once quoted as saying that he wouldn't mind sitting down with Hitler and Stalin if that would help his animals. He stressed 'It can be easier to work with a dictatorship on matters of conservation than it is to work with a democracy, because you don't have to deal with parliaments, and you can get on with the job' (Quoted in Bonner 1993:136-137).

Grzimek's popular books and documentaries: *No Room for Wild Animals* (Grzimek 1956) and *Serengeti Shall Not Die* (Grzimek & Grzimek 1960) sounded a warning bell over the risk wildlife was facing from natives' interests. Adams and McShane (1996:52) describe the second book as 'the Manifesto of Preservationism', but another of Grzimek's propaganda tools, filled with misleading, often falsified data." They quote a Nairobi-based journalist writing about Grzimek's fight against the idea of excising Serengeti: '…he fought NCA as he fought all the battles over wildlife conservation, with any weapon at his disposal; First by soft line, next by bribery, and if necessary by outright blackmail' (Adams and McShane 1996:53). Despite Grzimek's outstanding contribution to the survival of Serengeti to date, he has remained unpopular to natives, who associate him with the historical sufferings they had experienced from wildlife.

Despite the fight from conservationists against the idea of splitting the park, the government took a bold decision. Ngorongoro Conservation Area (NCA) was excised from the park and declared a multiple land use area where along with conservation, the interests of the Maasai pastoralists could be accommodated. Two different Ordinances, NCA Authority Ordinance Cap. 413 of 1959 and National Parks Ordinance Cap. 412 of 1959 were enacted to manage the areas and came into effect on 1 July 1959. The later repealed the National Parks Ordinance of 1951.

### *4.3 Tanzania's independence and the fate of wildlife conservation*

Freedom struggle against colonialism in Tanganyika picked up the pace in 1954 following the formation of a political party - Tanganyika African National Union (TANU). Julius K. Nyerere, who himself hailed from western Serengeti, was the Party President and a leader of this struggle. Mass support was solicited by taking advantage of potentials and problems that prevailed in different geographical localities. Anti-conservationist platform was ideal for western Serengeti where access and use of wildlife resources featured as a priority. Strategies

presented for addressing this agenda convinced the natives to render full support to TANU. Furthermore, it seemed unlikely that Nyerere would let down his homeboys.

Conservationists translated freedom campaigns as a war against wildlife conservation. Their scepticism was apparent. For example, quoted in Bonner (1993:64), Max Nicholson, one of the founders of World Wildlife Fund (WWF) contended, 'We felt that under the new African governments, all prospect of conservation of nature would be ended.' He was further quoted as saying, 'The fear was that all hell would break loose on independence with the National Parks such as Serengeti being inundated' (Pearce 1997: http://www.panos.org.uk/ ). Conservationists also doubted the competence of the Africans in managing wildlife since none of African staff was employed at high ranks. This is illustrated by views like: 'The notion of conserving the creatures of the wild to ensure their continuance into the future is alien to the Africans' (Simon in Bonner 1993:64) and 'Replacement of European staff by untrained, unqualified men spells disaster to game' (Train in Bonner 1993:57). Generally, political independence sounded good to Africans, but it was a huge disappointment to Europeans, who saw it as a tragedy to game.

As the Tanzania independence came closer, lobbying was the best strategy conservationists could use to pre-empt a threat of decolonising wildlife conservation. In September 1961, three months before independence, Nyerere, Tanzania's first Prime Minister, through a statement written by WWF officials, affirmed the country's stance on wildlife conservation at the International Union for Conservation of Nature and Natural Resources (IUCN) sponsored World Wildlife Symposium, which was held in Arusha. The declaration, which targeted all African leaders who attended the summit (Bonner 1993:65), has become to be known as Arusha Manifesto. Since then it has served as an important landmark statement for Wildlife conservation in the country and Africans often cite it to demonstrate their commitment to conservation. The Manifesto reads:

> ‘The survival of our wildlife is a matter of grave concern to all of us in Africa. These wild creatures amid the wild places they inhabit are not only important as a source of wonder and inspiration but are an integral part of our natural resources and of our future livelihood and well being. In accepting the trusteeship of our wildlife we solemnly declare that we will do everything in our power to make sure that our children’s grandchildren will be able to enjoy this rich and precious inheritance. The conservation of wildlife and wild places calls for specialist knowledge, trained manpower, and money. We look to other nations to co-operate with us in this important task, the success or failure of which not only affects the continent of Africa but the rest of the world as well’ (URT 1998:2).

Nyerere’s positive stance on conservation dispelled conservationists’ earlier skepticism about the future of wildlife conservation in Tanzania.

## 5. KEY ASPECTS OF WILDLIFE CONSERVATION IN THE POST-COLONIAL ERA

As mentioned earlier, the oppressive nature of colonial conservation policies made anti-conservation agenda an ideal tool for winning native support in freedom struggle. However, assessment of the legislative process for wildlife conservation during the post-colonial government indicates that, of the amendments and new legislation enacted, none paid attention to the rights of the natives. The legislation remained typically exclusive, prohibitive and punitive. For example, the amendment of the National Parks Ordinance Cap. 412 of 1959 in 1962, 1974 and 1975 strengthened the already existed exclusive and punitive policies. The Wildlife Conservation Act No. 12 of 1974 which repealed the Fauna Conservation Ordinance Cap. 302 of 1940 established ’semi’– protected areas with restrictions attached thereto. Under section 5(1) the President had the power to declare any area of Tanganyika a Game Reserve while sections 6 and 13 empowered the Minister and the Director of Wildlife Department to

declare any areas of Tanganyika the Game Controlled Areas and partial Game Reserves, respectively (URT 1974). The government enacted another punitive law - Economic and Organized Crime Act of 1984, which allowed imposition of heavy penalties for certain crimes under the National Parks Ordinance and the Wildlife Conservation Act.

Nyerere's political and economic ambitions in relation to the future of Tanzania made him endorse the continuation of the conservation laws and policies that favoured Western values and ideologies. His government inherited economic impoverishment. Yet he sought to provide social services (e.g. education and health) free of charge and promote rural development all over the country. Wildlife-based tourism was seen as a promising sector to sustaining these ambitions. Disappearance of wildlife in Europe following rapid industrialisation and urbanisation, general increase of wealth, desire for adventure and exoticism, more time for leisure and inexpensive flights (which made travelling long distances to become technically possible for larger groups) boosted growth of tourism industry in Africa (Neumann 2002). Furthermore, Nyerere considered wildlife as insurance in case of failure of minerals and agricultural sectors. He remarked:

> 'I personally am not interested in animals. I do not want to spend my holidays watching crocodiles. Nevertheless, I am entirely in favour of their survival. I believe that after diamonds and sisal, wild animals will provide Tanganyika with its greatest source of income. Thousands of Americans and Europeans have the strange urge to see these animals' (Quoted in Levine 2002:1047).

Nyerere's commitment to conservation attracted massive infusion of donor money from conservation organisations to cater for creation of more protected areas, capacity building and law enforcement (Bonner 1993; Levine 2002; Neumann; Neumann 2002). Increasing the number of protected areas around western Serengeti is linked to these policies. Maswa Game Reserve (2,200 $Km^2$) was created in 1962 while Kijereshi, Ikorongo and Grumeti were declared

Game Controlled Areas in 1974 and upgraded to Game Reserves in 1994. From 1967 the government recruited the first Africans in high ranks of management. David Babu, Elias Kapolondo, Benjamin Kanza, Obadiah Ndossi and L.L. Mitiri were the first park warden cadets to report in Serengeti.

The conservation developments in the post-colonial era disappointed the natives. They were unconvinced with justification given that the resource was now for the benefit of the entire nation and the future generations. In a community meeting the elders lamented that they had never seen any positive change other than being told to conserve for their grandchildren, the story that has persisted to date despite an increase of wildlife-induced costs. They claimed that confrontation with people under the post-colonial conservation arrangements surpassed that of the colonial era. For example, comparing anti-poaching operations during the two regimes one elder observed, "The current game rangers are worse than the colonial ones. They beat people, rape women and enter into the houses where they take even the cooked meat." Another elder queried, 'Does *Uhuru* (freedom) mean replacement of white oppressors by black oppressors?'

## 6. CONSERVATION CHALLENGES, DILEMMAS AND INTERVENTIONS ADOPTED DURING THE POST-COLONIAL ERA

Conservation during the post-colonial regime has had a number of challenges. While illegal hunting and habitat destruction appear to be the major threats, interventions adopted to address them present another form of challenges as they have proved to be fundamentally flawed. Population and economic factors and different actors (politicians/government leaders and investors) augment to these challenges and dilemmas. These challenges, intervention measures and dilemmas are discussed in this section.

### *6.1 Natives' resentment toward conservation policies*

Failure of the post-colonial government to provide alternative policies, which would address the legitimate rights of local people, exacerbated local resentment. Violation of law was pursued, both as a survival strategy or retaliatory response. Expansion of Serengeti National Park in 1960s, which took Kurya's grazing, arable and hunting land, culminated into resurgence in 1970s. Kurya declared their independence and pulled down a Tanzania flag, replacing it with a leopard banner. Although the government forces ended this resurrection, the hostility between Kurya and the park and its staff is still widespread. Discussion with some wildlife staff revealed a degree of negativity toward the tribe. They displayed the Kurya as stubborn, crooky and hard people to observe the conservation law. Resentment, however, is not limited to Kurya alone and, is still a common practice to date. The worst scenarios happened recently leading to serious wounding of Game Assistant (Kipara Nyundo) on 9 August 2001[1] and assassination of the Acting Magu District Game Officer (Mr Mihayo Lupilya) on 15 July 2002[2] by the Sukuma. The events were associated with natives' resentment toward the creation of Kijereshi Game Reserve.

### *6.2 Illegal hunting*

Between 1970s and 1980s Tanzania faced a severe economic depression, which resulted into under-funding of different sectors. From 1976 to 1981, the country's natural resources sector (viz. wildlife, forestry and fishery) was the least financed, receiving 1.2% only from the national development budget (Yeager 1986). These budget cuts reduced the capacity of the state to cope with escalating poaching, which was stimulated by the rise of international wildlife market and reduction of rural incomes. In Serengeti trophy hunting started in 1978. The entire park was served with one functional vehicle, which was often grounded due to fuel scarcity and

the rangers, while poorly equipped, went without salaries for months (Packer 1994). The situation worsened as the international agencies were reluctant to support Tanzania due to its former anti-western policy (socialism) (Packer 1994). The war between Uganda and Tanzania was another factor.

Like in other areas of Tanzania and Africa, commercial poaching had serious impact on Serengeti's black rhinoceros (*Diceros bicornis*) and elephant (*Loxodonta africana*). Somali traders and middlemen from urban areas such as Dar es Salaam, Mwanza and Arusha made frequent trips to Serengeti to buy the rhino horns and elephant tusks. Trading with Somali involved barter systems in which cattle were exchanged for trophies. A rhino horn was worth two heads of cattle while two elephant tusks could be exchanged for four to five heads of cattle. The middlemen paid Tanzania Shillings ranging between 100,000 and 150,000 per rhino horn[555]. This lucrative business reduced the species drastically. Rhino, numbering 2000 in 1975 was driven to the verge of extinction in 1986 while elephant numbers dropped by 80% (Dublin & Douglas-Hamilton 1987).

Although the problem of trophy hunting in Serengeti is virtually eliminated now, most likely due to international policies (e.g. CITES), game meat hunting has remained one of the critical management challenges in Serengeti. The major drivers for this are poverty and population growth. The number of illegal game meat hunters has been on the increase. For example, using the human population census the number was estimated at 23,290 in 1978; 31,660 in 1988 (Campbell & Hofer 1995) and 60,000 in 2002 (Loibooki et al. 2002). It is estimated that some 210,000 herbivores are illegally hunted per annum (Campbell & Hofer 1995). Wildebeest (*Connochaetes taurinus*) is the most hunted - ca. 118,922 off-take/year (Campbell & Hofer 1995), the situation threatening its future. Mduma et al (1998) suggest that a harvest of 80,000 wildebeest per year is unsustainable and may cause a total collapse of population by the year 2018. Another species with high rate of hunting is buffalo (*Syncerus*

*caffer*). Its population dropped by 80% from 63,144 in 1970 to 15,144 in 1998 (Campbell & Hofer 1995; TWCM 1999).

### *6.3 Habitat loss*

Sinclair and Arcese (1995) reported an increasing trend of habitat loss within the legal boundaries of Serengeti National Park between 1960s and 1990s. They estimated over 40% loss of ecosystem's original area (ca. 30,143 $km^2$ in 1910). A change of park's vegetation community had affected the fauna populations. For example, the loss of *Combretum*-dominated habitats is attributed to local extinction of roan antelope (*Hippotragus equinus*) in many parts of Serengeti (Sinclair & Arcese 1995).

According to Sinclair *et al.* (2002), the intensity of agriculture and bird species diversity and abundance in western Serengeti are negatively correlated. The abundance of bird species found in agricultural areas west of park was 28% of that for the same species in the native savannah. The agricultural areas have also lost about 50% of insectivorous and granivorous bird species. They attributed reduction of insectivorous to a decline of arthropods following disturbance to the grass layer. Discussions with local communities also revealed that most of the wild animals have abandoned the currently settled and farmed areas.

### *6.4 Flawed intervention measures*

Local and global concern over above threats (illegal hunting and habitat loss) prompted intervention measures sought to reconcile conservation with human development. Serengeti Regional Conservation Strategy (SRCS) was established in 1988 to this end, and became the first flagship community based conservation (CBC) project in Tanzania. The Norwegian Agency for International Cooperation (NORAD) funded the project. Its focus was to improve the income, food security and social welfare of the communities as an incentive to winning

local support in conservation. TANAPA administered another initiative called Community Conservation Service (CCS) - popularly in Swahili as *"Ujirani Mwema"* (good neighborliness). CCS sought to minimize the hostility between individual parks and local communities, reconcile conservation and development interests and facilitate the programme for benefit sharing.

Both initiatives, SRCP and CCS placed priority on benefit-based approaches with a view of motivating local people to align their behaviours with conservation goals. However, document and literature review, discussion with villagers and some key informants uncovered several flaws in these approaches as outlined below:

(a) The benefits are too low to offset the wildlife-related costs. For example, excluding other costs (e.g. opportunity costs of resources, livestock depredation and wildlife-related accidents), the costs of crop damage by wildlife alone exceeds US$ 500 per household per annum. The amount granted to communities indirectly through public goods averages at US$ 2.5 only per annum (Emerton and Mfunda 1999)

(b) The wildlife-related benefits are too low to outweigh the benefits generated by ecologically destructive but profitable land uses. For example, the value of illegal hunting was 45 times greater than the value of game meat provided by SRCP cropping scheme (Holmern et al. 2002)

(c) The nature of the benefits granted renders them inequitably distributed. Most of the public goods are non-excludable and non-rivalrous[3] and, therefore, provide a loophole for free riders. It is impractical to exclude criminals from using public goods such as walking on the roads or barring children from using a classroom. Further, local elites often monopolize the benefits

(d) The initiatives are often limited to few (pilot) villages and majority are left out, therefore, fomenting conflicts between the losers and winners

(e) The benefits do not address people's immediate and felt needs. For example, construction of a classroom is hardly appreciated during the critical food shortage

(f) Poverty may hinder access as some benefits require cash. For example, some villagers showed low appreciation to dispensary constructed through CCS programme as they were unable to access the services due to cost-sharing policy. Sometimes illegal hunting was justified on grounds of generating income to meet these costs.

(g) The interests of the powerful stakeholders (e.g. investors) may undermine the benefit sharing programmes. For example, Grumeti Reserves Fund, an investor in Serengeti, had made some attempts to frustrate community hunting conducted by SRCP.

(h) The sustainability of these projects is not guaranteed, especially in case of donor withdrawal or reduction of tourism earnings. The tourism sector is vulnerable to factors such as international and local politics, terrorism and natural catastrophes. Human population growth may further reduce the share of the benefits granted to local people, thus reducing their incentive to conserve.

### *6.5 Population and economic factors*

Human, livestock and wildlife population increase has heightened conflicts in Western Serengeti. The area is the most populated part of the ecosystem. Over 60% of the human population is composed of in-migrants attracted to the area, mainly by grazing and arable land, fishing and hunting opportunities (Kideghesho, unpublished data, 2004). According to 2002 national population and housing census, the current human population is above two million with annual growth rate exceeding the national average of 2.9% (URT 2002). This huge population has resulted in land scarcity. The fact that the majority of this population is very poor - with household income ranging between US$ 0.42 to US$ 0.55 per day (Johannesen 2002) – illegal hunting and encroachment on wildlife habitats have become the major adaptive

and coping strategies. Poverty makes clearing of new lands for agriculture the most feasible strategy of increasing crop output as people can barely afford agricultural inputs for land improvement such as fertilisers.

Livestock population increase along with shrinkage of grazing land due to expansion of protected areas and arable land (Kideghesho, unpublished data, 2004) translate into shortage of grazing land. The land required to sustain the current livestock population in Serengeti district is 3199.5 $km^2$. However, only 2456 $km^2$ is available. In Bunda district the land available and land required for livestock grazing is 2408 $Km^2$ and 3205.08 $Km^2$ respectively (Kideghesho et al. 2005). The expansion of cultivation and settlements forced realignments of the boundaries of Maswa Game Reserve three times, causing 15% loss of the original area (MNRT 1985).

Some wildlife species have shown a remarkable increase in Serengeti. For example wildebeest increased from 0.25 million in 1960 to 1.3 million in 1990s (Sinclair 1995). This was a dramatic recovery following decimation of the species by rinderpest outbreak in 1890s. The elephant population increased from 500 individuals in 1986 to 2000 individuals in 1998 (Walpole 2004). The termination of elephant poaching and increasingly effective conservation measures following the creation of the new Game Reserves are attributed to this increase (John Muya, pers. comm. 2004). As cultivation is increasing in close proximity to protected areas, the risk of crop raiding by elephants also increases. In 2004, elephants raided some 569 ha whose yield was estimated at 1408 Tons (Walpole 2004). Wildebeest also damages property, contaminate water, transmit diseases and lead to loss of domestic stock during migration.

### *6.6 Politicians and government leaders*

By virtue of their positions, politicians and government leaders, have continued to play a central role in conservation of wildlife in Serengeti – further evidence of wildlife being a political commodity. However, their decisions and interventions, pursued either intentionally or out of ignorance, have often fomented conflicts and sometimes culminated in gross violation of

human rights. Forceful eviction of Nyamuma villagers who were legally residing outside Ikorongo Game Reserve on grounds of meeting conservation needs is one of such interventions[4]. The Commission for Human Rights and Good Governance convicted the Serengeti District Commissioner (DC) for abusing his powers (URT 2004) but the government dishonoured this ruling. This furthered villagers' hatred and scepticism toward wildlife conservation programmes.

In Bunda district, after meeting the agropastoralists along Grumeti Game Reserve, the DC expressed sympathy and assured them of an immediate solution to problem of pastureland and water they were facing. She wrote to the Chief Warden Serengeti National Park[5] suggesting degazettement of a part of the reserve as a part of the solution. She raised the following issues, which reflect her minimal understanding of different mandates of government institutions, policies and legislation: (1) Pastoralists were severely mistreated, tortured, arrested and later taken to court by the Game rangers once found with livestock in River Rubana (2) A woman who was collecting firewood close to River Rubana was jailed for 10 years (3) Kids were seriously canned if found fishing in River Rubana (4) Some 50,000 cattle belonging to natives had no access to pasture and water.

The letter suggests lack of knowledge on the following facts: (1) In Tanzania's wildlife conservation network all Game Reserves are under jurisdiction of Wildlife Department and not Tanzania National Parks (a parastatal organisation) or individual park administration (2) The conservation authorities (and other organs) cannot influence the court decisions (3) the mandate of gazetting and degazetting Protected Areas lies within the parliament and not the Chief Park Wardens. The fact that a request to degazette a Reserve was a policy and legal issue, it was unlikely for immediate solution to be secured as the DC promised - a scenario that could foment more conflicts.

The 2002–2007 General Management Plan (GMP) for Ikorongo and Grumeti Game Reserves (IGGR) has addressed the problem. Some measures are proposed, but with reservations, which implicitly rule diminish the possibility of adopting the proposals. For example, practical constraints for permission to fish in Rubana River are identified as lack of information on species and their stock and lack of knowledge on control measures. The GMP speculates further that, permission to fish may encourage illegal activities among the would be fishermen. Vegetation trampling and overgrazing along the river, erosion of river banks and siltation, chances of crossing over (livestock trespassing) to the Game Reserve and diseases transmission are considered to be practical problems in case livestock will be allowed to access water in the River. Creating Community Conservation Use Zone may reduce tourist hunting area and, consequently, reduce revenue for the management. It may also create conflicts with outfitters (SRCP 20??).

Politicians also complicated the issue of Kijereshi Game Reserve. Villagers appealed to different authorities and prominent politicians and government against the 1994 order, which required them out of the newly established Game Reserve. Some of these people were, the then Mwanza Regional Commissioner; the Minister for Natural Resources and Tourism; the Member of Parliament for Magu; the Chairman of the presidential committee on land matters, the then President of the United Republic of Tanzania and the Retired President Julius K. Nyerere. The 'political sympathy' and promises raised people's expectations and feelings that they were "safe" against the intended conservation intervention[6]. This confidence hindered smooth implementation of the policies and resulted into serious conflicts that costed life of government officilas. The Mwanza Regional Commissioner, who initially was reluctant to act, instructed immediate eviction of the villagers from the reserve[7]. Eviction took place from 20 - 26 October 2002[8].

### *6.7 Investors: The new actors*

The recent social-economic liberalisation policies and institutional reforms in Tanzania have created an enabling environment for private investors. Private sector is increasingly becoming prominent as an engine for economic development and sustainability. Wildlife sector has been earmarked as one of the potential areas for investment. Western Serengeti, which until recently was under-utilised area, has attracted a number of investors. These investors are involved in game viewing tourism or tourist hunting. Examples are Grumeti Reserve Funds, Kijereshi Tented Camp, Bunda Safaris and Thompson Safaris.

Apart from contributing to the country's economic prosperity, some investors have pledged ambitious schemes in view of supporting local communities' development programmes. However, the behaviours of these investors have prompted perceptions among the local people that they are agents of marginalisation. For example, one of the investors in Serengeti District, Grumeti Reserve Funds, was blamed for intention of grabbing villagers' land. The company was also accused for harassment of the villagers using the scouts he has employed; preventing villagers from pursuing their legal livelihood strategies and attempting to halt community conservation initiative aiming at provision of game meat at affordable price. The villagers and some officials reported that the investor was boasting of political backing from some top government officials. He was also accused of frustrating other potential investors in the area. The investor was also spearheading relocation of Robanda villagers and Serengeti National Park staff residing in Fort Ikoma on claims that these areas are dispersal areas and migratory corridors for wildlife. However, the villagers snubbed the agenda of conservation, linking his intent to desire of preventing people from interfering with his resort's luxury safaris. The investor has backed the government plan of creating the Ikoma Wildlife Management Area. This is said to be consistent with his ambition, as most of human activities will be restricted.

Another investor in Magu District, Kijereshi Tented Camp (KTC) has also been in constant conflicts with the villagers. Villagers complained of mistreatment from his employees. His pressure on government to evict villagers from Kijereshi had been considerable. On 22 December 1999, the KTC Director General, wrote to the then Minister of Natural Resources and Tourism congratulating her following eviction of Kijereshi residents[9]. He called for severe penalties should the evictees attempt to return. On 8 September 2001 he wrote to Magu District Commissioner complaining that the villagers have invaded the Game Reserve and urged for eviction of the 'invaders'[10]. A similar letter was sent to Mwanza Regional Commissioner on 26 September 2002[11]. The Regional Commissioner responded to this letter urging the DC to act.

By having the government working on pressure from the investor, the impression of local people was that the reserve belonged to an investor, a scenario they translated as 'selling the country to foreigners.' A retired senior government official in Lamadi Magu stated,"what we call investment is nothing but the backdoor through which colonialism is returning to Tanzania. And this is the worst form of colonialism as we have willingly invited them." Villagers in western Serengeti felt that the investors were operating as a separate arm of the state. Some even believed that the investors were more powerful than the State.

## 7. DISCUSSION

### *7.1 Motives behind wildlife conservation*

The social, cultural and economic importance of wildlife has made it a significant political commodity contested by various actors. The powerful actors often win in this battle. They can either influence or introduce the new social structures for controlling access to resources. The formula: "discovering an issue, naming it and establishing the basis of the claim" (Blaikie 1999:133) has been important in instituting these structures. As shown in this study, use of propaganda ushered by racist languages was one of the prominent strategies in which these

structures were founded and maintained during the colonial regime. A number of reports, articles, books and conferences overstated the negative impacts that native activities had on wildlife resources (Neumann 1996; Neumann 1998; Neumann 2002). By presenting African hunting practices as cruel, barbarous and wasteful, justification was secured for criminalisation of the native activities. Undermining the interests of the natives (weak actors) and excluding them from political debate on issues related to wildlife management and utilisation was necessary because the interests of the Europeans depended on abrogating the native rights over wildlife. Therefore, the westerners were able to maintain their values and interests by formulating the agenda, which gave rise to legislation that alienated the local people from wildlife resources.

Giving possible reasons which led the colonial government to outlaw hunting by natives, Neumann (1998) argues convincingly that, hunting of wild animals in Africa offered Europeans a symbolic dominance of the continent and important marker of social class within settler society. Success in military campaigns, at both the individual and group level, could be measured by hunting. Therefore, being a ritualised act for distinguishing superior class from the inferior one, it could not be pursued along with traditional hunting as this would mean putting African culture and resource management practices on equal footing with those of Europeans. The cultural values and practices that motivated hunting by Africans seemed to offend the sensibilities of Europeans who held fast to their own values and myths concerning wildlife (Neumann 1998).

Although the African countries attained their political independence, the westerners were able to retain their interests and values over African wildlife. Their influence made the post-colonial governments to embrace the colonial conservation ideologies and laws uncritically. This was not difficult because the newly independent governments needed an economic base for political power and resource for promised socio-economic development. Wildlife-based

tourism was one of the major promising sectors to this end. To date, the westerners, by virtue of their economic power, have managed to retain their influence in prescribing what they consider to be the best conservation practices in the developing countries. The leaders in these countries are compelled to adopt these prescriptions for fear of risking the loans and grants from these potential donors. Reflecting on this, Nelson (2003:77) observes that, continuation of the flow of money depends "in significant part on a deep respect for the wishes of Europeans and Americans, including prominently international environmental organisations and their constituencies." However, embracing the colonial conservation policies meant disappointing the natives whose expectations for regaining their extinguished customary rights over wildlife were raised by political campaigns during the freedom movements. Therefore, resentment to conservation policies had remained a salient feature of conservation policies.

### *7.2 Issues and claims: How genuine were they?*

As aforementioned, conservation work has long been achieved by discovering issues, naming them and establishing the basis of claims. Reality derived from this study and literature, however, suggest insincerity in most of these issues and claims, especially during the colonial period. They were intended to secure justification for satisfying the interests of the powerful actors against those of weak actors. For example, the fact that the pressures that led to criminalisation of African land uses came from the 'politically powerful conservationists in London' rather than 'the colony's natural resources professionals' (Neumann 1992:88-89), illustrate how powerful actors framed the issues and claims to satisfy their interests.

Claims over destructive practices, which African natives were accused for in the past could hardly be justified given primitive technology, low population and the purpose for which hunting was conducted. In Serengeti, bows and arrows were mainly used in hunting. As revealed in this study, the use of wire snares started after World War II - some four decades

after laws prohibiting hunting came into force. Europeans hunted by guns and vehicles and targeted big games. The argument that hunting game for meal by bows and arrows was more destructive than guns and vehicles is far from reality. White hunters' activities worried even the fellow Westerners. For example, in a series of letters to *The Times* (London) in 1928 and 1929, Dennys Finch Hutton protested the 'orgy slaughter' in the Serengeti conducted by hunters (he called 'licensed butchers') on motorised vehicles (Adams & McShane 1996). Remarks by Sir Philips Cunliffe-Lister, the Secretary of State for the colonies, to the delegates who attended London Convention in 1933, also implicated white man (rather than natives) with decimation of wildlife:

> "the greatest danger to the animals……was the man who hunted for profit – the man who in 99 cases out of a hundred did not care a damn about the animals and their possible extinction, but was simply out to make all the money he could in the easiest way he could." (Quoted in Bonner 1993:168)

Reports blaming Africans for slaughter of game have been criticized for being too general. Neumann (2002:30) observes, 'the claim of slaughter was not specified geographically, nor in terms of numbers of species, nor was there any discussion of hunting rates in relation to wildlife population dynamics.' For example, in 1947 Major Keith Caldwell's report on situation of game claimed the loss of game areas by half 'and the game within many of the left by 75%' (Neumann 2002:32). He cited Tanganyika, in particular, as a territory where natives had decimated wildlife – a scenario he attributed to government's liberal policy on native hunting. Despite contradicting the individual territorial reports that indicated an increasing trend of wildlife populations, Colonial Office accepted Caldwell's generalised and unsubstantiated report as authoritative and final. It was, therefore, used as a basis for pressing the territorial governments to outlaw African hunting and create a system of National Parks.

The number of animals that white hunters killed is further evidence that blames of indiscriminate killing of game by Africans were mere fabrications. While Africans hunted a few specimens of the animals for food, examples abound showing how white hunters killed several animals. Dennys Finch Hutton's letter in *The Times* in the late 1920s quoted an American who had already killed twenty-one lions from his car exclaiming, 'Let us kill every living thing we can find and see what bag is possible in one day' (Quoted in Adams & McShane 1996:30). William Finaughty wrote in his book that he killed 500 elephants in Matebeleland using large bore muzzleloaders (Finaughty 1991). In his hunting trip to East Africa in 1909, Theodore Roosevelt, the former United States President, killed over 500 large mammals (Adams & McShane 1996). Scotsmann Gordon Cumming boasted of having killed hundreds upon hundreds of elephants, impalas (*Aepyceros melampus*), rhino and wildebeest in his career while Fredrick Selous had recorded thirty one lions, and at least 200 buffaloes, and scores of elephants (Adams & McShane 1996). Available records indicate that white hunters were responsible for extinction of South Africa's quagga (*Equus quagga*) and a large antelope called blaubok (*Hippotragus leucophaeus*) (Pearce 1997).

### *7.3 Behaviour of marginalised actors, impact on wildlife and a need for a change*

As observed in this study the conservation policies had influence on behaviours of the natives. One, adoption of economic choices that are incompatible with conservation objectives became a necessity for survival. Two, resentment in form of violating laws, violence and vandalism (as a typical weapon of the weak) were reflections of unacceptable policies. These behaviours, further to fomenting of serious hostility with conservation authorities, had been detrimental to wildlife species and their habitats. Use of violence and other means to resent wildlife policies have been reported in many developing countries (see e.g. Gibson 1999; Machlis 1989; Wells & Brandon 1992).

As revealed in this study, the adoption of Community Conservation (CC) as an approach to end detrimental impacts associated with 'fences and fines' approach was fundamentally flawed. Poor performance has been reported for other CC programmes in Africa. Similar or different reasons have been advanced for these failures. (Gibson & Marks 1995; Songorwa 1999; Wells & Brandon 1992). These failures indicate that the interests of the weak actors are not yet addressed. The recent forceful evictions in western Serengeti and continued prohibitive and punitive policies raise questions on validity and sincerity of community conservation (CC) programmes. The reasonable speculation here is that the CC approach was adopted in response to situation that threatened to wipe out the elephants and rhinos in 1970s and 1980s rather than seeking the 'true' partnership with local communities as it is often being claimed. It is seemingly that the government and its agencies no longer consider local support as a necessity in conservation. Reasons that were given to justify evictions is another testimony that when it comes to meeting the interests of the powerful actors (government) those of weak actors (local people) become the non-issues.

## 8. CONCLUSION AND RECOMMENDATIONS

From this study a number of conclusions can be drawn: (1) that wildlife is highly contested by various actors due to its role as a social, economic and political commodity. (2) Powerful actors have often emerged the winners while the weak actors pay the costs. (3) The use of propaganda and fabrications has often been the key strategy in justifying conservation decisions and undermining local interests. (4) The post-colonial regime had maintained the colonial conservation laws due to economic and political ambitions. (5) Maintenance of these laws deepened conflicts with local communities who resumed resentment at the detriment of wildlife. (6) The CC approach adopted as an intervention to these conflicts has led to disappointing outcomes. (7) Continuation of punitive and exclusive policies raises a question of whether the approach is still valid and whether the local support is necessary in achieving

conservation goals. (8) Political and government leaders may be the major stumbling blocks in conservation programmes and (9) Investors as new and powerful players in conservation may frustrate the conservation goals, despite their anticipated key role in economic development.

However, despite the snags observed, importance of wildlife conservation remains indisputable. The snags identified can serve as important entry points towards more effective and realistic conservation efforts. We recommend the following as a way forward:

(i) Reverting to 'fences and fines' approach and assumption that local support is unnecessary should be considered as a flaw in conservation efforts. The use of force and propaganda paved the way for expansion of protected territories. However, today it may not be feasible due to such factors such as rapid population growth, increased poverty and increased awareness on human rights and activists who are ready to offer legal support to marginalised people.

(ii) The community Conservation approach is still important. However, there is a need to address the deficiencies associated with the approach

(iii) Benefit-based approaches should seek to address the problem of poverty and other factors threatening the ecosystem

(iv) Politicians and government bureaucrats need to be sensitised on wildlife legislation and policies. Good governance is also important

(v) The investment policies should be well harmonised with conservation and development policies. They should preclude any loopholes for marginalisation.

(vi) There is an urgent need to address the question on who pays for, and who benefits from wildlife conservation.

**NOTES**

[1]A letter Ref. Kumb Na. DG.10/134 (in author's file)

[2]A letter Ref. Kumb. Na.. G.10/4/161 from Magu District Commissioner to Mwanza Regional Commissioner (in Author's file)

[3]"Non-rivalrous goods" are goods whose benefits fail to exhibit consumption scarcity i.e. once produced, everyone can benefit from them without diminishing other's enjoyment e.g. roads, classrooms. " Non-excludable goods" – these are benefits which once created, it is very difficult or impossible to prevent access to the goods.

[4]Discussion with anonymous senior wildlife officials revealed that although the mandate of proposing and gazetting Wildlife Management Areas rests with Wildlife Department they were not aware of the plan. The DC justified eviction on grounds of the need to create WMA.

[5]A letter dated 12 June 2003 (No Ref No.) from Bunda District Commissioner to Chief Park warden Serengeti National Park (in Author's file)

[6]Community meetings with villagers and anonymous wildlife officials in /2003 and 2004

[7]Letter Kumb. Na. L20/5/Vol.III/56 (in Author's file)

[8]Letter Kumb. Na. GD/KDU/SRT/QR/Vol.2/18 (in Author's file)

[9]A letter dated 22 December 1999 (Ref. KTC/99) from the Kijereshi Tented Camp Director General to the then Minister of Natural Resources and Tourism (in author's file).

[10] A letter dated 8 September 2001 (Ref. No. KTC/CR/MZA/4) from the Kijereshi Tented Camp Director General to the then Magu District Commissioner (in author's file).

[11]A letter dated 26 September 2001 (Ref. KTC/MZA/CR) from the Kijereshi Tented Camp Director General to the then Mwanza Regional Commissioner (in author's file).

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# Paper III

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# 'Serengeti shall not die': Can the ambition be sustained?

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## ABSTRACT

Serengeti, a World Heritage Site and a Biosphere Reserve, is increasingly being threatened by human factors, which undermine its natural resource base and, therefore, contradict the ambition contained in Grzimeks' popular book 'Serengeti Shall Not Die'. We discuss five forces against the ambition: rapid human population growth, poverty, illegal hunting, habitat destruction, and wildlife diseases. We also review some of the current strategies adopted in view of pre-empting the negative outcomes resulting from these forces by pointing out their deficiencies. We conclude that, although human population growth and poverty are underlying factors threatening the Ecosystem, the current mitigative strategies barely address them adequately. We, therefore, recommend that, for Grzimeks' ambition to remain valid, the two factors should take priority. We also call for more research to establish the reasons making people exhibit unsustainable behaviours toward the resources. We further suggest learning from past mistakes in view of correcting the identified deficiencies. Support in the form of alternative sustainable livelihood strategies and discouraging all ecologically destructive policies are equally important. Drawing from experience of the Kenyan part of the Ecosystem we suggest banning of land privatization, commercial agriculture and other development policies conflicting with conservation interests around Serengeti National Park.

## INTRODUCTION

### Historical background of wildlife conservation in Tanzania

Tanzania has a long history of wildlife conservation dating back to the pre-colonial era. Although the notion of conservation among the pre-colonial traditional societies is highly disputed (Redford and Sanderson 2000; Songorwa *et al.* 2000), totemic links and spiritual affiliation to particular animals, plants or sites had benefited wildlife and habitats in some parts of Tanzania. For example, Mgumia and Oba (2003) showed that sacred groves and ritual sites represent a potential contribution to the conservation of biodiversity in the miombo woodland among the Wanyamwezi people of central Tanzania. In Tanzania's Western Serengeti Corridor, special respect accorded to sacred species such as elephant (*Loxodonta africana*) and bushbuck (*Tragelaphus scriptus*) has reduced their

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vulnerability to poaching compared to other edible species. As far as we can ascertain, there are currently no cases of elephant hunting for meat within 45 km west of the park. Likewise the annual offtake of bushbuck is the lowest (5%) compared to other species (Campbell and Hofer 1995).

The German colonial administration (1885–1919) enacted the first formal written wildlife law to regulate hunting in 1891 (URT 1998). This was followed by the creation of a number of protected areas (PAs). By 1911, about 30,000 $km^2$ or 5% of the colony had been included within 15 PAs (Baldus *et al.* 2002). The British Administration (1919–1961) established Selous Game Reserve (GR) as the country's first GR in 1922, followed by Ngorongoro Crater and Serengeti GRs in 1928 and 1929, respectively (URT 1998). In 1928, an aspiration for National Parks (NPs), a category prohibiting all human activities except research and game-viewing tourism, emerged. Strong advocacy for this idea came from the politically powerful conservation societies in England, spearheaded by the Society for the Preservation of the Flora and Fauna of the Empire (SPFFE) (Neumann 1992, 1996). Major Richard Hingston, who was sent to Tanganyika by the SPFFE in 1930 to investigate the needs and potential for developing a nature protection programme, recommended the creation of NPs as a matter of urgency.

The London Convention for Flora and Fauna of Africa, held in 1933, obligated all signatories (including Tanganyika) to investigate the possibilities of creating a system of national parks. Administrators in Tanganyika, however, remained adamantly against this idea on grounds that the strategy conflicted with African rights to such a degree that it could threaten the political stability in the colony (Neumann 1992, 1996). Pressures from powerful individuals in London, who consistently overstated the problem of what they termed 'indiscriminate slaughter' of wildlife by Africans, forced the colonial government to yield (Neumann 1996:90). The first game ordinance that gave the governor a mandate to declare any area a NP was enacted in 1940.

After independence in 1961, no radical changes were made to wildlife conservation policies to address the previously lost customary rights (Neumann 1996; Rugumayo 1999; Levine 2002). This was contrary to pledges made during the freedom movement campaigns (Levine 2002). The economic justification of wildlife-based tourism, rather than ecological reasons, triggered more support for creating PAs. Julius K Nyerere, the first President of Tanzania, backed this economic motive, as he was quoted saying,

> 'I personally am not interested in animals. I do not want to spend my holidays watching crocodiles. Nevertheless, I am entirely in favour of their survival. I believe that after diamonds and sisal, wild animals will provide Tanganyika with its greatest source of income. Thousands of Americans and Europeans have the strange urge to see these animals' (quoted in Levine 2002)

Nyerere further affirmed the position and commitment of Tanzania to wildlife conservation through a statement he released at the International Symposium on the Conservation of Nature and Natural Resources held in September 1961 in Arusha, Tanzania. This statement has become known as the Arusha Manifesto, and has since become an important landmark statement for wildlife conservation in the country (URT 1998).

Currently, Tanzania with an area of 945,087 $km^2$, has about 30% of its land surface devoted to one form or another of wildlife protection (URT 1998). Tanzania's wildlife policy, enacted in 1998, demonstrates an ambition to include more areas with rich and unique biological values within the PA system, fostering ecological conservation and economic prosperity (URT 1998). Udzungwa NP (1900 $km^2$) was established immediately following the signature of the UN Convention on Biological Diversity (CBD) in 1992. The size of Katavi NP was doubled in 1998 from 2253 to 4471 $km^2$ (Kideghesho 2001). Saadan and Kitulo have been proposed for inclusion into the NP system, while Ikorongo, Grumeti, Kijereshi and Usangu have been upgraded to GRs from their previous status as Game Controlled Areas.

Despite these historical conservation efforts, the wildlife habitats and species in Tanzania are increasingly threatened. Already with 46 extinct animal species, the country ranks third in Sub-Saharan Africa in terms of the number of animal species threatened (177), after South Africa (282) and Madagascar (254) (IUCN 2004). Of these 177 threatened animal species, 11, 69 and 72 fall in the categories of critically endangered, endangered and vulnerable, respectively (IUCN 2004). The country also ranks the third in terms of the number

of threatened plants in Africa, with some 239 threatened species, just behind Madagascar (276) and Cameroon (334) (IUCN 2004). Globally, Tanzania moved from 20th position in 1996 to 14th in 2002 on the list of countries with the highest number of threatened species (IUCN 2003). Some species (including those that are not globally threatened) are already locally extinct in some parts of Tanzania while some are prone to extinction (Newmark 1996; Kideghesho 2001).

The mounting pressures attributable primarily to socio-economic factors such as demographic growth, poverty and market forces have led to poaching and habitat destruction and consequently impaired the ecological integrity of many Tanzanian ecosystems. This has ultimately led either to the loss of species or has driven them to the verge of extinction (Newmark 1996; Kideghesho 2001; Brooks *et al.* 2002). The focus of this paper is the Serengeti Ecosystem. It seeks to uncover the forces contradicting the popular ambition 'Serengeti Shall Not Die' (Grzimek and Grzimek 1960). It also reviews some strategies employed to overcome these forces and attempts to identify deficiencies, which have decreased their effectiveness.

## The Serengeti Ecosystem

The Serengeti Ecosystem, with an area of about 25,000 km$^2$, is situated between latitudes 1° and 3°S and longitudes 34° and 36°E (Figure 1). The history of creation of PAs in this ecosystem dates back to 1928 when Ngorongoro GR was gazetted, followed by the declaration of Serengeti as a partial and then a complete GR a year later (Rugumayo 1999). The creation of these GRs infringed on the rights of over 10,000 resident Maasai pastoralists, initially by prohibiting cultivation and later by forceful eviction.

The Ordinance passed in May 1940 contained a clause that declared Serengeti the first NP in British colonial Africa. However, little was done about this due to World War II (Rugumayo 1999). A separate National Parks Ordinance passed in 1948 reaffirmed Serengeti as a NP and established an independent Board of Trustees (Neumann 1992). Calls for a full investigation of customary rights within the proposed boundaries of the NP were ignored. This resulted in resentment, leading to violence and sabotage. For example, the Maasai resistance triggered political disorder and the destruction of wildlife habitats and species through setting fires with malicious intent and spearing of rhinos (*Diceros bicornis*) (Neumann 1992).

A committee of enquiry appointed in 1956 to look into the matter recommended splitting of the park into Serengeti NP (SNP) and Ngorongoro Conservation Area (NCA) so that, along with conservation, the interests of the Maasai pastoralists could also be accommodated in the latter (Perkin 1995). This recommendation was adopted and two different ordinances, NCA Authority Cap. 413 of 1959 and National Parks Ordinance, Cap. 412 of 1959, were enacted to manage the areas. The National Parks Ordinance prohibits all human activities other than conservation, game viewing and research.

Along with SNP (14,763 km$^2$) and NCA (8,288 km$^2$), falling under the jurisdictions of Tanzania National Parks (TANAPA) and the NCA Authority (NCAA) respectively, more PAs have been gazetted in the ecosystem after independence in 1961. The new PAs sought to provide a buffer zone for SNP and to protect the corridors for ungulates migrating between SNP and the adjacent Maasai Mara National Reserve (MMNR) in Kenya. MMNR (1,368 km$^2$) is managed by Narok County Council. Maswa Game Reserve (2,200 km$^2$) was established in 1962 while Ikorongo and Grumeti were declared Game Controlled Areas (GCAs) in 1974. The two GCAs along with Kijereshi (65.7 km$^2$) were elevated to GRs following realization that the natural resources were still at risk and restriction in this category were inadequate to ensure effective protection of wildlife and the migratory corridors (John Muya, pers. comm. 2003). Between Ikorongo (ca. 563 km$^2$) and Grumeti GRs (ca. 416 km$^2$) lies Ikoma Open Area (IOA) (ca. 600 km$^2$) (Figure 1). The Department of Wildlife of the Ministry of Natural Resources and Tourism administers all GRs and GCAs.

The SNP and MMNR permit neither human settlement nor the extraction of natural resources. The legal uses are research and game viewing. In the GRs, trophy hunting and game cropping are allowed, although settlements are also prohibited. The upgrading of the GCAs to GRs in 1994, therefore, involved relocation of the local people. Limited cattle grazing, firewood collection, hunting (game cropping, resident and trophy hunting) and bee keeping are allowed in the Ikoma Open Area.

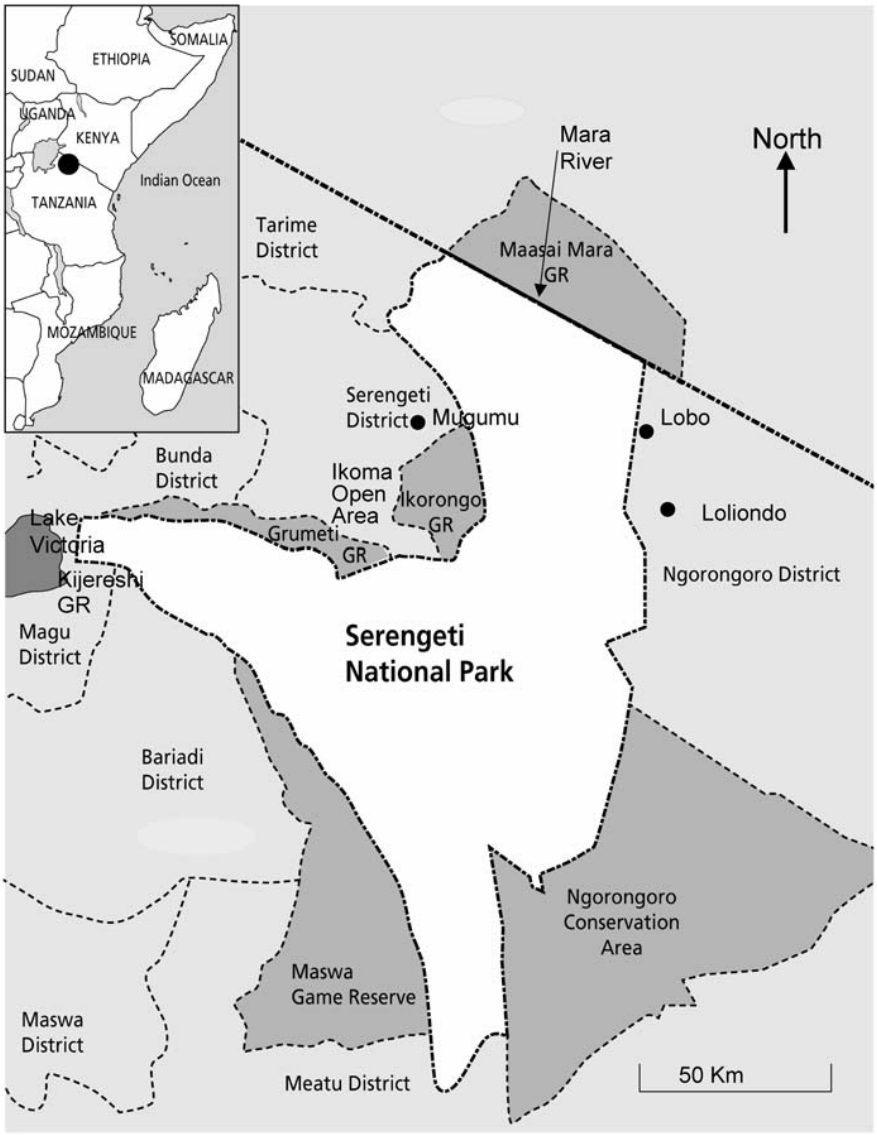


**Figure 1** Location of Serengeti National Park and Surrounding Protected Areas

Forming the same ecosystem complex, Ngorongoro and Serengeti together were designated as one Biosphere Reserve in 1981. They were inscribed separately on the World Heritage List in 1979 and 1981 respectively (UNESCO 2003).

A unique combination of diverse habitats enables Serengeti to support over 30 species of large herbivores and nearly 500 species of birds (Sinclair 1995). These species include both migrant and resident populations. Serengeti holds the largest and one of the last migratory systems of ungulates in the world (Sinclair 1995). Some 1.4 million wildebeest (*Connochaetes taurinus*), 0.2 million zebra (*Equus burchelli*) and 0.7 million Thompson's gazelle (*Gazella thompsoni*) migrate annually between Serengeti and Kenya's Maasai Mara National Reserve (Norton-Griffiths 1995). The resident herbivores found in Serengeti include warthog (*Phacochaerus aethiopicus*), eland (*Tragelaphus oryx*), impala (*Aepyceros melampus*), giraffe (*Giraffa camelopardalis*), topi (*Damaliscus korrigum*), hartebeest (*Alcelaphus buselaphus*), water buck (*Kobus ellipsiprymnus*), and Grant's gazelle (*Gazella grantii*). Elephants (*Loxodonta africana*) and hippo (*Hippopotamus amphibius*) are both charismatic and keystone species in the Ecosystem.

The Ecosystem supports one of the highest populations of carnivores in savannah, with lion (*Panthera leo*) numbering up to 3000 individuals (Packer 1990, 1996); leopard (*Panthera pardus*) ranging from 800

to 1000 (Borner *et al.* 1987); spotted hyena (*Crocuta crocuta*) estimated at 9000 (Hofer and East 1995); and cheetah (*Acinonyx jubatus*) and Black-backed jackal (*Canis mesomelas*), numbering 250 and 6300 respectively (Caro and Durant 1995). Total numbers of three species of mongoose – banded (*Mungos mungo*), dwarf (*Helogale parvula*) and slender (*Herpestes sanguineus*) – exceed 160,000 (Waser *et al.* 1995). Of the 500 bird species, some have restricted ranges, including rufous-tailed weaver (*Histurgops ruficauda*) (monotypic genus), Usambiro Barbet (*Trachyphonus usambiro*), grey-crested helmet shrike (*Prionops poliolophus*), grey-breasted francolin (*Francolinus rufopictus*), Fischer's lovebird (*Agapornis fischeri*), and Karamoja apalis (*Apalis karamojae*) (Stattersfield *et al.* 1998).

## 'SERENGETI SHALL NOT DIE': FORCES AGAINST THE AMBITION

In 1959, Benhard Grzimek and his son Michael co-authored a book entitled 'Serengeti Shall Not Die' (Grzimek and Grzimek 1960). The title of the book has not only amassed popularity worldwide, but has also been adopted as a 'motto' among nature lovers. This has been inspired by a desire to see Serengeti survive to benefit current and future generations of humankind, both locally and globally. Although this ambition has somehow remained valid for nearly five decades, the socio-economic and ecological changes in the region prompt a growing debate over the future prospects of this ecosystem. Huge pressures are threatening its ecological integrity. Huge pressures are threatening its ecological integrity (see e.g. Campbell and Hofer 1995; Hilborn 1995; Mbano *et al.* 1995; Sinclair and Arcese 1995; Loibooki *et al.* 2002). In 1985, Bernhard Grzimek warned (MNRT 1985:2):

> 'But the rhinos are gone and the elephants have been sadly reduced. Even more disturbing has been the tremendous growth in the number of people around the National Park. Areas, which we knew as wilderness, are now heavily settled and cultivated. Each day the park becomes more of an island, and pressures on its boundaries continue to grow. We must urgently renew our vigilant custodianship, lest we lose this asset for all mankind.'

In this section we discuss five factors – demographic factors, poverty, illegal hunting, habitat destruction, and wildlife diseases – to show how they contradict this ambition of sustaining Serengeti as the global asset. Our main focus is the western part of the Ecosystem. The part is defined as all buffer zones (all Open Areas and GRs) and Districts bordering the park in the west.

### Demographic factors

Over the last five decades, the western part of Serengeti Ecosystem has experienced rapid demographic growth accompanied by the expansion of human settlements and increased livestock populations. Between 1948 and 1978, the human population in the Eastern Lake Victoria basin increased from 1.5 to 3.3 million, but this growth is said to have had minimal effect on the areas adjoining SNP (MNRT 1985). Increased human settlement on the fertile lands close to Lake Victoria stimulated movement to the periphery of the park. Between 1957 and 1967, the human population adjacent to SNP grew at a rate of 10% per annum. The natural rate of increase was 3.4% and immigration contributed the remaining 6.6% (MNRT 1985).

Population growth around SNP has continued to be an issue. For instance, between 1988 and 2002, Serengeti and Bunda Districts recorded increases of 56% and 30% in population and 71% and 51% in the number of households, respectively (URT 1988; URT 2002). The current population in the seven districts to the west of the park is over two million with annual growth rate exceeding the national average of 2.9% (Packer 1996; URT 2002). This growth is mainly due to migration from within and even from outside the Tanzania, especially Kenya (Kideghesho, unpublished data). Economic potential due to good agricultural land, wildlife (as a source of game meat), water bodies (rivers and Lake Victoria for fishing), and gold deposits have been the major population pull-factors to the area. Hackel (1999) lists three conservation problems associated with people settling in or using new areas, which are also applicable to Serengeti (see Table 1).

Associated with human population growth is the increase of livestock numbers. This adds pressure on land, leading to overgrazing and land degradation. Statistics obtained from Serengeti District indicate that, between 1990 and 2002, the livestock units had increased by 52% from 175,680.5 to 266,624.5. This had lowered the carrying capacity,

**Table 1** Problems of settling close to Protected Areas (Hackel 1999) and how they apply to the Serengeti Ecosystem

| *Problem* | *Situation in Serengeti* |
|---|---|
| Disruption of ecological processes essential to maintain long-term biodiversity | Human impact causes depressed activities of migratory herbivores leading to detrimental effects on vegetation dynamics (McNaughton and Banyikwa 1995) Disruption of migratory corridors can render migration in the Serengeti a global Endangered Biological Phenomenon (EBP) (Meffe and Carroll 1997) |
| Increased hunting for home or market | Poaching data in Serengeti illustrate the relationship between human population growth and pressure on wild resources (see discussion on illegal hunting) |
| Increased pressure from local people to open protected lands for community use | The expansion of cultivation and settlements forced realignments of the boundaries of Maswa Game Reserve three times, causing 15% loss of the original area (MNRT 1985) The pastoralists in Bunda District (viz. Hunyari, Mariwanda, Kihumbu, Nyamatoke, Kyandege and Mugeta villages) and Serengeti (Nyichoka and Park Nyigoti villages) are currently appealing to the Government to legalise access to critical grazing and water points in Grumeti and Ikorongo Game Reserves (Personal observation). Manchira and Rubana Rivers in the two reserves, respectively, are critical water sources for communities who constantly complain of denied access. However, these communities have admitted that they illegally access these resources due to lack of alternatives |

**Table 2** The land available and land required* for livestock grazing in Serengeti and Bunda Districts in 2002

| *District* | *Livestock units (2002)* | *Land available ($km^2$)* | *Land requirement ($km^2$)* | *% of land exceeded* |
|---|---|---|---|---|
| Serengeti | 266 624.5[a] | 2456[b] | 3199.5[a] | 30.3 |
| Bunda | 267 090[c] | 2408[c] | 3205.08[c] | 33.1 |

Sources: [a]DALDO Serengeti District reports; [b]URT 2003, [c]DALDO Bunda District livestock reports. *The land requirement is calculated based on livestock units (LU), where 1 LU = 1 cow/bull = 2 goats or sheep = 5 donkeys, and requires 1.2 ha (Kauzeni 1995)

which was already considered to be exceeded a decade ago (Kauzeni and Kiwasila 1994). Table 2 shows the land available for livestock grazing in Serengeti and Bunda Districts and the land required based on livestock number/units.

## Poverty

Poverty is defined in a variety of ways. The World Bank (WB 1992:26) defines it as 'the inability to attain a minimal standard of living.' Chambers (1987:8–9) views it as 'a state of deprivation associated with lack of incomes and assets, physical weakness, isolation, vulnerability and powerlessness.' Both definitions conform to the situation in many rural areas of Tanzania, where poverty is considered a rural phenomenon. Between 22% and 39% of Tanzanians live below the food poverty line and basic needs poverty line, respectively (URT 2002). About 19.9% and 59.7% of the population live below US$1 and US$2 per day, respectively, while 41.6% live below the national poverty line (UNDP 2003). Serengeti is not exceptional – probably the situation is much worse.

Mara Region, in which much of Serengeti falls, ranks sixth in terms of poverty among the 21 administrative regions of Tanzania's mainland, with a regional annual per capita income of TAS 118,591 or US$119 (URT 2002). Gross annual income per household from crop production in Bunda and Serengeti is estimated at US$555 and 679 (Emerton and Mfunda 1999), respectively. Kauzeni (1995) and Johannesen (2002) reported a much lower income of between US$150 to 200 per household. Taking an average of 6 persons per each household for both districts (URT 2002), average expenditure for each individual is evidently far below US$1 per day.

Poor performance of agriculture and livestock in the area – attributed to land scarcity, drought, diseases and pests, poor soil fertility, lack of agricultural inputs and crop damage – is the main cause of poverty (Kauzeni 1995; Emerton and Mfunda 1999; Johannesen 2002). The villagers often blame wildlife conservation for exacerbating these factors (Kideghesho, unpublished data). The monetary

cost of crop damage by wildlife may be as high as US$0.5 million a year for the whole of Western Serengeti: US$155 for each of 3,000 households who regularly suffer from crop damage (Emerton and Mfunda 1999).

The above scenario constrains people's livelihoods, thus compelling the use of coping strategies that involve setting priorities and making economic choices that are ecologically destructive. Historically, illegal hunting and encroachment on wildlife habitats have been employed in Serengeti as both coping and adaptive livelihood strategies among poor households (Campbell *et al.* 2001; Johannesen 2002; Loibooki *et al.* 2002).

## Illegal hunting

Demand for game meat has been the main driver for illegal hunting in Serengeti. However, between the 1970s and 1980s when commercial hunting for trophies became rampant in many African countries, Serengeti was one of the focal points. The commercial poachers from outside the area targeted the black rhinoceros and elephant. The former was driven to the verge of extinction while the population of the latter decreased by 80% (Dublin and Douglas-Hamilton 1987). Trophy hunting was also linked to a dramatic decline of the buffalo (*Syncerus caffer*) population from 63,144 in 1970 to 15,144 in 1998 (TWCM 1999).

'Operation Uhai' (Uhai is Swahili word for life) was a countrywide war launched by the Tanzania government against poachers in 1989. The war which comprised army, police and wildlife staff resulted in arrest of many poachers and confiscation of a large number of weapons (Baldus *et al.* 2003). This, along with a global ban on ivory under the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) of 1988, kept the problem at minimum in the country and it was virtually eliminated in Serengeti.

However, illegal hunting for game meat has remained the major challenge to date. The economic situation forces people to pursue illegal hunting as a coping strategy to meet their livelihood requirements, i.e. protein and other household budgets, along with paying government levies and other contributions (Holmern *et al.* 2002; Johannesen 2002; Loibooki *et al.* 2002). Over 75% of the illegal hunters in Serengeti have limited sources of income and virtually no livestock (Campbell *et al.* 2001; Loibooki *et al.* 2002). Holmern *et al.* (2002) found that about 60.5% of illegal hunters in Western Serengeti hunt for their own consumption while 8.5% hunt for cash and 31% for both purposes. Illegal hunting earns the hunters an annual income of US$200, a value close to or equivalent to average on-farm income (Holmern *et al.* 2002).

Wire snaring is a common technique used by illegal hunters. The technique is very destructive and wasteful as it also kills untargeted species. However, it is the most preferred because it reduces the risk of arrest, as poachers spend the least time in the bush. Population growth and urbanisation have contributed to increased markets for game meat and consequently to escalating illegal hunting in Serengeti (J. Chuwa pers. comm. 2003). Tarime (particularly in villages bordering Kenya), Serengeti (Mugumu town), Bunda, Magu and Bariadi Districts and even some parts of Kenya are potential markets for bush meat from Serengeti.

Based on a 1991 aerial survey, Campbell and Hofer (1995) estimated that 210,000 herbivores (75,000 residents and 135,000 migratory) are hunted illegally each year within 45 km west of the protected areas. About 57% (118,922 off-take/year) are wildebeest. Mduma *et al.* (1998) suggest that a harvest of 80,000 wildebeest per year is unsustainable and may cause a total collapse of the population by the year 2018. Campbell and Hofer's estimated annual off-take is 50% higher, signifying an unpromising future for this species if the predictions of Mduma *et al.* are correct. In addition, the following seven resident species are estimated to experience heavy hunting pressure: waterbuck (94.3%), eland (30.9%), giraffe (29.6%), impala (28.7%), warthog (24.4%), topi (20.5%) and buffalo (19.5%) (Campbell and Hofer 1995).

As discussed above, human demography is an important factor dictating the magnitude of illegal hunting, along with other pressures on the ecosystem. On the basis of 1978 and 1988 national census data, Campbell and Hofer (1995) estimated the number of poachers within 45 km west of Serengeti National Park boundary and associated protected areas to be 23,294 and 31,655, respectively. More recent estimates of illegal hunters range between 52,000 and 60,000 (Campbell *et al.* 2001; Loibooki *et al.* 2002), an increase of 90% from 1988 to 1998.

## Destruction of wildlife habitats

Wildlife habitats provide shelter, breeding places, dispersal and foraging grounds along with movement and access to critical resources in other localities. These roles make them the critical components for ecological integrity and the long-term survival of any Ecosystem. Unfortunately, extensive utilization of land and other resources driven by human population growth, limited alternative survival strategies for local people, land tenure and development policies, is increasingly causing destruction and outright loss of some critical habitats in Serengeti Ecosystem.

Failure to afford modern technologies and agricultural inputs has made expansion into new land – including sensitive areas for wildlife, such as migratory corridors and dispersal areas – the most feasible strategy for increasing agricultural output to cope with population growth. As in other parts of Tanzania, firewood and charcoal are extensively used in both urban and rural areas around Serengeti, due to a lack of alternative sources of energy. The high market demand for charcoal and firewood increases the vulnerability of critical wildlife habitats. Electricity could be an alternative source of energy, but most areas do not have access to this service including some District Headquarters such as Mugumu, Serengeti. However, even in areas with electricity, such as Bunda District, only few households can afford it, due to high installation costs; and even in the few households with the service, high tariffs make its use for cooking and boiling water economically unaffordable. For most Tanzanians (including some senior government officials), electricity is used for lighting and radio.

There is considerable encroachment for agriculture in SNP and Maswa GR, and mining and settlement are taking place in migratory corridors. Villagers in Park Nyigoti in Serengeti District reported that, during migration, it was becoming common to find several wildebeest killed after falling in the pits created by gold mining within the village. They also revealed that the animals have abandoned routes which are heavily settled by humans (Park Nyigoti villagers, pers. comm. 2003). Also contributing to land degradation and loss of ecological integrity are overgrazing by livestock, deforestation and bush fires. The latter originate mainly from human settlements along the western boundary of the SNP. Deforestation and unplanned fire also affect woodland vegetation. Conversion of once-wooded vegetation to open grasslands is said to have had an impact on browsers in the North of SNP (Sinclair and Arcese 1995).

In 1995, Sinclair and Arcese (1995) estimated that 40% of the Serengeti Ecosystem's original area (ca. 30,143 $km^2$ in 1910) had been lost. They reported that the loss was accelerating rather than abating and that it was taking place largely within the legal boundaries of the park. They further observed that the greatest loss had occurred between the 1960s and 1990s, despite the great attention devoted to the area by researchers and conservationists. According to Sinclair, (as quoted by Morell 1997: 2059), 'Thirty to 40% of the park has changed its vegetation community in the last 25 years,' and that 'change should bring an accompanying change in the fauna.'

One example of the implication of habitat changes on fauna is the local extinction of roan antelope (*Hippotragus equines*) in many areas of the Ecosystem due to the loss of its *Combretum*-dominated habitats (Campbell and Borner 1995; Sinclair 1995). Sinclair (2005) reported an extraordinary loss of some 50% of bird species outside of Serengeti due to habitat loss, along with a loss in insect diversity due to human intervention in their systems. Loss of tree cover in riverine forests has led to the disappearance of the previously healthy populations of trogons and large-casqued hornbills (Morell 1997). Some bird species, such as shrikes and thrushes, have moved into the park, while black and white colobus monkeys (*Colobus angolensis*), previously seen along the Grumeti River, have moved further west. Rural communities have also reported the disappearance and reduction of animal species in areas where they were previously abundant, due to habitat loss.

Despite the above pressures on habitats in the Tanzanian part of the Ecosystem, its land tenure system, land use policies and market conditions have made it less prone to destruction compared to the Kenyan part. In Tanzania, the land belongs to the State, although most of it (except PAs) is held in a communal type of tenure – often called the deemed right of occupancy. In Kenya, the land outside the core PAs is privately owned. In both countries wildlife belongs to the State. In contrast to private land tenure, State control of land has the advantage that the State can implement policies

against land uses likely to cause detrimental impacts on wildlife.

The private land tenure system in Kenya has led to considerable negative impact on wildlife in the Kenyan part of the Serengeti Ecosystem. The system had allowed the landowners to respond to market opportunities for mechanized agriculture (Homewood *et al.* 2001). Between 1975 and 1995, the Kenyan part of Serengeti Ecosystem experienced higher decrease in vegetation cover than the Tanzanian side. In the former, over 50,000 ha of rangeland were converted to large-scale mechanised wheat farms (Serneels and Lambin 2001). This, along with fencing, had destroyed the wet season dispersal and/or calving grounds for the resident wildebeest population, leading to a decrease of 81% from 119,000 in 1977 to 22,000 in 1997 (Ottichilo *et al.* 2001a). The total non-migratory wildlife population declined by 58% in the same period. Populations of giraffe, topi, buffalo and warthog declined by 73 to 88% while populations of waterbuck, Thompson and Grant gazelles, kongoni, and eland decreased by about 60% (Ottichilo *et al.* 2001b). According to Serneels and Lambin (2001) the decline in the Kenyan wildebeest population had little effect on Serengeti wildebeest population over the last decades. However, they warn that more land conversion closer to Maasai Mara National Reserve would reduce the dry season range for the Kenyan and Serengeti population and consequently affect the entire ecosystem. In Tanzania, external investors have earmarked the Lobo and Loliondo areas, east of the SNP, as potential areas for large-scale agricultural schemes. If the government errs in its political decisions and allow the project on grounds of granting priority to food security, that will be another tragedy to Serengeti wildlife.

Recently, further development programmes with potential negative impacts to Serengeti Ecosystem have been proposed on the Kenyan side. The conservationists are concerned that, if implemented, the programmes may affect the water quantity in Mara River – a dry season refuge for over a million wildebeest and zebra of the Serengeti. The proposed programmes are Mau forest degazettement, irrigation of mechanized farming and the development of the Amala Weir Hydropower project (Gereta *et al.* 2002). Using the ecohydrology model, Gereta *et al.* (2002) predicted that the projects might cause severe drought and thus reduce wildebeest population by 80%. With 50% die-off, it may take 20 years for the population to recover, while with 80% there may be no population recovery (Gereta *et al.* 2002).

Failure of wildlife conservation to compete effectively with alternative land uses in the area provides incentive for conversion to agriculture. For example, decision by the landowners around MMNR to convert their rangelands into agriculture is ecologically costly but economically profitable: the value of developing the land to full agricultural potential was 15 times greater than its use for wildlife-based tourism along with limited agriculture and livestock. Profit earned by landowners for devoting their land to wildlife conservation was US$2.78 per hectare compared to US$43.21 for alternative use (Norton-Griffiths 1995).

## Wildlife diseases

Although diseases in wildlife areas have received minimal attention in the past, there is now a tendency to view this factor as one of the major constraints to the effective management of biodiversity in Tanzania. Drastic drops of wildlife populations due to diseases in Tanzanian protected areas at different times have contributed to making diseases an important agenda item for the effective conservation and management of wildlife.

Recent and serious epidemics in Serengeti have been canine distemper virus (CDV) and rabies. CDV killed about 1,000 out of 3,000 lions in 1993–94 (Harder *et al.* 1995; Morell 1995; Roelke-Parker *et al.* 1996). The CDV epidemic spread north to Kenya's Maasai Mara National Reserve, where it also affected a large number of hyenas, foxes, and leopards (Roelke-Parker *et al.* 1996). Rabies contributed to the drastic decline of wild dogs (*Lycaon pictus*) and their ultimate decimation in the Serengeti and the Maasai Mara (Woodroffe and Ginsberg 1997) in the 1990s. Domestic dogs (*Canis familiaris*) on the perimeter of the Serengeti National Park (estimated at 30,000) have been identified as the source of both epidemics. Lack of vaccination against the two diseases had made these animals potential agents of transmission (Morell 1995; Roelke-Parker *et al.* 1996). However, the association between domestic dogs, rabies and disappearance of wild dogs is contested (Dye 1996; East and Hofer 1996). Another disease is rinderpest: an outbreak killed several hundred

buffaloes in the Serengeti-Ngorongoro area in 1982 (EMERCSA 2002).

## SUSTAINING THE AMBITION: SOME STRATEGIES AND THEIR DRAWBACKS

Some strategies are being adopted in order to ensure that Serengeti survives. However, these have not been sufficiently effective in meeting the intended objectives. In this section, an attempt is made to show why these strategies are flawed.

### Provision of adequate conservation status to wildlife areas

One strategy has been to create new PAs or upgrade areas from lower to higher categories. In Serengeti, the GCAs have recently been elevated to GR. In the legal context, GCAs are the least restrictive category of PAs in Tanzania (URT 1974b). They, therefore, present lower opportunity costs to people in terms of land and other resources. This has rendered many GCAs prone to degradation in the face of increasing human population and unsustainable land uses.

As pointed out earlier, Ikorongo, Grumeti and Kijereshi were declared GCAs in 1974 (URT 1974a) in order to provide a buffer zone for Serengeti National Park and protect corridors for migratory herbivores in the western part. However, this status could not meet the objectives for which these GCAs were established. Therefore, a consultative meeting in 1984 between the Wildlife Department and Bunda and Serengeti District Councils proposed upgrading them to GRs. The Mara Region Development Council endorsed and submitted this proposal to central government in 1985. However, the intervention was needlessly delayed until 1994 (URT 1994). And yet after gazettement, effective enforcement was delayed until 2000.

The process of establishment of the GRs was fundamentally flawed because the ten-year time lag allowed more developments and expansion onto previously unoccupied lands. The local communities, therefore, resented the process as this meant loss of economic opportunities. Later, as the process became a matter of urgency, implementation was effected as a 'fire fighting' or 'crash programme' culminating with forceful eviction, human rights violations, and a general failure to observe the principles of good governance. Apathy and resentment towards wildlife conservation increased among the rural communities, a scenario unhealthy for conservation.

Generally, the above events have lowered the credibility of the government and its conservation agencies as communities have lost trust. There is poor acceptability and scepticism towards conservation initiatives aiming at promoting conservation and development, despite the promise they hold for communities.

### Anti-poaching activities

It is claimed that improved anti-poaching operations have resulted in a substantial increase in the number of poachers arrested annually (Joseph Chuwa, pers. comm. 2003). Between 1995 and 2002, SNP staff (excluding Game Reserves, Village Game Scouts and Anti-poaching Unit) arrested 7359 poachers, an average of 1051 per annum (J. Chuwa, Pers. comm. 2003). Considering the high number of poachers estimated to be living in the area (ca. 52,000 to 60,000) (Loibooki *et al.* 2002), this achievement is insignificant. Between July 2002 and June 2003, 433 court cases were filed against poachers in the four Districts of Western Serengeti – about 0.72% of the estimated poachers. This may suggest that, despite heavy investment in anti-poaching operations, the strategy is not effective in overcoming the problem of poaching, which is one of the serious threats to the ecosystem.

### Community participation in conservation and management of wildlife

Community conservation (or participation in conservation) is increasingly gaining prominence as a major paradigm of conservation work in Africa. It seeks to address the deficiencies of the 'fences and fines' approach. The latter is believed to have failed to conserve wildlife mainly due to shrinkage of government budgets (Gibson and Marks 1995; Songorwa 1999: Newmark and Hough 2000; Baldus *et al.* 2003). Community participation entails the involvement of communities in designing, planning, decision-making, benefit sharing, implementation and evaluation and monitoring.

In the Serengeti Region, the approach has enjoyed considerable publicity through two community conservation programmes: Community

Conservation Service (CCS) and Serengeti Regional Conservation Project (SCRP) run by Tanzania National Parks (TANAPA) and Wildlife Division (WD), respectively. The two initiatives are, however, flawed in that their main focus had been on benefit provision. Only minimal emphasis is given to other components of participation, thus rendering the communities the 'passive beneficiaries.'

The perception among the communities is that genuine participation is lacking, and that the wildlife managers often reserve the right to the final say on what should or should not be done. The exercise of developing the General Management Plan (GMP) for Ikorongo and Grumeti GRs in 2000 may be cited as an example. The communities were invited along with other stakeholders to the planning workshops, giving an impression that the process was participatory. The communities, however, complained later that their interests did not appear in the draft GMP document as agreed during the planning sessions. Some of the provisions identified and agreed upon during the planning exercise were access to water points for livestock during the dry season, salt licks and visits to sacred groves. However, these activities have remained illegal and liable to penalties, prompting the local people to question the logic of being invited to the planning workshops if their ideas and interests are ignored (Villagers bordering Grumeti GR, pers. comm. 2004).

## Benefit-based strategy

The benefit-based strategy is a key component of many community conservation programmes. Such a strategy aims at motivating rural residents to align their behaviours with conservation goals. It is considered as a positive rather than negative incentive. The latter – relying primarily on regulation and control – is considered to be necessary, but 'insufficient and inherently unstable' (Murphree in Hutton 2004:586). Through the strategy the target beneficiaries are expected to 'surrender access to, or curtail illegal offtake of, native species and their habitats' (Barrett and Arcese 1995: 1074) for the interest of conservation. The assumption behind this is that lack of benefits prompts illegal use and/or active destruction of the resource (Emerton 2001). Examples of the benefits that are often provided include low cost game meat (through cropping schemes) and social services (e.g. health and education facilities). Despite being popular, compared to other components of participation, benefit-based strategy is flawed, and thus its efficacy in meeting conservation objectives is limited. Some of the flaws constraining the strategy are discussed below.

### *Priority compared to other strategies*

The benefit-based strategy receives low priority compared to the promotion of the unpopular 'fences and fines' approach, in which the wildlife managers still invest heavily. For example, SNP records (as of 2004) indicate that the Law Enforcement Department (LED) had 172 staff, 18 centres/ranger posts, and 21 vehicles, in contrast to 18, 6 and 4, respectively, for the Community Conservation Service (CCS). The budgets allocated to the two departments from 1999 to 2004 were US$862,000 and 361,000, respectively. Donor agencies also direct most of their support in the form of vehicles, uniforms and ammunitions to LED. Villagers in Robanda, Serengeti District, criticised Frankfurt Zoological Society [FZS: a donor organisation] for neglecting the development aspect of the people while investing heavily in supporting anti-poaching activities.

### *The nature and types of the benefits granted*

Most of the conservation-induced costs (such as property damage and opportunity costs) are borne and felt by individuals and households rather than the entire community. However, conservation-related benefits often accrue communally (in the form of social amenities such as the construction of roads, classrooms and dispensaries) rather than to individuals and households. This means that the victims of the wildlife costs are insufficiently compensated. Additionally, these benefits are not easily realised by the victims, since they rarely solve the actual problems caused by wildlife, such as food insecurity and conservation-induced opportunity costs. A classroom or a tarmac road has lower value than a bag of maize to a person who is starving (due to crop raiding by elephant); as a villager in Nyichoka, Serengeti District, observed, 'even if the classrooms are decent like *ikulu* (State house), children cannot concentrate with empty stomachs.'

Another problem with communal benefits is that they can hardly be distributed evenly. The share for households/individuals incurring serious losses due to conservation is the same as that gained by the least affected and those reaping the benefits illegally (e.g. through poaching). For example, it is impractical to bar a poacher from walking on a road constructed by a conservation agency or denying his son the right to sit in a classroom donated through a conservation initiative. There is also a tendency for local elite to monopolise the benefits.

*Total benefits are too small to balance the costs*

The conservation-related benefits that trickle down to rural communities are too small to balance the costs of conservation. Emerton and Mfunda's (1999) cost–benefit analysis at individual household level shows that each of the 9,500 households in Western Serengeti indirectly receives an average of US$2.5 per year as benefit-sharing through the implementation of development projects. The wildlife-related costs range from US$155 per household for farmers adjacent to the Serengeti National Park and Grumeti and Ikorongo GR to more than US$770 a year for illegal cultivators inside the Reserve. The Secretary of the Pastoralists in Hunyari ward, Bunda District, elaborated this by saying:

> 'This is a joke! Few shillings used to construct two classrooms and two kilograms of bush meat we buy from SRCP (Serengeti Regional Conservation Project) per year can not match up to loss of pasture and water sustaining our cattle amounting to 70,000. Nor could they (classrooms and meat) be able to restore our dignity, which is openly being abused by game rangers when they get us inside the reserve. What is the use of school if it means loss of the cattle which provides food, clothes and school requirements for children who are intended to attend to this school.'

Moreover the 'ecologically damaging' activities are more economically profitable compared to benefits people receive in order to abstain from these (destructive) activities. For example, illegal hunting in Western Serengeti generates an economic value 45 times greater than that derived from the SRCP community cropping scheme (Holmern *et al.* 2002). In Maasai Mara, returns for landowners from agriculture and ranching were 15 times greater than from conservation (Norton-Griffiths 1995). Therefore wildlife conservation is more of a liability rather than an asset, making it disadvantageous for people to forego their current activities in favour of conservation goals.

*Sustainability of the benefits*

As already mentioned, conservation-related benefits are granted in order to win local support for conservation. Likewise, these benefits are often believed (in theory) to aim at reducing poverty since this is the main driving force triggering poaching and other unsustainable activities. For communities to access these benefits, however, stakeholders from developed countries (i.e. donors and tourists) are critically important. Virtually all conservation projects or programmes in Africa depend on donor funding and revenues generated through tourism.

Experience shows that most of the conservation projects have been vulnerable to collapse since the host governments or departments are unwilling, or can rarely afford, to fund these projects after the donor pullout. The Norwegian Agency for Development Cooperation (NORAD) funds SRCP and, as the project will end in 2006, there has been a substantial reduction of budget allocation every year in what is termed as 'smooth landing'. Experience of similar projects in Tanzania such as Matumizi Bora ya Malihai Idodi and Pawaga (MBOMIPA) and the Selous Conservation Project (SCP) has indicated the government's reluctance to take over the responsibilities after donors have pulled out on the grounds of inadequate financial capacity (Songorwa 2004). This scenario may suggest that no miracles will emerge for SRCP. The unwillingness and/or inability of the Tanzanian government to fund these projects signals that even the minimal benefits that accrue to communities are to be terminated. On the other hand, tourism is susceptible to factors such as political instability, economic hardship, or terrorism. This again reduces the reliability of the industry as a viable source of benefits to communities. Since the benefits are intended to change people's behaviours, their curtailment may inevitably turn people to illegal and unsustainable activities.

*Establishment of Wildlife Management Areas*

The Wildlife Policy of Tanzania prescribes the establishment of Wildlife Management Areas (WMAs) as a pragmatic way of empowering people to manage and benefit from wildlife on their lands. In Western Serengeti, Ikona WMA is being established to this end. Five villages bordering Ikorongo and Grumeti GRs (Robanda, Park Nyigoti, Nyichoka, Natta-mbiso and Nyakitono) are the intended beneficiaries. However, the optimum acceptability of the intervention is likely to be constrained by past history, policy, and institutional failures.

Perceptions that politicians and government bureaucrats have hijacked the idea of WMAs have lowered the credibility of the intervention. The District authorities are accused for giving orders contradicting the guidelines of WMAs, deciding on the type of investors and 'protecting' them even in cases where they have failed to observe the contracts. Scepticism is furthered by the fact that there are fewer local representatives on the board than District officials and that no law has been enacted to back this intervention. The participation of some organizations, which have had historical conflicts over wildlife conservation with local people, has amplified the cynicism that the creation of WMA is an impending land grab by the government and foreigners (Nyichoka Villagers, pers. com. 2003). At the conservation stakeholder meeting held in Robanda village on 16 September 2003, villagers were less convinced that Frankfurt Zoological Society (FZS), whose priority for decades has been 'wildlife against people', could stand for the interests of the local people. One villager had this to say in the meeting:

> 'WMA cannot be a good thing to us (communities), if it is spearheaded by Frankfurt. The history of Frankfurt since Grzimek's time has been to save wildlife at the expense of our life. And there is no sign that this practice has changed as to date it is still donating new vehicles and guns to TANAPA as if there is a war to fight.'

Communities are also worried about the likely increased restrictions to access over resources, such as grazing land and water, within the current proposed boundaries of WMAs. Narrating the history of relocation in Serengeti, an octogenarian in Nyichoka says:

> 'History has taught us a lot. We were forced out of Serengeti (National Park). First the boundary was moved from Naabi Hill to Banagi River in 1950s. Then, in 1960s Mochatongarori became the new boundary and later we were pushed to Romoti River in 1970s. In 1974 Ikorongo and Grumeti were set aside as Game Controlled Areas and we were promised to remain in and continue to enjoy resources critical to our households, although in few weeks we were relocated because of the so-called villagisation policy. Our attempt to go back and make living from our lands in Ikorongo and Grumeti after failure of villagisation policy was defeated by the government in 1994 by mere baptizing the areas as Game Reserves. We were therefore forced out of the reserve and we therefore lost Manchira River, which was critical source of water and salt for domestic use and livestock. Further to this we lost our grazing land, settlements, sacred sites and mining areas, which served as a source of employment to our youth. Today they want to baptize our land with the name WMAs. As usual we see a lot of promises here! But next year the name will change and we (communities) will be forced out. Can't these people be advised that we are fed up? What is the difference between this policy and several other government policies, which we have heard of before? Is it not true that despite a lot of good promises these policies ended in vain? Where is ujamaa vijijini (villagisation policy)? where is Azimio la Arusha (Arusha Declaration)?'

## CONCLUSION AND RECOMMENDATIONS

Serengeti has ecological importance as the last intact plains ecosystem supporting the Earth's largest populations of terrestrial mammals. The designation of protected areas and the designation of the area as a Biosphere Reserve and World Heritage Site should have been important measures for guaranteeing the ecological integrity and viability of Serengeti. However, as trends discussed in this paper show, Serengeti – a global asset – remains endangered. Further, interventions other than creation of the protected areas – such as community participation, benefit-based strategy, anti-poaching, and the creation of WMAs – are also

flawed as observed in this paper due to problems of implementation. The following specific recommendations are essential for Grzimeks' ambition to be sustained:

*Making human population growth a matter of priority*: Although population growth is one of the underlying causes of threats facing Serengeti Ecosystem, none of the current strategies addresses it adequately. Overlooking this factor is synonymous to treating the symptoms rather than the causes. Unless a proactive intervention is sought, it is apparent that human population will keep on growing and, therefore, demand for more land and resources will increase. As population increases, the effectiveness of the current strategies will be diluted and conflicts will intensify. The possible strategies may include developing the active policies to reduce immigrants from other areas by limiting the population-pull factors.

*Provide alternative sustainable livelihood strategies*: The agenda of human survival is critical if forces threatening the ecosystem are to be halted. It is illogical for anyone to accept a scenario where preservation of biodiversity implies starvation. To reduce the pressures on natural resources and habitats, strategies may include: (1) devising a special policy which will obligate other regions of the country to provide employment opportunities to young people from Serengeti area; (2) supporting the agricultural sector by subsidizing inputs, providing credits and access to markets, and controlling problem animals; and (3) securing and subsidizing the alternative sources of energy (e.g. biogas and electricity) to reduce dependency on fuelwood.

*Knowledge on the nature of illegal activities*: The current strategies suggest that there is either lack or inadequacy of this knowledge. Knowing why local people exhibit a particular unsustainable behaviour may be useful in devising more pragmatic solutions to current challenges facing the ecosystem. More research programmes in this area are, therefore, imperative.

*Learning from mistakes and correct identified deficiencies*: Current conservation-related flaws in Serengeti can be a good entry point to safeguarding the ecosystem: (1) ensure the genuine participation of local people and value their concerns and contribution in conservation activities; (2) review the mechanisms for benefit sharing to ensure that they are evenly distributed, adequate to offset the conservation-induced costs and they can outweigh those generated by alternative land uses; (3) the government, its agencies and donors have to prove to people that, unlike in the past, they are credible and trustworthy and, therefore, the initiatives or programmes they propose will work; and (4) wildlife staff, donor organizations and other stakeholders also need to change their attitude regarding local people and the way conservation should be pursued – sensitization may help.

*Discourage land privatization and commercial agriculture*: The detrimental impact of private land tenure on wildlife around the Kenyan part of Serengeti Ecosystem should serve as a precaution against adopting similar policies around Serengeti. The current state/communal land tenure and policies restricting commercial and mechanization agriculture should be maintained. Further, practical ways seeking to harmonize the development policies around the Ecosystem should be developed by both countries sharing the Ecosystem.

*Participatory land use planning*: The appropriate zones should be determined for particular uses. The uses that are incompatible with conservation should be discouraged in critical wildlife areas such as migratory corridors, calving and dispersal grounds

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# Paper IV

# Dilemmas of the Benefit-Based Approaches to Conservation of Wildlife in the Serengeti Ecosystem, Tanzania

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**Summary**

Community Conservation (CC) has become a major paradigm of conservation work in Africa. This paradigm, developed in response to the perceived failure of fortress conservation approach, uses benefits as a positive incentive to motivate local people to align their behaviours with conservation goals. Proponents of the strategy view it as a pragmatic way of transforming wildlife from a liability to an asset and therefore reconciling conservation interests with development. There are some mixing views regarding the efficacy of the strategy. Growing literature and field experience in some parts of the world claim that the strategy is not working as expected. This paper employs the current community conservation programmes in Serengeti to establish whether the strategy has a desired impact for future of wildlife in the area. It finally recommends some measures to strengthen the strategy in order to better its contribution to conservation.

**Key words:** Africa, Tanzania, Serengeti, community conservation, benefits-based approach, wildlife.

## 1. INTRODUCTION

American's Yellowstone National Park - cited as the beginning of the modern era of protected areas (Chape *et al*., 2005) - had served as a model for creation of protected areas in the world. The model - popular as "fences and fines" or "fortress conservation" - has been operating under the principal "define a rich wildlife area, declare it protected, remove indigenous people, and prevent them from re-entering" (Meffe and Caroll, 1997, p. 510). The adoption of the model in Africa alienated the natives from resources they, or their chiefs, formerly had the right to own and control (Bonner, 1993; Neumann, 1992). Resentment from local communities toward this model – aiming at forcing opportunities to secure their access to resources - is well documented (IIED, 1994; Machlis, 1989; Neumann, 1992; Wells and Brandon, 1993; Western, 1984).

Despite local opposition towards the model, the post-colonial governments inherited it uncritically. These governments devoted more land for conservation and some went to extremes by adopting a "shoot-on-sight" policy against illegal bushmeat hunters. For instance, in Kenya one poacher was killed on the average of every four days in the late 1980s while in Zimbabwe 145 illegal hunters were killed between 1984 and 1991 (Bonner, 1993). Yet these harsh measures could not guarantee the survival of wildlife. Human encroachment on wildlife habitats and illegal hunting continued - both as coping and adaptive livelihood strategies (Gibson and Marks 1995; Loibooki *et al.,* 2002; Wells and Brandon 1993). Surveys in the last two decades suggested that human activities had reduced Africa's original wildlife habitats by more than 65% (Newmark and Hough 2000). Illegal hunting in 1970s and 1980s reduced the African elephant (*Loxodonta africana*) population by 50% while black rhinoceros (*Diceros bicornis*) was driven to the verge of extinction (Adams and McShane, 1992; Bonner, 1993; Rolfes, 1997). This sad story to conservation is attributed to shrinkage of government budgets at the face of worsening rural poverty, human population growth and availability of trophy market[1]. Minimal budgets allocated to wildlife conservation could hardly cater for effective patrol of protected areas[2].

Further to minimal budgets, it was also argued that even the well-funded coercive conservation programmes could barely prosper where people's livelihoods and household budgets depended largely on prohibited natural resources from protected areas (Agrawal and Gibson, 1999; Wells and Brandon, 1993). Local resentment is furthered by, not only opportunity costs from restriction over resources, but also property damage and wildlife-induced accidents to people (Parry and Campbell, 1992; Songorwa *et al.*, 2000).

The above realities have inspired a growing recognition that successful long-term management of the protected areas can potentially be secured if local people participate fully in their conservation and derive tangible benefits from the resources therein. The proliferation of the community conservation (CC) initiatives is a response to this recognition[3]. These initiatives seek to provide alternative sources of income and sustenance, or direct compensation in form of social services associated with an improved standard of living by inducing "rural residents to surrender access to, or curtail illegal offtake of, native species and their habitats" (Barrett and Arcese, 1995, p. 1074). Essentially, as Songorwa puts it, the focus is "to change rural people's behaviours and practices and use those people and their new behaviours as a vehicle for achieving a conservation goal" (1999, p. 2061). An incentive to conserve, and to tolerate wildlife-related costs, among the local communities is, therefore, a function of economic gain – short of that may lead to illegal use and/or active destruction of the resource (See e.g. Emerton, 2001; Neumann, 1992; Wells and Brandon, 1993; Western, 1994).

The importance of linking protected areas management with local economy has enjoyed political backing internationally as numerous reports and publications indicate. For examples, the World Conservation Strategy (IUCN, 1980); the 1982 World Congress for National Parks in Bali (Wells & Brandon 1993); Our Common Future (Brundtland, 1987); Caring for the Earth (IUCN/UNEP/WWF, 1991) and the Rio Summit (UNCED, 1992) underscore the need to reconcile conservation interests with human needs. However, the outcomes of many programmes/projects seeking to attain this desire are disappointing. Contrary to expectations,

illegal hunting and hostility towards the wildlife staff are still prevalent (Gibson and Marks, 1995; Loibooki *et al.,* 2002) – a failure attributed to a number of factors (Table 1).

**Table 1: Some flaws of Integrated Conservation Development Projects (ICDPs)**

| **Flaw** | **Source(s)** |
|---|---|
| 1. Problematic, untested and unjustified assumptions | Wells & Brandon (1993); Barrett & Arcese (1995); Songorwa et al (2000); Newmark & Hough (2000) |
| 2. Inadequate socio-economic data for effective project design | Wells & Brandon (1993) |
| 3. Missing or unclear critical linkage between development and conservation | Barrett & Arcese (1995); Wells & Brandon (1993) |
| 4. Limited budgets that render the projects too small to exert a reasonable influence over the forces threatening protected ecosystems | Wells and Brandon (1993) |
| 5. Mistaken vision that views communities as a unified, organic whole, and consequently disregarding of differences affecting resource management outcomes, local politics and strategic interactions within the communities | Agrawal & Gibson (1999) |
| 6. Missing link between the benefits and costs; uneven and narrowly distribution of benefits | Gillingham & Lee (1999); Madzudzo (1997); Wells & Brandon (1993) |
| 7. General lack of interest among the rural communities | Songorwa (1999) |
| 8. Buffer zones are ill-defined, without specific enabling legislation | Wells & Brandon (1993) |
| 9. Inadequate or lack of political commitment | Songorwa et. al.(2000); Songorwa (2004b) |
| 10. Inadequate monitoring and evaluation | Wells & Brandon (1993) |
| 11. Lack of participation of local communities in decision making for resource management | Parry & Campbell (1992) |
| 12. Lack of constructive relationship between the key stakeholders | Wells & Brandon (1993) |
| 13. Limited viable alternatives to the extensive resource use | Wells & Brandon (1993) |

Some earlier evaluators, linked under-performance of most CC projects with life cycles, that they had not been underway long enough to be fairly evaluated (Newmark and Hough, 2000; Wells and Brandon, 1993). Having operated for about two decades now, most of these projects are mature enough for fair and critical evaluation. This paper is a contribution to the ongoing debate in the conservation literature regarding the efficacy of CC approaches. It seeks to answer the following questions: (1) Is commitment to CC genuine and adequate? (2) Do the nature and distribution of the benefits address people's felt needs and guarantee a fair and equitable access (among the individuals, households and villages)? (3) Are the CC benefits adequate enough to offset the wildlife-induced costs, and outweigh the returns generated by alternative land uses considered to be ecologically damaging? (4) How do the roles, behaviour, interests and powers of '*other stakeholders*'[4] influence people's perceptions and access to CC benefits? (5) And can the benefit-based approaches save the region's wildlife? - If so, what critical issues have to be resolved? The paper is organized as follows: following an overview of CC in Tanzania (Section 2), Section 3 is about methodology (description of study area, data collection and analysis). Results, discussion and conclusion are presented in Sections 4, 5 and 6, respectively.

## 2. COMMUNITY CONSERVATION IN TANZANIA

Tanzania, which has devoted over 28% of its land (ca. 945,090 $km^2$) for wildlife protection, went through a deep economic recession between 1970s and 1980s, like other African countries. This resulted into serious under-funding of the natural resources sector (i.e. wildlife, forestry and fisheries). From 1976 to 1981, the sector was the least financed, receiving only 1.2% from the development budget. In this period only US$52 million were allocated for the entire sector (Yeager, 1986). The wildlife subsector had not stabilised and continued to worsen. For instance, in 1994 and 1995 the Wildlife Department had a total budget of US$1.04 Million and US$1.01 Million, respectively – a decrease of 3% (URT, 1995). The Selous Game Reserve's budget in 1987 amounted to US$3/$km^2$ (Baldus *et al.,* 2003). This was far less compared to the amount

required for effective control of commercial poaching, which ranged between US$200 and 400/km$^2$ per annum (Bonner, 1993; Leader-Williams *et al.,* 1990).

Inadequate staff and equipment (Masilingi, 1994; Severre, 2000) to conduct effective law enforcement led to a dramatic decline of wildlife species in the country. Elephant and rhino were the most affected species. The elephants declined from 203,000 individuals in 1977 to 57,334 in 1991 (IUCN, 1998) while in 1992 only 275 rhinos remained compared to 3,795 individuals in 1981 (Rolfes, 1997). The economic crisis also stimulated illegal hunting for game meat to cater for household budgets. In 1989 the government intervened by launching "Operation Uhai" (Uhai is swahili word for life) that comprised army, police, and Wildlife Department personnel (Baldus *et al.,* 2003).

Although the operation minimised the problem, it could not be sustained given the resource constraints. The situation forced Tanzania, (just like other African countries), to subscribe to Community Conservation programmes with ambitious objectives of reconciling human development and conservation interests. The Selous Conservation Project (SCP) and MBOMIPA[5] emerged as the country's pioneer flagship conservation projects. Their success and sustainability is, however, being questioned (Songorwa, 1999; 2004). A similar intervention was also introduced in the Western Serengeti to address the long-term conservation and socio-economic problems that threatened the ecological integrity and, therefore wildlife populations. The Serengeti Regional Conservation Project (SRCP) and Tanzania National Parks' (TANAPA) Community Conservation Service (CCS) were set up for this purpose.

### *(a) Serengeti Regional Conservation Project*

The Serengeti Regional Conservation Project (SRCP) is an outcome of a workshop held at Seronera in Serengeti National Park (SNP) in December 1985 with the "goal of identifying and implementing long-term solutions to the resource use conflicts threatening conservation of the ecosystem" (Mbano *et al*. 1995, p. 605). The project started in 1988. The basic premise of the

Seronera workshop, that ”conservation and human development in Serengeti can no longer proceed in isolation from one another” gave rise to the overall goal of SRCP, i.e. to design a new approach toward the management and utilization of the Serengeti Region’s natural resources. Specifically, SRCP aimed at ensuring that: (1) Human development needs and natural resource conservation requirements in the region are reconciled with one another through the cooperation of all resource users and managers; (2) The protected areas, and wildlife resource in particular, play a central role in the economic development of the region; (3) Local communities are committed to the conservation of the Serengeti region’s wildlife resource through being directly involved in its management and utilization and through receiving direct benefits; and (4) Local communities achieve sustainable use of other natural resources in the region through ownership of land and village-generated land use plans, thereby reducing pressures on the resources of the protected areas” (Mbano *et al*. 1995, p. 606).

### *(b) Community Conservation Service or Outreach programme*

Implemented by TANAPA, the Outreach programmes started in 1988 around SNP. When it started it was known as Neighbours as Partners before it changed name to Community Conservation Services (CCS) and now Outreach programme. The programme evolved from a working group at the Serengeti Regional Conservation workshop in 1985, which recommended having a ‘Rural Extension Education’ programme (Bergin & Dembe 1996). The African Wildlife Foundation (AWF) sponsored a pilot project to support TANAPA in developing its capacity for CCS focusing on three villages (viz. Ololosokwan, Oloipiri and Soit Sambu) of eastern Serengeti in 1988 (TANAPA 2000). In 1992 CCS became a full-fledged department in TANAPA’s 12 national parks and at the headquarters. The programme has four objectives: (1) Improving relations between individual parks and local communities; (2) Ensuring that the interests of National Parks with regard to natural resource conservation and community welfare are presented at all levels; (3) Facilitating the sharing of benefits with target communities; and (4) Assisting

communities to gain access to information, resources and services which promote sustainable development (TANAPA 1994).

## 4. METHODOLOGY

### *(a) Study area*

The study was conducted in three districts bordering SNP in the Western part: Serengeti and Bunda (in Mara region) and Magu (in Mwanza region) (Figure 1). SNP forms 60% of the greater Serengeti ecosystem spanning an area of about 30,000 $km^2$ (lat: $1^0$ and $3^0$ S and long: $34^0$ and $36^0$ E). The Serengeti region is world-wide famous for its prolific wildlife - including 30 species of ungulates, 13 species of large carnivores and over 500 bird species (Sinclair, 1979; 1995). Some of the bird species are endemic to Serengeti (Stattersfield *et al.,* 1998). The regions holds the largest of the last migratory systems of ungulates in the world (Sinclair, 1995).

The wildlife conservation efforts in the area have traditionally involved creation of a series of protected areas. These include SNP (14,763 $km^2$), Ngorongoro conservation Area - NCA (8,288 $km^2$), Kenya's Maasai Mara National Reserve (1,368 $km^2$) and four Game Reserves - Maswa (2 200 $km^2$), Ikorongo (563 $km^2$), Grumeti (416 $km^2$) and Kijereshi (65.7 $km^2$). NCA and SNP together were designated as one Biosphere Reserve in 1981 and separately inscribed on the World Heritage List since 1979 and 1981, respectively (UNESCO, 2003).

Land alienation and restriction over access to resources associated with creation of PAs in Serengeti Ecosystem had often engendered local resentment. The most widely publicised dispute involved Maasai tribesmen spearing rhinos and setting fires with malicious intent in the late 1940s (Neumann, 1992). Rapid human population growth and poverty have worsened the situation by causing mounting pressures on natural resources, particularly in the Western Serengeti (Campbell and Hofer, 1995; Mbano *et al.,* 1995; MNRT, 1985; TWCM, 1998; 1999) - critical area in preserving the ancient migratory corridors. Over two million people living in this area have annual population growth rate beyond the national average of 2.9% (URT, 2002). The

population is multiethnic comprised of over 30 tribes, which pursue agropastoralism as their key livelihood strategy. An average household income range from US$ 0.42 to US$ 0.55 per day (Johannesen, 2002). The annual income is, therefore, far below the country's per capita income of US$ 280 (WB, 2003). Illegal hunting is pursued to complement the household budgets for the poorest and during the bad years (Loibooki *et al*, 2002).

***(b) Data collection and analysis***

A combination of methods was employed in this study: (i) Between July and August 2003 one community meeting was held in each of the six villages (N=6) viz. Park Nyigoti and Nyichoka (Serengeti district); Mariwanda and Nyatwali (Bunda district); Mwabayanda and Kijereshi (Bunda district) where some 50 villagers attended (N=300). An additional meeting was held with 20 people who were evicted from Nyamuma area, adjacent to Ikorongo Game Reserve. The meetings were arranged with the village government officials. Further to information obtained, the meeting proved to be useful in establishing rapport between the researcher and the communities. The agenda items for discussion were written on flip charts in form of questions seeking to solicit information regarding the protected area-people relationships, problems, opportunities, priorities and visions. The participants in the meetings were also requested to sketch a land/resource use map of their respective villages, which was used to clarify some issues raised in discussion along with probing for more specific issues. (ii) Focus group sessions aiming at providing further insights on attitudes, perceptions and opinions (Mikkelsen, 1995) of the villagers were conducted with ten women in each study village (N=60) and eight pastoralists from Mariwanda village. Using the village registers, the village official and a key informant assisted in selection of the participants. Selection was based on the location of participants' homes in order to ensure an even geographical coverage of the village. With a company of a village official and key informant, the selected participants were visited at their homes, briefed on the focus group sessions and invited to attend. The good rapport established with the villagers in

the previous village meetings, the company of the village official and key informant, inspired acceptance of the invitation, with exception of the few, who declined due to unavoidable grounds (e.g. attending the sick relatives). Replacement was made to those who declined. The prevailing relationship with the conservation authorities was also seemingly to have motivated people to accept an invitation as they saw it as an opportunity for their voices to be heard. The sessions took place some two to four days after invitation was made. During the sessions the discussion was kept on track by asking a series of open-ended questions meant to stimulate discussion. Participants were encouraged to talk freely and anonymity was guaranteed. The discussion was tape recorded and transcribed after the session. Additionally, the field assistant jotted down the key points given during the discussion. The sessions lasted for one to two hours and were conducted in Kiswahili (the language spoken by majority of Tanzanians); (iii)Various key informants were frequently consulted for specific knowledge (Mikkelsen, 1995) and clarification of issues that emerged in the aforementioned methods. These involved community elders, local leaders, wildlife staff, Member of Parliament for Serengeti, and District officials; (iv) Personal observations were made through physical visiting of the specific areas of interest in and outside the PAs; (vi) Relevant official documents were accessed and used as a source of data.

Data collected were analysed with the help of the communities while content and structural – functional analysis techniques were used to analyse qualitative data and information. Components of verbal discussions were analysed in detail with the help of the content analysis method. In this way the recorded dialogues with respondents were broken down into small meaningful units of information or themes and tendencies.

## 5. RESULTS

### *(a) Commitment to CC*

A balance – in terms of priority accorded in allocating resources - between the CC and law enforcement (as conservation strategies) and perceptions among the wildlife staff were used to assess the commitment to CC approaches.

***(i) A balance between community conservation and law enforcement***

The view that CC and law enforcement are "the right and left hands of one management strategy with CC providing incentives for conservation-friendly behavior and law enforcement providing disincentives for illegal activities" Bergin (2001, p. 103) is barely reflected in pursuing conservation work in Serengeti. Despite an increasing verbalization of CC as a viable conservation strategy and as an alternative to the "fences and fines" approach, too much weight is being placed on law enforcement. This makes the rationale for CC somehow redundant. The 1994 upgrading of Kijereshi, Ikorongo and Grumeti Game Controlled Areas to Game Reserves, which culminated in forceful evictions in the year 2000, and the change of ownership of the hunting blocks in 2002 also reinforced the emphasis on law enforcement. The new leaseholder (Grumeti Reserves Fund Ltd.) boosted security and started a close cooperation with Local Village Game Scouts and Bunda Anti-Poaching Unit. Moreover, they also invested heavily in anti-poaching training and equipment[6]. Further, SNP's organization structure, budget allocation and investment law enforcement department receives compared to other departments give an impression that law enforcement is not only superior, but also the heart of conservation. The law enforcement Warden automatically becomes the Deputy Park Warden and more resources (in terms of equipment, infrastructure and funds) are allocated to the department compared to CC Department (see Table 2).

**Table 2: Comparison of investments in community conservation and law enforcement departments in Serengeti National Park in 2004**

| Department | No. of staff | No. of centres/posts | No. of vehicles | Total budget allocated: 1999-2004 (in US$) |
|---|---|---|---|---|
| CCS | 8 | 6 | 4 | 361 000 |
| Law enforcement | 172 | 18 | 21 | 862 000 |

*Source*: SNP – Law enforcement and community conservation service annual reports

In addition to lion's share in operational budgets, support to conservation by donor agencies has traditionally been biased towards the law enforcement department, mainly through provision of uniforms, vehicles and other equipment and field gears. At the conservation stakeholders meeting held at Robanda village on 16 September 2003, communities criticised Frankfurt Zoological Society (an international conservation/donor organisation) for this bias. One villager claimed, "Frankfurt is repeatedly donating new vehicles and guns to the park as if there is a war to fight". Communities felt that part of the huge funds that SNP and donor agencies commit to anti-poaching activities could be used to supplement the minimal benefits they receive through CCS if they (the communities) were expected to support conservation. In other study villages, CCS department was frequently blamed for making false promises. For instance, in Park Nyigoti, Serengeti, villagers stated that they were told to build houses and grow vegetables on promise that TANAPA/SNP would give them the improved goat breeds and find a market for the vegetables, respectively. However, they were not seen to date.

***(ii) Acceptance of the CC initiative among the wildlife staff***

Discussion with the wildlife staff revealed differing views regarding the efficacy of benefit-based approaches. The proponents claimed to have realized "huge success" in terms of change of people's attitudes and increased local support for conservation. However, they lack sufficient explanation on why do the managers still invest heavily in the expensive and disputed "fences and fines" approach if their claims are genuine. The other camp emphasises on continuation of the militaristic approach, accusing CC for diluting the conservation agenda. In an interview, one senior officer stationed in the area described CC as "mere politics" implying that it was unrealistic and unachievable. He felt that the approach was defeating rather than promoting conservation, as the local communities, deliberately or unknowingly, misunderstood the approach as a "permission to

violate the law." The officer argued further that some local people thought that CC was adopted to provide them with immunity if and when found hunting illegally.

Showing obvious prejudice - a sign of disapproving the approaches- another officer described the local communities as stubborn, arrogant and conservative. He stated explicitly that, "criminals are never changed by rewards, but severe punishments." These perceptions give the impression that either the wildlife officers were inadequately prepared to implement the new conservation policies or that, even after 18 years of implementing CC, they still see no light at the end of the tunnel - a scenario suggesting performance snags and a slim chance of having CC objectives achieved. Local communities also see strict law enforcement to be more effective tool in conservation. Those who held this view were twice the number of those who called for improved benefits and increased legal supply of the game meat (see also Kaltenborn *et al,* 2003).

### *(b) Nature and distribution of the CC benefits*

Currently, the benefits accruing to local communities in the western Serengeti are mainly communal benefits with much emphasis on infrastructure development through construction of roads, classrooms and dispensaries. Experience has, however, shown that people are motivated to participate in conservation activities - both by doing and refraining from illegal activities – not only by accessing communal benefits, but mainly by enjoying them at individual and household level (Madzudzo, 1997; Songorwa, 2004). This is because most conservation-induced costs (such as property damage and opportunity costs) are borne and felt by individuals and their households rather than the entire community. Essentially communal benefits undermine people's short-term needs and create a loophole for free riders as they barely address the question of "who pays for, and who benefits from wildlife resource". In some cases, household poverty or/and exclusion of the village from the programme may sanction people from accessing the benefits.

#### *(i) Short-term (felt) needs and nonpecuniary benefits*

Generally, the villagers criticised the communal benefits for failure to address their actual (short-term) needs and priorities. For them, food support during the periods of shortage carried more weight than classrooms[7] as one villager expounded, "Even if the classrooms are as decent as a *Ikulu* (State House), children cannot concentrate with their studies on empty stomachs." Another villager noted that, "neither a classroom nor a tarmac road can substitute for lost pasture, firewood and medicinal plants." One warden claimed that when crop harvests fail illegal hunting increases.

More criticism was leveled at wildlife related benefits for failing to address the socio-cultural costs induced by wildlife conservation. The tribes of western Serengeti consider hunting as important part of their culture and a way of coming into contact with the spirits of animals (also see Kaltenborn *et al*, 2005). A successful hunter earns status from the community. The non-food parts of hunted animals have various uses such as medicinal, protective against sorcerer's magic, and used during the spiritual events. Likewise, the sacred groves and ancestral burial sites within the gazetted areas are critical for religious deity. These forfeited nonpecuniary values are barely observed and compensated accordingly.

***(ii) The problem of free riders***

The problem of free riders or cheaters (actors who take more than their fair share of the benefits or do not shoulder their fair share of the costs of a resource) is evident in Serengeti. This is because of *non-rivalrous* and *non-excludable* nature exhibited by communal benefits[8]. The villagers in the study area were concerned that some individuals/households were being overtaxed through wildlife-related costs, while others were only minimally affected. By virtue of their behaviours or positions they held in a society (e.g. leadership) some people were gaining substantially. Lack of mechanisms that guarantee a fair compensation and reward for good individual behaviours gives the victims, non-victims and culprits an equal access to communal benefits - a scenario that may reduce the intended impact of the benefits in checking people's

unsustainable behaviours (see Hardin, 1968). Citing the weakness of communal benefits, an elder in Mariwanda village, Bunda District, wondered how can one stop a poacher from walking on the road or deny his son from sitting in a classroom donated by SNP?

Sometimes the benefits reach neither the victims nor the intended beneficiaries. The then Minister for Natural Resources and Tourism verified this when she was responding to a question in the parliament on 28 July 2005 about compensation for wildlife-related costs[9]. She criticised the district councils for using their 25% share of revenues from tourist hunting for (paying) sitting allowances instead of directing it to target communities. Even if some of this money gets to the communities, all villages in the district are rewarded equally regardless of the costs they incur. The communities therefore fail to differentiate between the conservation-related benefits and other handouts given by the government. One village chairman complained that there were some villages that reap the benefits though they do not even know how an elephant look like, leave alone the havoc it wrecks on people.

***(iii) Failure to access the benefits due to poverty***

Discussion with villagers revealed that poverty restricts the poor households from accessing some wildlife-related benefits. For example, in Mariwanda village, Bunda district, some villagers could not access the medical services from the dispensary constructed by TANAPA due to government's cost sharing policy which required each villager to contribute some US$ 10 per year. This defeats the objective of the initiative i.e. inspiring local support to conservation.

Impact of poverty on restricting access to benefits was also expressed in SRCP's game cropping scheme and TANAPA's support in construction of secondary school. Although the game meat was cheap compared to beef, some villagers still felt that they could hardly afford buying it due to low income. Regarding support to education sector, it was stated that despite knowing its value some people could not benefit fully from it. One of the village officials in Park Nyigoti, Serengeti district, described construction of secondary schools in some of the wards as

being “an expensive benefit.” He clarified that, by increasing the chances for primary school leavers to join secondary schools, the parents were compelled to pay for school fees, buying uniforms and meeting other requirements. For poor parents, access to this benefit may be limited. According to the villagers, sometimes money to buy these requirements had to be obtained through illegal hunting, signifying that this form of benefits was encouraging rather than halting illegal activities. In the literature it is generally agreed that poaching is driven mainly by poverty and the need to increase food availability and economic income. Loibooki *et al* (2002) for instance reported from Serengeti that income poverty was the main reason for illegal hunting. Kaltenborn *et al* (2005) also documented that poverty is the main driver behind illegal hunting, but also argues that hunting fulfils other social-cultural needs.

***(iv) Exclusion and inequitable distribution***

Despite the fact that wildlife-related benefits are too low and often erratic, some degree of support to conservation activities among the participating villages was apparent. Village Game Scouts (VGS) in these villages assisted in controlling illegal activities, mainly poaching. But, SRCP’s game ‘cropping’ scheme in Western Serengeti has been operating in 14 pilot villages only. This is just a fraction of the villages which have a stake in the wildlife especially those that produce illegal hunters. Records from TANAPA and SRCP itself indicate that poachers hail from 126 villages.

This small-scale of operation has made non-participating villages (hereafter non-SRCP) see the SRCP’s initiative of ‘including few villages while excluding the majority’ as a ‘double standard’ and as a way of reinforcing the unpopular “fences and fines” approach. They question the criteria used to leave them out since, wildlife being a fugitive resource, is also costly to them. They interpreted the initiative as a government strategy of suppressing their interests through contracting the few villages to implement “the fences and fines” approach. At Park Nyigoti

village, Serengeti district, an elderly man equated this to colonial systems of "divide and rule" or "indirect rule[10]."

The SRCP project has created tensions between the SRCP and non-SRCP villages. The SRCP villages are regarded as "betrayers" and this has inspired revenge in response to arrests made by VGS to illegal hunters from non-SRCP villages. For example, in 1999 and 2001 two VGS from Iharara and Hunyari villages, in Bunda district, were reportedly killed by poachers suspected to have come from non-SRCP villages. Another incident was that of setting ablaze a house belonging to Kihumbu Village Natural Resource Committee chairman in 2000. Even within the villages participating in SRCP, access to or distribution of the benefits among households had been under constant criticism. The village government officials and village wildlife management committee members were accused for using their positions to earn lion's share from wildlife-related benefits. This explains why election campaigns to win these posts are big events prompting use of money and other assets (e.g. livestock) to "buy votes."

### *(c) Amounts of the benefits granted*

By virtue of being too minimal the benefits are unable to offset the costs and compete effectively with land uses considered to be ecologically damaging.

#### *(i) Inability to offset the wildlife-induced costs*

It was learned during the village meetings, focus group and key informant discussions that the wildlife granted benefits were too minimal to offset the wildlife-related costs. The costs were said to be increasing. These observations were confirmed by the Serengeti District Game Officer who attributed them to the newly created Game Reserves around SNP. According to him, the improved habitats, effective protection and, therefore increased wildlife populations and their proximity to people and their properties have exacerbated the problem of crop damage within the past 3-4 years. Assessment on crop damage conducted by his Office between November 2003

and January 2004 revealed that about 192.3 ha of food crops (406.6 tonnes) belonging to 407 households in the district were destroyed.

Using the crop prices in the local market in Mugumu town (the district headquarters), the above loss is equivalent to about US$210,000 (an average of US$516 per household). The wildlife-related benefits have remained more or less the same as estimated by Emerton and Mfunda (1999) i.e. US$2.5 per household per annum. Further, since these benefits are earned indirectly through implementation of development projects, the communities barely feel their impact as being fairly compensated.

***(ii) Inability to compete with other land uses***

During this study it was apparent that the local communities were unwilling to abstain from ecologically damaging activities, which they perceived to be economically profitable. For example, rumours that the government had a plan to relocate Nyatwali villagers in Bunda district as a measure of safeguarding the wildlife migratory route from SNP to Lake Victoria caused panic to villagers. They stated bluntly that they would use any weapon at their disposal to resent the plans. The lake is the reliable source of water for wildlife during the dry season. The possibility of being compensated (if the government was willing) was ruled out on grounds that the actual benefits could not surpass the opportunity cost that would result from foregoing the profitable fishing activity. In Hunyari Ward, in the same district, SNP's donation of two classrooms and SRCP hunting scheme were slated as unrealistic compensation for the lost pasture and water (following creation of Grumeti Game Reserve). The Secretary of the Pastoralists stated that:

> "This is a joke! A classroom and two kilogrammes of bush meat we buy from SRCP per year cannot match up to loss of pasture and water sustaining some 70 000 cattle. Nor could they (classroom and meat) be able to restore our dignity, which is overtly being abused by game rangers when they arrest us inside the reserve. What is the use of school

if it means loss of cattle giving us food, clothes and school requirements for children who are intended to attend to this school?"

An officer from SRCP admitted that conservation efforts were constrained by failure of the current benefits to offset the costs of alternative land uses and expressed scepticism about possibility of rectifying the situation.

Literature also demonstrates failure of wildlife conservation in Serengeti to offer competitive advantage over alternative land uses. For example, an economic value of illegal hunting in Western Serengeti is 45 times greater than that derived from the SRCP 'cropping' scheme (Holmern *et al,* 2002). In the group ranches adjacent to Kenya's Maasai Mara National Reserve, the lower value of wildlife-based tourism with limited agriculture compared to full-fledged agriculture and ranching (Norton-Griffiths, 1995) inspired the landowners to develop the latter. The consequence has been a destruction of core breeding and calving grounds for wildebeest - a situation that has caused a decline of resident population by 81% - from 119,000 in 1977 to only 22,000 in 1997 (Ottichilo *et al*, 2001).

### *(c) Roles, personality, interests and powers of 'other stakeholders'*

During the course of this study it became evident that confusion over roles and responsibilities, poor personality of civil servants working in institutions supported by conservation agencies and stakeholders seeking to meet their interests on 'non-transparent deals' may undermine the good intentions of CC programmes.

#### *(i) Confusion over roles and responsibilities*

It became evident at the community meetings that at times wildlife-related benefits flowing to the villages are perceived to be initiated by local politicians. This may diminish the role these benefits are expected to achieve i.e. enticing conservation objectives. For example, at Bonchugu, Serengeti district, villagers vehemently disagreed with their fellow villager who cited a borehole

as one of the benefits that the village had received from TANAPA/SNP. They attributed the benefit to their Member of Parliament (MP) on argument that, even if TANAPA had sponsored the borehole by 100%, this would have not been possible without the MP's efforts. To some extent TANAPA itself was to be blamed. It appeared only at the stage of implementation i.e. benefit provision. TANAPA staff never sat down with the villagers to prioritise their needs, plan and design the project. This, therefore, gave credit to the MP while TANAPA remained unpopular.

*(ii)* ***Poor personality***

The conservation agencies providing communal benefits have no mandate over the officers or civil servants working in sectors or institutions they support. After completion of the project (e.g. school, dispensary) the conservation agency hands it to local or central government. Sometimes the government officers working in "supported institutions" may become irresponsible, and thus diminish the communities' appreciation to conservation initiatives. For instance, in Mariwanda village, Bunda district, villagers accused the medical personnel (in the dispensary constructed by TANAPA) of arrogance, using abusive language to the patients, bribery, pilferage of medicines and vacating offices during working hours. Because of this behaviour, it was said that sometimes the patients opted to remain at home or consult the traditional healers rather than reporting to dispensary.

***(ii) Interference from 'powerful' stakeholders***

By virtue of being economically powerful, one of the stakeholders was accused of being arrogant and assuming superiority over other stakeholders. This was said to jeopardise the flow of direct benefits to the villagers. The stakeholder (Grumeti Reserves Fund Ltd) started by stopping trophy hunting in the area. Later it went on and stopped resident hunting conducted through the District Council. The next step aimed at community hunting conducted through SRCP. The

company defended this intervention by arguing that it was meant to allow recovery of the resident wildlife populations since there was not enough wildlife left in the area. This intervention and the conduct of law enforcement are, however, contradictory to the interests of the project and the communities.

The disbursement of funds to SRCP for 2004 hunting season was coincidentally delayed and thus hunting did not take place. Some key informants claimed that, VIP Safari Club took advantage of the delay, colluded with some village leaders and prepared minutes of village meetings, which were never convened. The fake minutes showed that the villagers had agreed on receiving payment of some TAS 1.8 million (US$ 1,800) as compensation for their hunting quotas. A representative of the company reported, however, that there was a negotiation, the claims that were strongly refuted by the villagers who maintained their dislike over the decision of selling the quota.

On 16 June 2005 a representative of the investor reported that the communities get many tangible benefits. He mentioned supply of books to schools, provision of scholarships, a drilling rig, health, self-help projects e.g. brick burning and slate making, creation of jobs (about 3,000 villagers are employed as casual labourers at the hotel construction work), purchase of vegetables from local farmers, etc. However, the villagers still felt that community hunting gave them more direct benefits than the money that would result from selling their quotas to VIP[11].

In Nyichoka village, Serengeti district, Grumeti Reserves Fund Ltd was implicated in "buying" the village government and Village Natural Resource Committee leaders in order to protect its interests, i.e. control of village land, which is rich in wildlife[12]. The area was the only reliable pastureland for the village. Further to supporting the village leaders materially, the investor was also accused of financing village election campaigns for the sake of ensuring that "his men" remained in office.

Some villagers urged the government to give its position over Grumeti Reserve Funds Ltd, as the company seemed to over-power the government. The general (mis)conception was that the

investor had bought all wildlife in the area. Some villagers went further by speculating that this was an indicator of gross corruption characterizing the higher government circles. This seemed to exacerbate cynicism over the Wildlife Division's intention to create Wildlife Management Areas (WMAs). The villagers wondered how the communities (being politically, economically, and legally weak) could manage to halt the unacceptable behavior of the investor if the government cannot.

The midterm review report for SRCP's Phase III (2002-2006) also accuses the company for undermining the intention of the project. It concludes by pointing out that, "Villagers are agitated about the fact that an investor 'VIP' has already acquired a large tract of land and intends to acquire more land (including the intended site for Serengeti National Park Headquarters at Fort Ikoma). And thus furthermore non-transparent 'deals' seem to be underway for VIP to buy up all villagers' hunting quotas" (Bryceson *et al.,* 2005, p. 107). Regarding the issue of SNP headquarters at Fort Ikoma and the neighbouring Robanda village, the representative of the investor argued that the company was willing to compensate the park and every family at Robanda and build them new homes somewhere else as their houses/offices were located on the migratory routes. He also revealed the company's plans of paying lease for the land occupied currently by Robanda village.

## 5. DISCUSSION

### *(a) Has benefit based approach saved wildlife in Serengeti?*

Based on the CCS and SRCP objectives, one would have expected that adoption of benefit-based approaches would have led to improved local livelihoods, a significant decrease in the hostility characterizing the "fences-and-fines" approach and thus, inspire local support to conservation. However, the dilemmas discussed above have rendered this desire unrealistic.

Continuation of punitive and exclusive policies, with inadequate attention to CC approaches, has continued to undermine local livelihoods and, therefore, inspire hostility and opposition

towards conservation as a way of forcing opportunities for increased access to land and wildlife resources. The worst scenarios of this were serious wounding of a Game Scout in Magu District on 28 July 2001 followed by killing of the District Game Officer on 15 July 2002 - events associated with local protest against relocations from Kijereshi Game Reserve[13].

However, one obvious fact is that enlarged effective conservation areas (Ikorongo, Grumeti and Kijereshi Game Reserves) had led to increased wildlife populations, a situation that can be cited as achievement in conservation. However, this has negative social and economic connotations to local communities who stand to suffer more from property damage and wildlife-related accidents, which raises questions on the social responsibility of protected areas managers. A similar scenario unfolded around Kenya's Amboseli National Park. Western (1998, p. 1507) described increased conflict between elephants and Maasai tribesmen as a result of "the very success of local community involvement beginning in the 1970s." He verified the success by an increase of elephants from 480 to nearly 950. Sadly, human deaths from elephant attack rose from nine a year to over 40 (Western, 1998). Likewise, in the western Serengeti elephant populations have increased sharply from only 500 in 1986 to over 2000 in 2003 (Walpole, 2004). This has exacerbated human-elephant conflicts, largely due to increasing cultivation close to the boundaries of the protected areas and greater security in the Game Reserves that has resulted in greater incursions of elephants into settled and cultivated area. Crop raiding is a serious issue in both districts bordering the Game Reserves, since there currently exist no effective deterrent. An increased human-elephant interaction level has also resulted into increase of the number of deaths and injuries.

Currently there is no evidence to associate the benefit-based approaches with a decrease in illegal hunting (see also Loibooki *et al.,* 2002). One villager from Mariwanda argues that, "If at all poaching has diminished in this area, it is not because of the benefits from CCS and SRCP, but rather because of more 'soldiers', more cars, and a helicopter all of which patrol over here every day." Between 2001 and 2003 a total of 1931 poachers were apprehended originating from

126 villages in six districts in Western Serengeti (an average of 15 poachers per village). Bonchugu and Machochwe villages had the highest numbers of apprehended poachers viz. 135 and 105, respectively, despite accessing the benefits through CCS[14]. Holmern *et al.* (2004) also reported high rate of illegal hunting among SRCP households than households outside SRCP although annual number of animals per hunter was much higher for the latter than former.

There is a general consensus that distribution of game meat from SRCP hunting scheme is both unfeasible and uneconomical option. Holmern *et al*. (2002) recommended that the scheme should be discarded, a recommendation that the Director of Wildlife supported when he was quoted by Lwezaula (2001, p. 26) saying, "the idea of spoon-feeding villagers with game meat as part of community-based conservation did not, unfortunately, attain the expected results."

### *(b) Can benefit-based approaches save wildlife in Serengeti?*

In the research based literature there is reasonable consensus around certain conditions - which must occur together in order to have returns from wildlife conservation which exceed the alternative land use options. These include (1) areas with very poor or marginal lands - poor soils, erratic rainfall – and, therefore, rare crop surpluses (Child, 1996; Little, 1994; Murphree, 1996); (2) large tracts of uninhabited and uncultivated land, large wildlife populations and only small human populations (Murphree, 1996); (3) less stratified human population economically with strong intra- and inter-community linkages where conflicts are minimal (Songorwa *et al.*, 2000); and (4) where easy market for wildlife products and service is guaranteed (Songorwa *et al.*, 2000). In Western Serengeti, these conditions are either lacking and/or inadequate. The wildlife resource, therefore, cannot meet the criteria that inspire communities' support to sustainable resource management. De Merode *et al.* (2003) outline these criteria as: (1) the resource must have a sufficient value; (2) the proceeds must be well enough distributed (see also Madzudo, 1997; Gillingham and Lee, 1999); and (3) future access and control must be sufficiently well guaranteed.

Even if the first two criteria above can be met (although it has proved to be difficult), the donor dependency syndrome and vulnerability of the tourism industry may thwart the third criterion. Generally, the benefit-based approach in Africa is mainly sustained through external funding (IIED, 1994) and photographic and sport hunting tourism. Experience shows that most of the donor funded projects are vulnerable to collapse as the host governments or departments are either unwilling or incapable of running them after the donors pullout (Barrett and Arcese 1995; Songorwa 2004; Songorwa *et al.,* 2000). For example, the Tanzanian government has shown reluctance in taking over responsibilities of sustaining MBOMIPA and Selous Conservation Project (SCP) after donor pullout on grounds of inadequate financial capacity (Songorwa, 2004).

However, inadequate financial capacity does not seem to be the major constraint. Unwillingness and low commitment among the governments and its wildlife authorities seem to be promted by the fact that these initiatives are external demand with minimal inputs from within. The minutes for the 1994 annual national workshop for wildlife officers in Tanzania verify this: "Most of the Community Conservation projects in the country are donor initiated and funded. This approach is top-down and the local institutions…and communities are only passengers while the donors are doing steering" (URT 1994, p. 13). Neumann (1997, p. 559) shares this view as he argues, "despite the emphasis on participation and benefit-sharing, many of the new projects replicate more coercive forms of conservation practice…"

As observed above, there is a potential risk associated with heavy reliance on donor funding for implementation of the CC projects. The benefits to communities are likely to be terminated in event of donor pullout. In the case of SRCP, funded by NORAD, there could be no miracle to exempt it from this scenario. In the period between 1998 and 2002, NORAD provided some US$ 330,000 annually, but since then the amount has been decreasing gradually as the project is approaching to an end in 2006.

The tourism industry - another potential source of wildlife-related benefits to communities - is susceptible to factors such as political instability, economic hardship, international politics,

terrorism and even natural catastrophes. For example, in Zimbabwe, the land reform programme in 2000 that led to declining international image and deepening economic and political crisis had detrimental impacts on the tourism and wildlife sectors. Tourism revenues fell from US$ 700 million in 1999 to US$ 71 million in 2003 and over 80% of its large game in private conservancies was poached (ZimConservation, 2004). In Tanzania, following bombing of American Embassy in Dar es Salaam travel agencies and tour companies reported a drastic drop of inquiries about holidaying with some clients who had already booked for safaris calling back to cancel the bookings (Anon., 1998). Ecological factors such as diseases, drought, floods and other natural catastrophes may reduce (or even wipe out the entire population) of charismatic and suitable wildlife species for hunting (see e.g. EMERCSA, 2002; Morell, 1995; Harder *et al*, 1995) and, therefore, reduce the revenues from game viewing and hunting industries.

Unpredictability of donors and tourism (as the principle sources of CC benefits) along with human population growth suggests that even if the benefits provided would lead to anticipated positive effects (instilling conservation-friendly behaviours), the situation may be temporary and unstable. The intended outcomes may be achieved initially, but as soon as the benefits are terminated or reduced people may inevitably revert to their unsustainable illegal hunting behaviours - the probable scenario being "no benefits no conservation." Delay of disbursing funds to SRCP in 2004 (October instead of July) and the subsequent failure for community hunting illustrate this. Some village leaders admitted to having allowed illegal hunting by suspending anti-poaching activities by village game scouts on grounds of observing humanity. They claimed that it was unethical and inhumane to prevent a starving person from getting food.

However, even if donor funding and tourism industry are to remain stable as potential sources of benefits, a share of the benefits to individuals and/or households may not remain the same due to factors such as demographic changes. The fact that the current benefits are already perceived to be insufficient to offset the wildlife-induced costs and opportunity costs of

conservation, the local communities may hardly understand and tolerate further reduction of these benefits.

## 6. CONCLUSION AND RECOMMENDATIONS

As other African countries, Tanzania subscribed to CC in late 1980s and adopted the benefit-based approach as a strategy of motivating the rural communities to align their behaviours with conservation goals. Unfortunately - as this study reveals - several factors seem to work against this desire. The benefits granted are barely adequate and equitable enough to motivate conservation-friendly behaviours. The ecological, social and economic factors of the area provides a dire chance for current returns from wildlife to outweigh those generated by alternative land uses which are ecologically destructive. The current benefits are heavily depending on donors and tourism – the sources that are unreliable.

In order to sustain the benefit-based approaches in Serengeti and realize the desired outcomes, the government has to resolve the seemingly critical and challenging issue of benefit provision with a view of ensuring that they are adequate, equitably distributed and replicated on a much larger scale. However, the emerging question is sustainability. Will the government be able to do this on its own in villages exceeding 100 if it could not do so in 14 villages?

The dilemmas characterizing benefit-based approaches in Serengeti prompts a conclusion that the current benefits are less effective in inspiring sustainable conservation behaviours. We recommend a more comprehensive and integrated study that will offer more innovative and effective options in view of making the CC initiatives more plausible. The options should seek to increase more opportunities that will divert the communities from heavy reliance on wildlife species and habitats for survival. For example, the benefits should be more realistic and lead to improvement of local people’s living standards at the household level.

**NOTES**

1. The price for ivory rose from about US$ 5 in 1960 to US$ 52 in 1978 and up to US$ 300 in 1988 per kg (*http://www.achimerfriendsofrhino.de*). In 1980 a kg of rhino horn was worth US$1,000 (EMERCSA 2002).
2. For example, while the ideal staffing ratio for Game Reserves is 1:25 (persons:$km^2$), in the year 2000, the ratio in Tanzania's Game Reserves was 1:125 (Severre 2000) and Cameroon's Lobeke National Park was 1:200 (Koulagna Koutou 2001). Law enforcement was also seriously constrained by poor remuneration and under-equipment of the wildlife staff who had to patrol the large remote areas and face the poachers well-equipped with automatic weapons (see e.g. UNESCO 2001; Bonner 1993; Masilingi 1994).
3. Some of these projects/programmes in Africa are Zimbabwe's WINDFALL (Wildlife Industries New Development for All) and CAMPFIRE (Communal Areas Management Programme for Indigenous Resources), Burkina Faso's NWUP (Nazinga Wildlife Utilisation Project) and Zambia's ADMADE (Administrative Management Design for Game Management Areas) and LIRDP (Luangwa Integrated Resource Development Project). These became the pioneer and flagship Community Conservation projects in Africa (IIED 1994).
4. The term *'other stakeholders'* here refers to politicians, civil servants (other than wildlife staff) and investors.
5. MBOMIPA is Swahili acronym for "Matumizi Bora ya Malihai Idodi na Pawaga Divisions" which literally means, "Project for Sustainable Use of Natural Resources in Idodi and Pawaga Divisions." The project was operating around Ruaha National Park in Tanzania's Southern tourist circuit.
6. Since the Grumeti Reserves Fund Ltd bought hunting blocks inside the Game Reserves and in the Ikoma Open Area, it has increased the anti-poaching effort significantly. In the period between 2002 and 2004 eighty Village Game Scouts (VGS) have undergone a six weeks training course in anti-poaching techniques and over US$480 000 have been invested in anti-poaching equipment such as vehicles, VHF radios, handheld GPSs and night-vision binoculars (VIP 2004).
7. Interview with anonymous key informants in Nyichoka village in Serengeti District, 21 July 2003.
8. "Non-rivalrous goods" are goods whose benefits fail to exhibit consumption scarcity i.e. once produced, everyone can benefit from them without diminishing other's enjoyment e.g. roads,

classrooms. " Non-excludable goods" – these are benefits which once created, it is very difficult or impossible to prevent access to the goods.

**9.** The current wildlife policy (URT 1998) and legislation - the Wildlife Conservation Act No. 12 of 1974 (URT 1974) – lack provision for compensation. The Bill seeking to replace this Act – A Draft Bill for the Wildlife Conservation and Management Act, 2004 has also remained silent on this matter (URT 2003).

**10.** "Divide and rule" is a system in which the colonial masters used to keep themselves in a position of power by causing disagreements among the Africans so that they are unable to question the power of the rulers. Under "indirect rule" British colonial masters delegated some of their powers to local chiefs in order to reduce opposition to their policies.

**11.** Interview with anonymous villagers in Nyichoka and Robanda villages, in Serengeti district, 15 & 17 April 2005.

**12.** It was alleged that the investor bribe the village leaders by building them the modern houses, giving them the radio calls, giving them transport and organising parties with them.

**13.** A part of the letter (Ref: Kumb. Na. G.10/4/161) dated 18 September 2002 from Magu District Commissioner to Mwanza Regional Commissioner reads:

> "The assassination of the government officer has triggered a huge concern and a fear that the invaders (to Game Reserve) have defeated the government. It is on this ground that I am compelled to write you to request that a special operation to evict the invaders is conducted before cultivation season starts."

**14.** TANAPA reports: Illegal hunters arrested from 2001 to 2003.

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# Paper V

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ORIGINAL PAPER

# Factors influencing conservation attitudes of local people in Western Serengeti, Tanzania

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**Abstract** Attitudinal studies are increasingly being adopted as tools for evaluating public understanding, acceptance and the impact of conservation interventions. The findings of these studies have been useful in guiding the policy interventions. Many factors affect conservation attitudes positively or negatively. The factors inspiring positive attitudes are likely to enhance the conservation objectives while those inducing negative attitudes may detrimentally undermine these objectives. The magnitude of the resultant effects of each particular factor is determined by the historical, political, ecological, socio-cultural and economic conditions and this may call for different management interventions. In this study we examined how conservation attitudes in western Serengeti are shaped by the following factors: level of conflicts with protected areas; wildlife imposed constraints (inadequate pasture, water, diseases, loss of livestock during migration, theft and depredation); participation in the community based project; and socio-demographic factors (age, education level, wealth, immigration, gender and household size). The results indicated that the level of conflicts, participation in the community based project, inadequate pasture, lack of water, diseases, wealth and education were important in shaping peoples' attitudes. However, in a stepwise linear regression analysis, 59% of the variation in peoples' attitudes was explained by three variables i.e., conflict level with protected areas, lack of water and participation in the community based project. In addition to these variables, level of education also contributed in explaining 51% of the variation in people's attitude regarding the status of the game reserves. Five variables (lack of water, level of education, inadequate pasture, participation in the

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community based project and diseases) explained 12% of the variation in people's attitude towards Serengeti National Park. The paper discusses the implications for conservation of these results and recommends some measures to realise effective conservation of wildlife resources.

**Keywords** Attitudes · Benefits · Conflicts · Conservation · Protected areas · Socio-demographic variables · Tanzania · Western Serengeti



## Introduction

Over the past two decades the importance of understanding local communities' attitudes, needs and aspirations has received increasing attention among researchers, donors, conservation agencies and protected area authorities. This importance commensurates with the paradigm shift where the local communities are recognised as the key focus for success of the conservation agenda (Baldus et al. 2003; Barrows and Fabricius 2002; Hackel 1999; Western 2001). Attitudinal studies are being widely used in evaluating public understanding, acceptance and the impact of conservation interventions, as well as to inform the development of new management strategies (see e.g., Gillingham and Lee 1999; Holmern 2002; Holmes 2003; Infield 1988; Infield and Namara 2001; Kalternborn and Bjerke 2002; Kalternborn et al. 1999; McClanahan et al. 2005; Parry and Campbell 1992; Songorwa 1999; Røskaft et al. in press).

A growing research-based literature indicates that support to conservation is often compromised in situations where people's interests and livelihoods are threatened. Kalternborn et al. (1999) and Røskaft et al. (in press) reported antagonistic attitudes toward large carnivores in Norway among the sheep farmers in areas with a high degree of depredation. In Wisconsin, USA, individuals reporting losses to wolves (*Canis lupus*) and other predators were more likely to favour extermination of the predator population (Naughton-Treves, et al. 2003). In Tanzania, grievances with the park or park officials inspired people's desire to see the parks degazetted(Newmark et al. 1993). Gillingham and Lee (1999) observed that villagers around Selous Game Reserve were ready to support conservation so long it did not threaten their interests and livelihoods. In the same areas, strong opposition against the conservation programme was reported due to increased crop damage and associated opportunity costs (Songorwa 1999). In Kenya's Laikipia District, peasants perceived many aspects of wildlife conservation negatively due to costs inflicted by crop raiders and dangerous wild animals (Gadd 2005). In Mozambique, farmers who lost crops to elephants (*Loxodonta africana*) were more negative to Maputo Elephant Reserve than non-victims (De Boer and Baquete 1993). In Uganda, the families which were allowed to resettle in the Lake Mburo National Park in 1986 after eviction in 1983 opted for slaughtering of wildlife in an attempt to eliminate the area's conservation value and, therefore, preclude the possibility of being re-evicted (Hulme 1997).

As a way of reducing opposition and ensuring local support to conservation, the benefit-based approaches are being widely adopted. The approaches are based on the premise that tangible benefits from conservation are vital motivational factors for local people to change their attitudes, support conservation efforts, and align their behaviours with conservation goals (Archabald and Naughton-Treves 2001;



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Gadd 2005; Gillingham and Lee 1999; Holmes 2003; Lewis et al. 1990). The impacts of benefits in changing attitudes and engendering local support may be enhanced by regular contacts between the wildlife staff and local communities (Holmes 2003; Hulme 1997). However, the desired effects of benefit-based approaches have often been temporary or rare. The reasons behind this observation are: inadequate benefits (compared to costs of conservation); inequitable distribution; undelivered promises and unrealised expectations (Gadd 2005; Songorwa 1999); and lack of, or limited participation of communities in decision-making for resource management (Parry and Campbell 1992; Songorwa 1999). Other reasons include problematic, untested and unjustified assumptions; failure to honour communities' priorities (Songorwa 1999); inadequate political commitment (Songorwa 2004b); inadequate socio-economic data for effective design (Wells and Brandon 1992); and obscure critical linkage between development and conservation (Barrett and Arcese 1995; Newmark and Hough 2000; Songorwa et al. 2000; Wells and Brandon 1992)

In addition to conservation costs and benefits, socio-demographic factors are also important predictors of conservation attitudes. Those commonly found in the literature include wealth, ethnicity, gender, education, size of household, occupation and age (Infield 1988; Kalternborn et al. 1999; McClanahan et al. 2005; Røskaft et al. 2004, in press)

## Framing the issue

In developing countries, pressures on natural resources are growing in line with increasing human populations (Hackel 1999; Kideghesho et al. 2005b; Madulu 2004; Songorwa 2004a). Creation of protected areas is increasingly being adopted as the most feasible strategy in mitigating the undesirable effects generated by these pressures. The last two decades have seen a significant growth of protected areas. The World Data Base on Protected Areas indicates that some 20 million $km^2$ or 12.7% of the earth's land surface is occupied by 104,791 protected areas (Chape et al. 2005). This is a dramatic increase compared to 1980 where the PAs network covered only 3% of the earth's surface (Brockington 2004). Most of these protected areas are situated in developing countries, where the focus for further expansion is placed due to their high level of biodiversity (Chape et al. 2005; Naughton-Treves et al. 2005).

The salient feature shared by many African protected areas is historical poor public relations and, therefore, minimal support from local communities. This problem is attributed to marginalisation of local people by conservation policies and legislation. Forceful eviction of the natives from the protected areas and criminalisation of their practices perpetrated on grounds of safeguarding the ecological integrity (Bonner 1993) had fomented hatred and local resentment toward conservation policies (IIED 1994; Machlis 1989; Neumann 1992; Wells and Brandon 1992; Western 1984). In addition to opportunity costs of land and related resources, local communities also bear other disproportionate costs through crop damage, livestock depredation and wildlife-related accidents (See e.g., Archabald and Naughton-Treves 2001; De Boer and Baquete 1993).

The above challenges have prompted a consensus that the ecological reasons alone are insufficient in insuring the survival of protected areas (Baldus et al. 2003; Barrows and Fabricius 2002; Hackel 1999; Western 2001). Indeed, public acceptance is critical to the success of conservation objectives,



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as Stankey and Shindler (2006:29) put it, "conservation policies and practices are inherently social phenomena, as are the intended and unintended changes in human behaviour they induce". This recognition has inspired adoption of different human-inclusive strategies guided by the philosophy that if conservation is to prosper, it should not be pursued against the interests of the communities. The growing urgency for conservation of biodiversity at the face of human population increase and increasing levels of consumption poses two important challenges: (1) the feasibility of creating more protected areas and at the same time changing the attitude of the already antagonistic local people, and (2) evaluating the adequacy of the current conservation strategies and their sustainability in maintaining the desired conservation attitudes and behaviours.

Following adoption of community conservation as a complementary (or an alternative) conservation strategy to fences and fines, protected area authorities and donor agencies often claim success over this strategy. However, such claims are seldom supported by empirical data. In some cases hostility and non-compliance to protected area regulations are apparent, but the factors responsible are inadequately addressed. The tendency has often been to blame local people for being ignorant and arrogant (Kideghesho et al. 2005a) and, consequently, stringent law enforcement measures have often taken precedence in suppressing local opposition to conservation efforts. Effective management of the protected areas requires rigorous assessment of the perceptions and factors behind these perceptions (McClanahan et al. 2005). In this study, we sought to undertake such an assessment with a view to contributing to a scientific basis for management of the Serengeti ecosystem. In particular, we tested the following hypotheses:

1. Local communities experiencing more costs from wildlife conservation are less likely to support protected areas.
2. Local communities who receive more benefits from conservation initiatives will be more positive to protected areas.
3. Conservation attitudes will be more positive to Serengeti National Park than to the adjacent Game Reserves.

We also tested attitude with respect to socio demographic factors viz. gender, education, residence status, household size and wealth.

## Methodology

### Study area

The study was conducted in six villages of three administrative districts of Serengeti, Bunda and Magu around the Western Corridor of Serengeti. The corridor serves as a buffer zone for the worldwide renowned Serengeti National Park, spanning an area of 14,763 km$^2$. The park, gazetted in 1951, is both a Biosphere Reserve and World Heritage Site since 1981 (UNESCO 2003). The park is buffered from human impact by four Game Reserves in the Western part viz. Maswa (2,200 km$^2$), Ikorongo (1,867 km$^2$), Grumeti (1,900 km$^2$) and Kijereshi (65.7 km$^2$) (Figure 1). The last three GRs attained their current status in 1994 after being upgraded from Game Controlled Areas.



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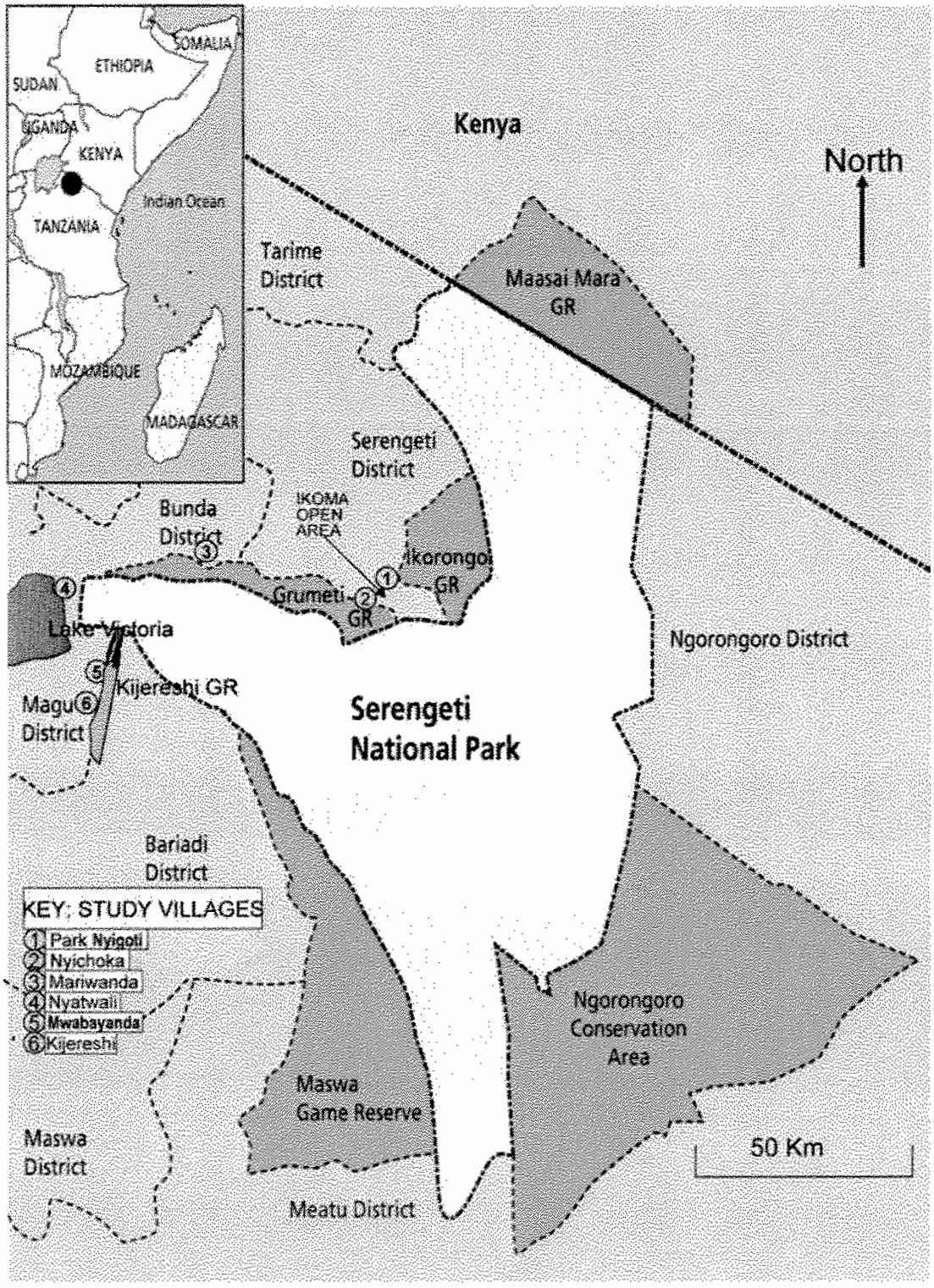


**Fig. 1** Serengeti National Park, study villages and adjacent projected areas

160 The latter three GRs play vital ecological roles. Besides serving as buffer zones
161 for Serengeti National Park, they are also critical migratory corridors for ungulates
162 migrating between the Tanzania's Serengeti National Park and Kenya's Maasai
163 Mara National Reserve. The migration involving some 1.4 million wildebeest



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(*Connochaetes taurinus*), 0.2 million zebra (*Equus burchelli*) and 0.7 million Thompson's gazelle (*Gazella thompsoni*) (Norton-Griffiths 1995), is one of the best known biological phenomena in the world. The area also provides habitats and dispersal areas for resident herbivores such as giraffe (*Giraffa camelopardalis*), Grant's gazelle (*Gazella grantii*), elephants (*Loxodonta africana*) and hippo (*Hippopotamus amphibius*). Serengeti is also a home for over 500 bird species including ostrich (*Struthio camelus*) -the biggest bird in the world (Sinclair 1995).

Western Serengeti is composed of multi-ethnic groups numbering to over 20. The dominant groups are Ikoma, Isenye, Kurya, Sukuma, Zanaki, Jita, Ikizu, Ngoreme, Taturu and Luo. The current population, estimated at two million (URT 2002), pursue cultivation and livestock keeping as its main livelihood strategies. However, illegal hunting is also pursued to supplement the latter strategies, as they barely sustain the household budgets. The average annual income ranges from US $ 150–200 (Johannesen 2003), far less than Tanzania's average per capita income of US $ 280 (WB 2003).

The economic options pursued by local communities in order to cope with poverty situation along with rapid population growth and resultant high levels of consumption—threatened the ecological integrity and survival of Serengeti National Park (Kideghesho et al. 2005a, b). Intervention from the government and its conservation agencies in order to mitigate these threats became inevitable. This intervention involved upgrading of the previously Game Controlled Areas to Game Reserves in 1994. The prohibitive and restrictive nature of the latter category has made this intervention costly to local people by curtailing access to their livelihood strategies. As a result, the Western Serengeti has become a centre of conflicts between the local people and conservation authorities. The conflicts have become more apparent since 2000 following effective enforcement of law which culminated in forceful eviction of the local people. In Tanzania's wildlife protected areas system, the National Parks is the highest management category and, therefore, the most prohibitive and restrictive in terms of access to resources by local communities. The legal uses in this category are limited to non-consumptive use form only (e.g., game viewing, research and photographic tourism). In addition to uses permitted in the national parks, the Tanzania Wildlife Conservation Act No. 12 permits licensed hunting in the Game Reserves but prohibits illegal entry, cultivation and livestock grazing. These uses are permitted in the Game Controlled Areas, thus making them the least and the weakest management category (URT 1974).

## Data collection

The questionnaire survey involved respondents from a randomly selected sample of 282 households drawn from the village registers. For the purpose of this study, household was defined as a group of one or more persons living together under the same roof or several roofs within the same dwelling and eating from the same pot or making common provision for food and other living arrangements. The villages covered were Park Nyigoti ($n = 45$) and Nyichoka ($n = 44$) in Serengeti District, Mariwanda ($n = 45$) and Nyatwali ($n = 48$) in Bunda District and Kijereshi ($n = 50$) and Mwabayanda ($n = 50$) in Magu District. The household heads were targeted as the respondents. In case of absence their wives or another permanently resident-adults (> 18 years) in the households took part in the interview. Over 80% of the households were male-headed. This resulted in gender imbalance composed of 65%



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males and 35% females. The date for interview was communicated to each selected household in 1–2 days before. Cultural reasons hindered the desire of achieving gender-balance by interviewing women in presence of husbands. A few people (< 5%) who declined to participate in the interview on grounds of problems such as sickness were replaced by their neighbours. The purpose of the interview was explained as seeking to know how people interact with wildlife and protected areas. All interviews were conducted in Swahili and carried out by the first author who had been conducting research on the villages on wildlife conservation and use aspects for about 2 years. Therefore he had won confidence of the villagers as a result of this prior interaction.



The information solicited included respondents' socio-demographic variables (gender, age, level of education i.e., uneducated, adult, primary or secondary; the household size i.e., number of people living in the household, type of residence i.e., born or migrated from other places); economic activities; the costs and benefits generated by protected areas; and their attitudes towards the protected areas. As a measure of attitudes three questions were posed: (1) "How do you rate your relationship with the protected area close to your village" (good, fair or poor)? (2) "Which idea would you support regarding the status of a game reserve" (degazette, reduce its size, and retain it as it is or expand it)? (3) "Which idea would you support regarding the status of Serengeti National Park" (as in 2)?

The attitude concept, when properly defined, has three components: one dealing with behaviour—or rather the intentions to carry out a specific behaviour (such as supporting or resisting an action); a cognitive or knowledge component; and an affective component dealing with normative beliefs and emotions. In our case, we were seeking information about two elements: how do people feel (affective) about the protected areas; and to what extent will they support management actions regulating the protected areas (behavioural intentions).

The study villages were categorised into two groups: those participating in the community based project (Serengeti Regional Conservation Project—hereafter called SRCP villages: Nyichoka and Mariwanda); and those not participating (Non-SRCP villages: Park Nyigoti, Nyatwali, Mwabayanda and Kijereshi). SRCP is a community based conservation project started in 1988 with the goal of reconciling human development needs with conservation goals. The project, funded by the Tanzania government in collaboration with the Norwegian Agency for International Development (NORAD), aimed at providing tangible benefits to local people through community hunting. The project was operating in 14 pilot villages located in Serengeti and Bunda districts. Like similar conservation projects, SRCP sought to motivate local people to align their behaviours with conservation goals. Further categorisation of the villages was based on the level of conflicts villages experienced with protected areas—those with serious conflicts (hereafter called CONFLICT villages: Mwabayanda, Kijereshi and Mariwanda) and those with minimal conflicts (NON-CONFLICT villages: Park Nyigoti, Nyichoka and Nyatwali). The levels of conflicts were established during the village meetings, focus group discussions and by using the key informants. The conflict villages were the ones which were directly affected by the recent gazettement of the three Game Reserves (Kijereshi, Ikorongo and Grumeti) through eviction and/or prohibition from access to resources.

Five constraints to livestock production were examined to assess their impact in shaping peoples' attitudes toward the protected areas. These were inadequate pasture, livestock depredation, diseases, restriction over access to water, loss of



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livestock during wildebeest migration, and theft. Villagers identified these constraints during the village meetings, which were held with the first author. The respondents to the questionnaire were required to rank them based on how they perceived their effect on livestock husbandry (important and non-important).

Data were analysed by using SPSS (the Statistical Package for the Social Sciences, version 12.0). Because most of the data were non-parametric we based our analyses on non-parametric statistics unless otherwise stated. However, because no multivariate non-parametric test exists, we applied a robust linear regression analysis for this purpose. Independent variables in the stepwise regression analysis were coded as follows: conflict with protected areas (serious = 1; minimal = 2); participation in SRCP (Yes = 1; No = 2); level of education (no = 1; adult education = 2; primary = 3; secondary = 4); gender (male = 1; female = 2); wealth (number of livestock) and age (number of years). Each of the four constraints to livestock keeping viz. lack of water, inadequate pasture, livestock depredation and diseases, were coded as (important = 1; non-important = 2).



## Results

### The effects of conflicts level and participation in SRCP on people's relationship with the protected areas

There was a positive correlation between the two attitudes (1) "relationship to Game Reserves" and (2) "the idea regarding the status of the Game Reserves" ($r_{sp} = 0.642$, $N = 282$, $P < 0.001$). Both these attitudes, on the other hand, were not correlated with the attitude of (3) "How people regarded the status of Serengeti National Park" ($r_{sp} = 0.024$, $N = 282$, $P = 0.694$ and $r_{sp} = 0.014$, $N = 282$, $P = 0.809$, respectively).

The majority of the respondents ($N = 282$) rated the relationship with protected areas as poor while a minority rated it as good or fair. The villagers with minimal conflicts with protected areas differed significantly from those having serious conflicts in their perception about the relationship with the protected areas (Table 1), those with minimal conflicts being more positive. This finding supports the hypothesis that communities which experience more wildlife induced costs are less likely to support conservation. Again, the majority of the respondents supported the idea of degazetting the Game Reserves compared to those who held the opinion that their size should be reduced or retained as they were. Overall the views of the respondents from villages with serious conflicts differed significantly from those coming from villages with minimal conflicts, those with minimal conflicts being more positive to Game Reserves (Table 1). A significant majority of 86% ($n = 282$) supported the idea of retaining Serengeti National Park and there was no significant difference between the villagers with serious and those with minimal conflicts in this respect (Table 1). This finding supports the hypothesis that conservation attitudes were more positive to the Serengeti National Park than to the adjacent Game Reserves.

Respondents' relationship with protected areas differed significantly between the SRCP and non-SRCP villagers, those from SRCP being more positive. Although SRCP villagers were slightly more positive to Game Reserves than non-SRCP villagers, the difference was not significant. Likewise, the difference in attitude



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**Table 1** The impact of conflicts level and participation in Serengeti Regional Conservation Project on attitude about the relationship with protected areas ($N = 282$, differences tested with $\chi^2$ tests)

| Question | Category | Conflict level with protected areas | | | $\chi^2$ | df | $P$ |
|---|---|---|---|---|---|---|---|
| | | Serious | Minimal | Total | | | |
| How do you rate the relationship with protected areas | Good | 0 (0%) | 70 (51.1%) | 70(24.8%) | 170.5 | 2 | <0.001 |
| | Fair | 7 (4.8%) | 41 (29.9%) | 48 (17.0%) | | | |
| | Poor | 138 (95.2%) | 26 (19.0%) | 164 (58.2%) | | | |
| Which idea would you support regarding a Game Reserve close to your village | Degazette | 110 (75.9%) | 22 (16.5%) | 132 (47.5%) | 115.9 | 2 | <0.001 |
| | Reduce its size | 31 (21.4%) | 45 (33.8%) | 76 (27.3%) | | | |
| | Retain it as it is | 4 (2.8%) | 66 (49.6%) | 70 (25.2%) | | | |
| Which idea would you support regarding Serengeti National Park | Degazette | 2 (1.4%) | 0 (0%) | 2 (0.7%) | 3.72 | 3 | NS |
| | Reduce its size | 15 (10.8%) | 19 (14.4%) | 34 (12.5%) | | | |
| | Retain it as it is | 122 (87.8%) | 112 (84.8%) | 234 (86.3%) | | | |
| | | Participation in SRCP | | | | | |
| | | Yes | No | Total | | | |
| How do you rate the relationship with protected areas | Good | 22 (24.7%) | 48 (24.9%) | 70 (24.8%) | 64.6 | 2 | <0.001 |
| | Fair | 23 (25.8%) | 25 (13.0%) | 48 (17.0%) | | | |
| | Poor | 44 (49.4%) | 120 (62.2%) | 164 (58.2%) | | | |
| Which idea would you support regarding a Game Reserve close to your village | Degazette | 33 (37.5%) | 99 (52.1%) | 132 (47.5%) | 5.20 | 2 | NS |
| | Reduce its size | 28 (31.8%) | 48 (25.3%) | 76 (27.3%) | | | |
| | Retain it as it is | 27 (30.7%) | 43 (22.6%) | 70 (25.2%) | | | |
| Which idea would you support regarding Serengeti National Park | Degazette | 0 (0%) | 2 (1.1%) | 2 (0.7%) | 4.51 | 3 | NS |
| | Reduce its size | 15 (18.1%) | 19 (10.1%) | 34 (12.5%) | | | |
| | Retain it as it is | 68 (81.9%) | 167 (88.8%) | 235 (86.7%) | | | |

regarding the status of Serengeti National Park between the SRCP and non-SRCP people was not significant. A majority from both types of villages supported the current status of the park (Table 1).

## Constraints to livestock keeping

Of the six constraints facing livestock keeping, four (i.e., depredation, inadequate pasture, diseases and lack of water) appeared to have an influence on how people perceived protected areas. The other two (theft and loss of livestock during wildebeest migration) had no significant influence (Table 2).

## Effects of socio-demographic conditions

The only socio-demographic variable influencing how people perceived protected areas was wealth, i.e., number of livestock—with wealthier households being more negative to the protected areas. The five other variables (gender, age, education, family size, and nature of residence) had no significant influence (Table 3).

## Multivariate analysis

In a stepwise linear regression analysis, 59% of the variation in people's attitudes on the relationship with protected areas was explained by three significant variables: (1) conflict levels with protected areas; (2) lack of water; and (3) participation in SRCP (Table 4). In addition to these variables, level of education also adds an impact factor in explaining 51% of the variation in people's attitude regarding the status of the Game Reserves (Table 4). Five variables (lack of water; level of education; inadequate pasture; participation in SRCP; and diseases) explained 12% of the variation in people's attitude on the status of Serengeti National Park (Table 4). Although several of these factors independently do not affect the attitudes toward

**Table 2** The impact of different livestock keeping constraints on people's attitudes about relationship with protected areas ($N = 282$, differences tested with $\chi^2$ tests)

| Constraint | Response category | $n$ | Relationship with the protected area (% of respondents) | | | $\chi^2$ | $P$ (NS when not significant) |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | | |
| | Total respondents | 282 | 25 | 17 | 58 | | |
| Depredation | Important | 115 | 42.6 | 27.0 | 30.4 | 61.7 | <0.001 |
| | Unimportant ($n = 167$) | 167 | 12.6 | 10.2 | 77.2 | | |
| Inadequate pasture | Important ($n = 204$) | 204 | 14.2 | 14.2 | 71.6 | 59.7 | <0.001 |
| | Unimportant ($n = 78$) | 78 | 52.6 | 24.4 | 23.4 | | |
| Diseases | Important ($n = 136$) | 136 | 30.1 | 25.0 | 44.9 | 20.8 | <0.001 |
| | Unimportant ($n = 146$) | 146 | 19.9 | 9.6 | 70.5 | | |
| Theft | Important ($n = 10$) | 10 | 20.0 | 0 | 80.0 | 2.71 | NS |
| | Unimportant ($n = 272$) | 272 | 25.5 | 17.6 | 57.4 | | |
| Lack of water | Important ($n = 224$) | 224 | 13.8 | 17.9 | 68.3 | 72.7 | <0.001 |
| | Unimportant ($n = 58$) | 58 | 67.2 | 13.8 | 19.0 | | |
| Livestock loss during migration | Important ($n = 4$) | 4 | 50.0 | 50.0 | 0 | 6.00 | NS |
| | Unimportant ($n = 278$) | 278 | 24.5 | 16.5 | 59.0 | | |



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**Table 3** The impact of socio-demographic variables on people's attitudes about their relationship with protected areas

| Constraint | Response category | *n* | Relationship with the protected area (% of respondents) | | | $\chi^2$ | *P* (NS when not significant) |
|---|---|---|---|---|---|---|---|
| | | | Good | Fair | Poor | | |
| | Total respondents | 282 | 25 | 17 | 58 | | |
| Gender of a person | Male | 115 | 26.9 | 19.2 | 53.8 | 4.02 | NS |
| | Female | 167 | 21.0 | 13.0 | 66.0 | | |
| Level of education | No formal education | 65 | 10.8 | 24.6 | 64.6 | 12.3 | NS |
| | Adult education | 9 | 33.3 | 22.2 | 44.4 | | |
| | Primary education | 88 | 27.7 | 14.9 | 57.4 | | |
| | Secondary education | 20 | 40.0 | 10 | 50 | | |
| Residence status (Were you born in this village?) | Yes | 108 | 25.9 | 11.1 | 63.0 | 4.37 | NS |
| | No | 174 | 24.1 | 20.7 | 55.2 | | |
| | | | Relationship with the protected area [Means ± Standard Error (SE) of respondents] | | | *F* | |
| Age of a person | Number of Years | | 41.0 ± 1.4 | 45.5 ± 1.8 | 45.0 ± 1.0 | 2.93 | NS |
| Household size | Number of people | | 7.0 ± 0.2 | 8.0 ± 0.3 | 7.0 ± 0.2 | 1.73 | NS |
| Wealth (No. of livestock) | Number of cattle owned | | 9.0 ± 1.3 | 15.0 ± 1.7 | 20.0 ± 1.6 | 10.1 | <0.001 |
| | Number of goats owned | | 7.0 ± 0.9 | 9.0 ± 1.1 | 11.0 ± 0.7 | 8.06 | <0.001 |
| | Number of sheep owned | | 3.0 ± 0.5 | 4.0 ± 0.8 | 4.0 ± 0.3 | 1.01 | NS |

**Table 4** The effects of different socio-demographic variables and land use factors on attitudes (1, 2, 3) toward the protected areas (linear regression analyses)

| Independent variables | (1) How do you rate your relationship with the protected area? | | (2) Which idea do you support regarding the status of the game reserves? | | (3) Which idea do you support regarding the status of the Serengeti National Park? | |
|---|---|---|---|---|---|---|
| | *t*-Value | P | *t*-Value | P | *t*-Value | *P* |
| Conflict level with protected areas | 9.0 | <0.001 | 6.7 | <0.001 | 0.2 | NS |
| Lack of water | 4.6 | <0.001 | 4.2 | <0.001 | 4.2 | <0.001 |
| Participation in SRCP | 2.6 | <0.011 | 3.9 | <0.001 | 2.3 | <0.020 |
| Gender of a person | 1.2 | NS | 0.7 | NS | 0.1 | NS |
| Level of education | 1.1 | NS | 3.4 | <0.001 | 4.1 | <0.001 |
| Livestock depredation | 0.4 | NS | 0.1 | NS | 0.1 | NS |
| Age of a person | 0.4 | NS | 1.0 | NS | 0.1 | NS |
| Inadequate pasture | 0.3 | NS | 0.1 | NS | 2.6 | <0.011 |
| Number of cattle owned | 0.2 | NS | 0.6 | NS | 0.2 | NS |
| Number of goats owned | 0.2 | NS | 1.3 | NS | 1.8 | NS |
| Diseases | 0.2 | NS | 0.9 | NS | 2.1 | <0.001 |
| $r^2$ | 0.591 | <0.001 | 0.511 | <0.001 | 0.124 | <0.001 |

protection, they collectively interact in such a way that they form a significant relationship and explain a certain portion of the variance in attitudes. While this is a modest predictor conceptually it does show how several factors interact in the shaping of attitudes toward conservation.

## Discussion

### Conservation attitudes towards protected areas

Generally the attitudes towards the protected areas were negative, with only 25% of respondents ($n$ = 282) rating the relationship with protected areas as good. However, results support the hypothesis (3) that local communities were more supportive to Serengeti National Park than to the Game Reserves. The idea of retaining the Game Reserves against degazettement was supported by 25% of respondents compared to 86% who supported the continuation of Serengeti National Park.

The observed disparity of support between the park and Game Reserves may be explained by the age of these protected areas. Creation of Serengeti National Park—gazetted by British rule as a partial Game Reserve in 1921, then a full Game Reserve in 1929 and elevated to a National Park in 1951—involved relocation of the communities, just as what transpired in Ikorongo, Grumeti and Kijereshi Game Reserves in the early 2000. However, resistance was minimal, and people were able to tolerate the creation of the park because the land and other resources were abundant to cater for low human and livestock population. Furthermore, the majority of the villagers were either too young or were not even born when the park came into existence. Therefore, they did not feel the pain of eviction, if there was any.



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The strong opposition to the park occurred in the eastern part where relocation of Maasai pastoralists left them without alternative grazing land (Bonner 1993). On the other hand, the establishment of the three Game Reserves (viz. Ikorongo, Grumeti and Kijereshi) in 1994 implied taking from communities the only land which was important in sustaining their livelihoods. The opportunity costs experienced might have diminished people's tolerance over wildlife conservation. Furthermore, establishment of these areas followed the colonial format of non-participatory decision-making, despite two decades of advocacy for conservation with people. The disparity could also be a function of geographical location of the villages. Of the studied villages, only one (Nyatwali) borders Serengeti National Park. However, the village does not experience much conflict with the park. Probably this is because dependence on park resources is minimal as the majority of the villagers earn their living through fishing in Lake Victoria.



## Constraints to livestock keeping

Most of the constraints facing livestock were linked to wildlife and protected areas and, therefore, were regarded as conservation-induced costs. Those who experienced higher costs were more likely to oppose protected areas than those who were minimally affected, supporting the hypothesis that communities which experience more wildlife induced costs are less likely to support conservation. The majority rated the relationship with the Game Reserves as poor and opted for their degazettement. However, all villages, irrespective of the costs, were supportive of Serengeti National Park, suggesting that the park was not perceived as a threat to local livelihoods compared to the recently established Game Reserves. This finding supports the hypothesis that conservation attitudes were more positive to Serengeti National Park than to the adjacent Game Reserves. The low explanation value of only 12% of the variation in people's attitude toward the Serengeti National Park is probably due to the fact that most of the respondents were positive to the park. Studies conducted elsewhere also indicate prevalence of negative conservation attitudes among the people suffering from the costs of conservation [e.g., USA (Naughton-Treves et al. 2003), Norway (Kalternborn et al. 1999; Røskaft et al. in press), Kenya (Gadd 2005), Tanzania (Gillingham and Lee 1999; Newmark et al. 1993) and Mozambique (De Boer and Baquete 1993)].

Conflicts and negative attitudes towards the protected areas in Western Serengeti were correlated with restrictions over access to pasture and water for livestock, again supporting the hypothesis that communities, which experience more wildlife induced costs, are less likely to support conservation. However, the effect of pasture disappeared in the multivariate analyses. These imposed constraints were also associated with many other costs, which were not quantified in this study. For example, local communities cited the two constraints as the major predisposing factors for livestock diseases. Overcrowding and competition for limited pasture and water, infrequent dipping services (due to water scarcity), and exhaustion due to long distance of up to 200 km (covered during the seasonal migration in search of water and pasture) increase vulnerability to transmissible diseases. Villagers around Kijereshi Game Reserve perceive these problems as the fundamental causes for a decline of livestock numbers, low production, low income and general deterioration of the socio-economic life. They reported that during the drought, the market price for cattle dropped for more than 50% from between US$75 and 100 before 2000 to less



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than US$50 in 2004. "We sell them (cattle) at a throw away price", lamented a villager.

## Wildlife-related benefits

As results indicate, the SRCP—through which hunting for communities is conducted—has had a positive impact on local attitudes towards the protected areas. This finding supports the hypothesis that communities, which receive more wildlife-related benefits, are more likely to support conservation efforts. This observation corroborates other previous studies conducted in Africa [e.g., Tanzania (Gillingham and Lee 1999; Holmes 2003), Kenya (Gadd 2005) and Uganda (Archabald and Naughton-Treves 2001)]. In addition to access to game meat, the positive attitude toward the protected areas among the SRCP villagers may be enhanced by regular contacts with the project staff and expectations raised. This observation concurs with Holmes' (2003) findings that increased personal contact carried out in good faith was a critical factor to the development of understanding and trust between wildlife staff and local residents around Katavi National Park, Tanzania.

## Socio-demographic variables

Of the socio-demographic factors examined (age, gender, education, wealth, household size and residency status), only wealth and education (in terms of livestock number) were important predictors of the relationship between local communities and protected areas. Those with more livestock were more negative to protected areas than those with less. This should not be surprising because people with more cattle are more likely to interact with the protected areas in a negative way through restrictive, prohibitive and punitive laws. They are likely to be arrested and fined if found grazing or watering their livestock illegally in the protected areas. More livestock also implies an increase of workload since the owners are compelled to migrate seasonally in search of water and pasture. Kaltenborn et al. (1999) also noted that in Norway negative attitudes toward the large carnivores were correlated with ownership of livestock. They predicted that a decrease in proportion of livestock producers in Norway would expose fewer people to negative attitudes toward large carnivores and, consequently, result in reduction in negative attitudes as time passes.

Results also indicate that, people with higher level of education supported the current status of protected areas. This is in accordance with other studies. While this may be attributed to high level of understanding of the importance of wildlife conservation among the highly educated people (Kalternborn et al. 1999; McClanahan et al. 2005; Røskaft et al. 2004; Røskaft et al. in press), the role of education as a key to better opportunities for employment and, therefore, a route for alternative livelihood strategies may also explain this result. As in other parts of Africa, people with higher education in Tanzania have more access to formal employment in government and private sectors such as education, tourism, health and wildlife. This may diminish their direct dependency on resources from the protected areas. Those with higher education may be minimally affected by conservation interventions. This supposition corroborates the findings by Kalternborn et al. (1999) and McClanahan et al. (2005) linking occupational differences to stakeholders' conservation attitudes. However, education may also increase



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opposition to conservation initiatives. For example, Songorwa (1999) found that people with more formal education in Selous Game Reserve were more likely to oppose the community conservation program. This suggests that level of education may not necessarily benefit conservation strategies. Meaningful support may be a function of many factors including sincerity and sufficiency in addressing people's expectations.

Contrary to other studies (e.g., Kaltenborn et al 1999; Kaltenborn and Bjerke 2002), gender had no effect on attitudes on the relationship with protected areas. This scenario can be attributed to the fact that the costs of recent creation of the protected areas have affected both women and men. Seasonal migration with livestock reduces the manpower for agricultural activities. Women, who often remain at home, have to shoulder responsibilities, which were previously carried out by men. Furthermore, both men and women are victims of arrests, harassment and fines from wildlife rangers. The risk become obvious to men if found grazing or watering livestock inside the Game Reserves while women may be arrested upon entering the protected areas to collect firewood. Some women around Kijereshi Game Reserve admitted entering into the Game Reserve during the dark hours to avoid arrest by rangers, but risking attack by dangerous animals.



## Implications for conservation

The fact that conservation attitudes were more positive towards Serengeti National Park than the recently established Game Reserves, and the proposition that the age of the protected areas could account for this disparity suggest that local people can support conservation efforts as long as their interests are not threatened. This further suggests that while in the past forced relocation may have guaranteed success in conservation, the recent ecological, social and political changes render the strategy less feasible. Unlike during the colonial times, awareness of democracy and human rights has increased and people can question and disagree with the decisions likely to affect their livelihoods. Use of force to achieve conservation objectives may increase unpopularity of conservation to local people and erode the government credibility. Human and livestock populations have also increased, resulting in scarcity of land and associated resources. An attempt to put more areas under protection translates into more social and economic costs and, consequently, conflicts and minimal social acceptability toward the protected areas. This underscores the need for genuine participation of the key stakeholders in pursuing the conservation strategies likely to affect people's livelihoods. In this process the needs and interests of local people should receive adequate priority. Through participation, alternative livelihood strategies should be developed to overcome the sanctions that conservation strategies will impose on local people in terms of access to resources. For instance, the problem of water for livestock can be solved by construction and maintaining the bore holes in the village lands.

As the present study indicates, a benefits-based approach is an important motivational factor in securing local support to conservation. However, several authors have pointed out some potential flaws that may limit the effectiveness of the approach in securing the long-term goals of conservation (Barrett and Arcese 1995; Hackel 1999; Songorwa 1999; Wells and Brandon 1992). If success in conservation work is to be realised some challenges are worth addressing. First, replication of the



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benefits to other villages is imperative, as it is illogical to expect success by changing the attitude of just a fraction of communities. Second, the benefits should be sufficient enough to offset the direct costs resulting from conservation and indirect costs of forgoing the ecologically destructive activities that local people perceive to be economically profitable. Third, the benefits should also be equitably distributed and their future access should be well guaranteed. However, economic, ecological and political factors may undermine the achievement of these ambitions. The most pragmatic solution to long-term success depends on improvement of local people's living standards by alleviating poverty. Provision of benefits to local people will hardly deter them from illegal activities if they cannot meet their resource demands for survival. While protected areas can only minimally contribute to this goal, other sources should be secured locally and globally.

Education also needs an emphasis, both as a way of creating awareness and changing attitudes and directing people to alternative income-generating activities that will relieve the pressure on conservation area resources. The focus should be on young people. The fact that people with high numbers of livestock were more negative to conservation suggests that attempts to solve human-wildlife conflicts should target this group of people. It may be well worth to create incentives that will motivate and assist them to convert their livestock into alternative forms of capital, which has less impact on the environment.

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| 1997 Gunvor Øie | Dr. scient Bothany | Eevalution of rotifer *Brachionus plicatilis* quality in early first feeding of turbot *Scophtalmus maximus* L. larvae. |
| 1997 Håkon Holien | Dr. scient Botany | Studies of lichens in spurce forest of Central Norway. Diversity, old growth species and the relationship to site and stand parameters. |
| 1997 Ole Reitan | Dr. scient. Zoology | Responses of birds to habitat disturbance due to damming. |
| 1997 Jon Arne Grøttum | Dr. scient. Zoology | Physiological effects of reduced water quality on fish in aquaculture. |

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| 1997 Per Gustav Thingstad | Dr. scient. Zoology | Birds as indicators for studying natural and human-induced variations in the environment, with special emphasis on the suitability of the Pied Flycatcher. |
| 1997 Torgeir Nygård | Dr. scient. Zoology | Temporal and spatial trends of pollutants in birds in Norway: Birds of prey and Willow Grouse used as Biomonitors. |
| 1997 Signe Nybø | Dr. scient. Zoology | Impacts of long-range transported air pollution on birds with particular reference to the dipper *Cinclus cinclus* in southern Norway. |
| 1997 Atle Wibe | Dr. scient. Zoology | Identification of conifer volatiles detected by receptor neurons in the pine weevil (*Hylobius abietis*), analysed by gas chromatography linked to electrophysiology and to mass spectrometry. |
| 1997 Rolv Lundheim | Dr. scient. Zoology | Adaptive and incidental biological ice nucleators. |
| 1997 Arild Magne Landa | Dr. scient. Zoology | Wolverines in Scandinavia: ecology, sheep depredation and conservation. |
| 1997 Kåre Magne Nielsen | Dr. scient Botany | An evolution of possible horizontal gene transfer from plants to sail bacteria by studies of natural transformation in *Acinetobacter calcoacetius*. |
| 1997 Jarle Tufto | Dr. scient. Zoology | Gene flow and genetic drift in geographically structured populations: Ecological, population genetic, and statistical models |
| 1997 Trygve Hesthagen | Dr. philos. Zoology | Population responces of Arctic charr (*Salvelinus alpinus* (L.)) and brown trout (*Salmo trutta* L.) to acidification in Norwegian inland waters |
| 1997 Trygve Sigholt | Dr. philos. Zoology | Control of Parr-smolt transformation and seawater tolerance in farmed Atlantic Salmon (*Salmo salar*) Effects of photoperiod, temperature, gradual seawater acclimation, NaCl and betaine in the diet |
| 1997 Jan Østnes | Dr. scient. Zoology | Cold sensation in adult and neonate birds |
| 1998 Seethaledsumy Visvalingam | Dr. scient Botany | Influence of environmental factors on myrosinases and myrosinase-binding proteins. |
| 1998 Thor Harald Ringsby | Dr. scient. Zoology | Variation in space and time: The biology of a House sparrow metapopulation |
| 1998 Erling Johan Solberg | Dr. scient. Zoology | Variation in population dynamics and life history in a Norwegian moose (*Alces alces*) population: consequences of harvesting in a variable environment |
| 1998 Sigurd Mjøen Saastad | Dr. scient Botany | Species delimitation and phylogenetic relationships between the Sphagnum recurvum complex (Bryophyta): genetic variation and phenotypic plasticity. |
| 1998 Bjarte Mortensen | Dr. scient Botany | Metabolism of volatile organic chemicals (VOCs) in a head liver S9 vial equilibration system in vitro. |
| 1998 Gunnar Austrheim | Dr. scient Botany | Plant biodiversity and land use in subalpine grasslands. – A conservtaion biological approach. |
| 1998 Bente Gunnveig Berg | Dr. scient. Zoology | Encoding of pheromone information in two related moth species |
| 1999 Kristian Overskaug | Dr. scient. Zoology | Behavioural and morphological characteristics in Northern Tawny Owls *Strix aluco*: An intra- and interspecific comparative approach |
| 1999 Hans Kristen Stenøien | Dr. scient Bothany | Genetic studies of evolutionary processes in various populations of nonvascular plants (mosses, liverworts and hornworts) |

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| 1999 Trond Arnesen | Dr. scient Botany | Vegetation dynamics following trampling and burning in the outlying haylands at Sølendet, Central Norway. |
| 1999 Ingvar Stenberg | Dr. scient. Zoology | Habitat selection, reproduction and survival in the White-backed Woodpecker *Dendrocopos leucotos* |
| 1999 Stein Olle Johansen | Dr. scient Botany | A study of driftwood dispersal to the Nordic Seas by dendrochronology and wood anatomical analysis. |
| 1999 Trina Falck Galloway | Dr. scient. Zoology | Muscle development and growth in early life stages of the Atlantic cod (*Gadus morhua* L.) and Halibut (*Hippoglossus hippoglossus* L.) |
| 1999 Torbjørn Forseth | Dr. scient. Zoology | Bioenergetics in ecological and life history studies of fishes. |
| 1999 Marianne Giæver | Dr. scient. Zoology | Population genetic studies in three gadoid species: blue whiting (*Micromisistius poutassou*), haddock (*Melanogrammus aeglefinus*) and cod (*Gradus morhua*) in the North-East Atlantic |
| 1999 Hans Martin Hanslin | Dr. scient Botany | The impact of environmental conditions of density dependent performance in the boreal forest bryophytes *Dicranum majus*, *Hylocomium splendens*, *Plagiochila asplenigides*, *Ptilium crista-castrensis* and *Rhytidiadelphus lokeus*. |
| 1999 Ingrid Bysveen Mjølnerød | Dr. scient. Zoology | Aspects of population genetics, behaviour and performance of wild and farmed Atlantic salmon (*Salmo salar*) revealed by molecular genetic techniques |
| 1999 Else Berit Skagen | Dr. scient Botany | The early regeneration process in protoplasts from *Brassica napus* hypocotyls cultivated under various g-forces |
| 1999 Stein-Are Sæther | Dr. philos. Zoology | Mate choice, competition for mates, and conflicts of interest in the Lekking Great Snipe |
| 1999 Katrine Wangen Rustad | Dr. scient. Zoology | Modulation of glutamatergic neurotransmission related to cognitive dysfunctions and Alzheimer's disease |
| 1999 Per Terje Smiseth | Dr. scient. Zoology | Social evolution in monogamous families: mate choice and conflicts over parental care in the Bluethroat (*Luscinia s. svecica*) |
| 1999 Gunnbjørn Bremset | Dr. scient. Zoology | Young Atlantic salmon (*Salmo salar* L.) and Brown trout (*Salmo trutta* L.) inhabiting the deep pool habitat, with special reference to their habitat use, habitat preferences and competitive interactions |
| 1999 Frode Ødegaard | Dr. scient. Zoology | Host spesificity as parameter in estimates of arhrophod species richness |
| 1999 Sonja Andersen | Dr. scient Bothany | Expressional and functional analyses of human, secretory phospholipase A2 |
| 2000 Ingrid Salvesen, I | Dr. scient Botany | Microbial ecology in early stages of marine fish: Development and evaluation of methods for microbial management in intensive larviculture |
| 2000 Ingar Jostein Øien | Dr. scient. Zoology | The Cuckoo (*Cuculus canorus*) and its host: adaptions and counteradaptions in a coevolutionary arms race |
| 2000 Pavlos Makridis | Dr. scient Botany | Methods for the microbial econtrol of live food used for the rearing of marine fish larvae |
| 2000 Sigbjørn Stokke | Dr. scient. Zoology | Sexual segregation in the African elephant (*Loxodonta africana*) |
| 2000 Odd A. Gulseth | Dr. philos. Zoology | Seawater tolerance, migratory behaviour and growth of Charr, (*Salvelinus alpinus*), with emphasis on the high Arctic Dieset charr on Spitsbergen, Svalbard |

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| 2000 | Pål A. Olsvik | Dr. scient. Zoology | Biochemical impacts of Cd, Cu and Zn on brown trout (*Salmo trutta*) in two mining-contaminated rivers in Central Norway |
| 2000 | Sigurd Einum | Dr. scient. Zoology | Maternal effects in fish: Implications for the evolution of breeding time and egg size |
| 2001 | Jan Ove Evjemo | Dr. scient. Zoology | Production and nutritional adaptation of the brine shrimp *Artemia* sp. as live food organism for larvae of marine cold water fish species |
| 2001 | Olga Hilmo | Dr. scient Botany | Lichen response to environmental changes in the managed boreal forset systems |
| 2001 | Ingebrigt Uglem | Dr. scient. Zoology | Male dimorphism and reproductive biology in corkwing wrasse (*Symphodus melops* L.) |
| 2001 | Bård Gunnar Stokke | Dr. scient. Zoology | Coevolutionary adaptations in avian brood parasites and their hosts |
| 2002 | Ronny Aanes | Dr. scient | Spatio-temporal dynamics in Svalbard reindeer (*Rangifer tarandus platyrhynchus*) |
| 2002 | Mariann Sandsund | Dr. scient. Zoology | Exercise- and cold-induced asthma. Respiratory and thermoregulatory responses |
| 2002 | Dag-Inge Øien | Dr. scient Botany | Dynamics of plant communities and populations in boreal vegetation influenced by scything at Sølendet, Central Norway |
| 2002 | Frank Rosell | Dr. scient. Zoology | The function of scent marking in beaver (*Castor fiber*) |
| 2002 | Janne Østvang | Dr. scient Botany | The Role and Regulation of Phospholipase $A_2$ in Monocytes During Atherosclerosis Development |
| 2002 | Terje Thun | Dr. philos Biology | Dendrochronological constructions of Norwegian conifer chronologies providing dating of historical material |
| 2002 | Birgit Hafjeld Borgen | Dr. scient Biology | Functional analysis of plant idioblasts (Myrosin cells) and their role in defense, development and growth |
| 2002 | Bård Øyvind Solberg | Dr. scient Biology | Effects of climatic change on the growth of dominating tree species along major environmental gradients |
| 2002 | Per Winge | Dr. scient Biology | The evolution of small GTP binding proteins in cellular organisms. Studies of RAC GTPases in *Arabidopsis thaliana* and |
| 2002 | Henrik Jensen | Dr. scient Biology | Causes and consequenses of individual variation in fitness-related traits in house sparrows |
| 2003 | Jens Rohloff | Dr. philos Biology | Cultivation of herbs and medicinal plants in Norway – Essential oil production and quality control |
| 2003 | Åsa Maria O. Espmark Wibe | Dr. scient Biology | Behavioural effects of environmental pollution in threespine stickleback *Gasterosteus aculeatur* L. |
| 2003 | Dagmar Hagen | Dr. scient Biology | Assisted recovery of disturbed arctic and alpine vegetation – an integrated approach |
| 2003 | Bjørn Dahle | Dr. scient Biology | Reproductive strategies in Scandinavian brown bears |
| 2003 | Cyril Lebogang Taolo | Dr. scient Biology | Population ecology, seasonal movement and habitat use of the African buffalo (*Syncerus caffer*) in Chobe National Park, Botswana |
| 2003 | Marit Stranden | Dr.scient Biology | Olfactory receptor neurones specified for the same odorants in three related Heliothine species (*Helicoverpa armigera, Helicoverpa assulta* and *Heliothis virescens*) |
| 2003 | Kristian Hassel | Dr.scient Biology | Life history characteristics and genetic variation in an expanding species, *Pogonatum dentatum* |

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| 2003 | David Alexander Rae | Dr.scient Biology | Plant- and invertebrate-community responses to species interaction and microclimatic gradients in alpine and Artic environments |
| 2003 | Åsa A Borg | Dr.scient Biology | Sex roles and reproductive behaviour in gobies and guppies: a female perspective |
| 2003 | Eldar Åsgard Bendiksen | Dr.scient Biology | Environmental effects on lipid nutrition of farmed Atlantic salmon (*Salmo Salar* L.) parr and smolt |
| 2004 | Torkild Bakken | Dr.scient Biology | A revision of Nereidinae (Polychaeta, Nereididae) |
| 2004 | Ingar Pareliussen | Dr.scient Biology | Natural and Experimental Tree Establishment in a Fragmented Forest, Ambohitantely Forest Reserve, Madagascar |
| 2004 | Tore Brembu | Dr.scient Biology | Genetic, molecular and functional studies of RAC GTPases and the WAVE-like regulatory protein complex in *Arabidopsis thaliana* |
| 2004 | Liv S. Nilsen | Dr.scient Biology | Coastal heath vegetation on central Norway; recent past, present state and future possibilities |
| 2004 | Hanne T. Skiri | Dr.scient Biology | Olfactory coding and olfactory learning of plant odours in heliothine moths. An anatomical, physiological and behavioural study of three related species (*Heliothis virescens, Helicoverpa armigera* and *Helicoverpa assulta*). |
| 2004 | Lene Østby | Dr.scient Biology | Cytochrome P4501A (CYP1A) induction and DNA adducts as biomarkers for organic pollution in the natural environment |
| 2004 | Emmanuel J. Gerreta | Dr. philos Biology | The Importance of Water Quality and Quantity in the Tropical Ecosystems, Tanzania |
| 2004 | Linda Dalen | Dr.scient Biology | Dynamics of Mountain Birch Treelines in the Scandes Mountain Chain, and Effects of Climate Warming |
| 2004 | Lisbeth Mehli | Dr.scient Biology | Polygalacturonase-inhibiting protein (PGIP) in cultivated strawberry (*Fragaria* x *ananassa*): characterisation and induction of the gene following fruit infection by *Botrytis cinerea* |
| 2004 | Børge Moe | Dr.scient Biology | Energy-Allocation in Avian Nestlings Facing Short-Term Food Shortage |
| 2005 | Matilde Skogen Chauton | Dr.scient Biology | Metabolic profiling and species discrimination from High-Resolution Magic Angle Spinning NMR analysis of whole-cell samples |
| 2005 | Sten Karlsson | Dr.scient Biology | Dynamics of Genetic Polymorphisms |
| 2005 | Terje Bongard | Dr.scient Biology | Life History strategies, mate choice, and parental investment among Norwegians over a 300-year period |
| 2005 | Tonette Røstelien | PhD Biology | Functional characterisation of olfactory receptor neurone types in heliothine moths |
| 2005 | Erlend Kristiansen | Dr.scient Biology | Studies on antifreeze proteins |
| 2005 | Eugen G. Sørmo | Dr.scient Biology | Organochlorine pollutants in grey seal (*Halichoerus grypus*) pups and their impact on plasma thyrid hormone and vitamin A concentrations. |
| 2005 | Christian Westad | Dr.scient Biology | Motor control of the upper trapezius |

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| 2005 | Lasse Mork Olsen | PhD Biology | Interactions between marine osmo- and phagotrophs in different physicochemical environments |
| 2005 | Åslaug Viken | PhD Biology | Implications of mate choice for the management of small populations |
| 2005 | Ariaya Hymete Sahle Dingle | PhD Biology | Investigation of the biological activities and chemical constituents of selected *Echinops* spp. growing in Ethiopia |
| 2005 | Ander Gravbrøt Finstad | PhD Biology | Salmonid fishes in a changing climate: The winter challenge |
| 2005 | Shimane Washington Makabu | PhD Biology | Interactions between woody plants, elephants and other browsers in the Chobe Riverfront, Botswana |
| 2005 | Kjartan Østbye | Dr.scient Biology | The European whitefish *Coregonus lavaretus* (L.) species complex: historical contingency and adaptive radiation |
| 2006 | Kari Mette Murvoll | PhD Biology | Levels and effects of persistent organic pollutans (POPs) in seabirds<br>Retinoids and α-tocopherol – potential biomakers of POPs in birds? |
| 2006 | Ivar Herfindal | Dr.scient Biology | Life history consequences of environmental variation along ecological gradients in northern ungulates |
| 2006 | Nils Egil Tokle | Phd Biology | Are the ubiquitous marine copepods limited by food or predation? Experimental and field-based studies with main focus on *Calanus finmarchicus* |
| 2006 | Jan Ove Gjershaug | Dr.scient Biology | Taxonomy and conservation status of some booted eagles in south-east Asia |
| 2006 | Jon Kristian Skei | Dr.scient Biology | Conservation biology and acidification problems in the breeding habitat of amphibians in Norway |
| 2006 | Johanna Järnegren | PhD Biology | ACESTA OOPHAGA AND ACESTA EXCAVATA – A STUDY OF HIDDEN BIODIVERSITY |
| 2006 | Bjørn Henrik Hansen | PhD Biology | Metal-mediated oxidative stress responses in brown trout (*Salmo trutta*) from mining contaminated rivers in Central Norway |
| 2006 | Vidar Grøtan | phD Biology | Temporal and spatial effects of climate fluctuations on population dynamics of vertebrates |