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WILDLIFE-HUMAN CONFLICT IN KENYA:

Integrating Wildlife Conservation with Human Needs in the Masai Mara Region

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ABSTRACT

Masai Mara, a large nature reserve in south-western Kenya, was created in the midst of semi-arid agropastoralist rangelands to protect wildlife. Wildlife and indigenous people co-existed for many years, usually with limited conflict; but in recent years, the conflict has intensified, mainly due to increasing human population, changing land use patterns, and altered perceptions of wildlife. This study examines the causes and nature of wildlife-human conflict in the Maasai rangelands of Kenya, and considers how wildlife conservation and human development needs can best be integrated.

Findings indicate that common conflicts are livestock depredation and crop damage, human deaths or injuries, transmission of diseases, and competition for resources. Land surrounding the reserve can be divided into two distinct topographic and agroclimatic regions. The degree of conflict is spatially varied within the region. Upland ranches have high land use potential, high human and livestock population densities, and more development of agriculture. They experience limited conflict with wildlife. Lowland ranches are more arid, have lower human population density and little agriculture, but have high wildlife and livestock population densities and experience a high degree of conflict. These conflicts vary seasonally, and with distance from the protected area.

Perceptions of wildlife and attitudes towards conservation are related to past experience with wildlife. The degree of loss, effectiveness of damage control, fairness of government compensation, and involvement in wildlife tourism affect the degree of tolerance for wildlife conflict. Various socio-economic factors including level of education, knowledge of conservation priorities, and system of land ownership are related to attitudes towards wildlife. As human activity increases in the region, wildlife is more likely to be displaced. Because most animals are migratory, conflict in the land surrounding the reserve puts the viability of animal population in the protected area in question.

A two-phase program for integrating wildlife conservation with human needs is proposed. The first phase involves designation of the region into four zones: Zone A - the protected area, Zone B - the peripheral area, Zone C - multiple use, and Zone D - agriculture. The second phase of the program is the integration of the wildlife conservation with human interests through: community wildlife-damage-control, compensation for loss, sharing of tourism benefits with local people, conservation education, and local participation in wildlife conservation policy. The program provides a framework within which operational decisions can be made, and serves broader natural resource management and community development objectives in the rangelands.

RÉSUMÉ

La grande réserve naturelle de Masai Mara, au sud-ouest du Kenya, a été créée au milieu de prairies semi-arides occupées par des agropastoralistes afin de protéger la faune. La faune et les peuples autochtones ont coexisté pendant de nombreuses années sur ces territoires, habituellement sans grand conflit; mais, ces dernières années, les conflits ont gagné en intensité surtout en raison de l'augmentation de la population humaine, de la modification des schémas d'occupation du sol et de la modification des perceptions relatives à la faune. La présente étude examine les causes et la nature des conflits entre la faune et les humains dans les prairies de Maasai, au Kenya, et se penche sur des moyens d'intégrer la conservation de la faune et la satisfaction des besoins en développement des humains.

Les résultats indiquent que les conflits courants consistent en la destruction de bestiaux par des prédateurs et des dommages causés aux récoltes par des animaux, en des pertes de vie humaine ou des lésions subies par des humains, en la transmission de maladies et en la concurrence pour les ressources. Le territoire entourant la réserve peut être réparti en deux régions topographiques et agroclimatiques distinctes. Le degré de conflit varie dans l'espace, à l'intérieur de la région. Les ranchs des hautes terres présentent un fort potentiel d'utilisation du sol, des populations humaines et animales (bétail) de forte densité et un développement plus important de l'agriculture. Il y a peu de conflits avec la faune. Les ranchs des basses terres sont plus arides; la densité de la population humaine y est inférieure et l'agriculture moins développée, mais les densités des populations d'espèces fauniques et de bestiaux y sont plus élevées et les conflits y sont donc plus fréquents. Ces conflits varient selon les saisons et la distance de la zone protégée.

Les perceptions que les gens se font de la faune et les attitudes envers la conservation sont liées aux expériences antérieures avec la faune. Le niveau des pertes, l'efficacité des contrôles visant à réduire les dommages, l'équité de l'indemnisation gouvernementale et la participation à l'exploitation du tourisme faunique affectent le degré de tolérance envers les conflits avec la faune. Divers facteurs socio-économiques dont le niveau d'éducation, la connaissance des priorités en matière de conservation et le système de propriété foncière sont liés aux attitudes envers la faune. L'accroissement de l'activité humaine dans la région rend plus probable un déplacement de la faune. Comme la plupart des espèces animales sont migratoires, les conflits survenant dans les terres entourant la réserve remettent en question la viabilité des populations animales dans la zone protégée.

Un programme à deux stades d'intégration de la conservation de la faune et des besoins humains est donc proposé. Le premier stade consiste dans le découpage de la région en quatre zones : zone A - zone protégée; zone B - zone périphérique; zone C - zone à usages multiples; zone D - zone agricole. Le second stade du programme consiste dans l'intégration de la conservation de la faune et des intérêts humains grâce à divers mécanismes : mesures communautaires de contrôle des dommages causés par la faune, indemnisation des pertes, partage des bénéfices du tourisme avec les populations locales, éducation en matière de conservation et participation locale à la politique de conservation de la faune. Le programme fournit un cadre pour la prise des décisions opérationnelles et favorise la réalisation des objectifs plus généraux de gestion des ressources naturelles et de développement communautaire dans les prairies.

STATEMENT OF ORIGINALITY AND CONTRIBUTION TO KNOWLEDGE

This study makes a number of contributions to knowledge in the field of natural resource conservation and management, and wildlife-land-human conflict studies. First, it generates information on the nature and causes of wildlife-human conflict in the Masai Mara region. Common types of conflict are identified. Intensity, frequency and the geographical configuration (spatial variations) of the conflict in the region are described and assessed. Impacts of conflict both on wildlife and on humans are identified. Local residents' opinions and perceptions of the conflict and of proposed solutions are reported.

Previous studies on wildlife-land-human interactions have noted the existence of conflict but often in an abstract manner. This study provides an empirical basis for defining further research and contains useful information for planners, wildlife managers and conservationists.

The study develops strategies for integrating protection of wildlife with the development needs of the local communities, bringing together various disciplines in the human-environment research tradition. Most research in conservation has been done by field biologists, who tend to work within wilderness areas. This study demonstrates how geographers can contribute directly to problem-solving issues by looking at the spatial and socio-economic context of wildlife issues. Time has shown that conservation issues are as much political and historical as they are biological. Management of wildlife must include human as well as ecological dimensions and integrate human activity as part of a system. Social systems must be compatible with wildlife and environmental protection if conservation goals are to be met. This study provides data to assess how that might be done.

The proposed management program, if implemented, will have a number of benefits. It would: (1) lead to reduction of conflict, (2) generate direct development benefits to the local communities, and (3) ensure protection of wildlife and the reserve area, as well as protect the local people from wildlife damage. It will sustain tourism in the region and maintain the fragile rangelands environment. The program may also be adaptable to other areas with similar situations and contribute to the conservation of global biodiversity. Lastly, by combining theories in resource management with theories of conflict resolution, the study makes contributions towards conceptual and theoretical perspectives on conflict resolution in natural resource conservation and management.

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ABBREVIATIONS USED IN BOTH TEXT AND REFERENCES

AFEW: African Foundation for Endangered Wildlife (International)
ADMADE: Administrative Design for Game Management Areas (Zambia)
AFW: African Wildlife Foundation (International)
ASAL: Arid and Semi-Arid Lands
CAMPFIRE: Communal Areas Management Program for Indigenous Resources (Zimbabwe)
CAWM: College of African Wildlife Management (Tanzania)
CBS: Central Bureau of Statistics
CIDA: Canadian International Development Agency
DANIDA: Department of International Development Cooperation (Denmark)
DC: District Commissioner
EAWS: East Africa Wildlife Society
EEC: European Economic Community
EIA: Environmental Impact Assessment
ESA: Environmentally Sensitive Areas
FAO: Food and Agriculture Organization of the United Nations
FZS: Frankfurt Zoological Society
GIS: Geographic Information System
GTZ: Deutsche Gesellschaft fur Technische Zusammenarbeit, West Germany (Germany Agency for Technical Cooperation)
IBRD: International Bank for Reconstruction and Development (World Bank)
IIED: International Institute for Environment and Development
IUCN: International Union for Conservation of Nature and Natural Resources; currently called: The World Conservation Union (Switzerland)
KARI: Kenya Agricultural Research Institute
KREMU: Kenya Rangelands Ecological Monitoring Unit {currently Department of Resource Surveys and Remote Sensing (DRSRS)}
KWS: Kenya Wildlife Services (Nairobi, Kenya)
MAB: Man-and-the-Biosphere (UNESCO)
MOTW: Ministry of Tourism (Republic of Kenya)
NCC: Narok County Council (Narok District, Kenya)
NGO: Non-governmental Organization
NORAD: Norwegian Agency for International Development
NMK: National Museums of Kenya
NYZS: New York Zoological Society
ODA: Overseas Development Administration (U.K. Government)
REP. OF KENYA: The Republic of Kenya Report (Nairobi, Kenya).
SIDA: Swedish International Development Agency
UNEP: United Nations Environment Programme (Nairobi, Kenya).
UNESCO: United Nations Education, Scientific and Cultural Organization (Paris, France)
USAID: United States Agency for International Development
WCED: World Commission on the Environment and Development
WCMD: Wildlife Conservation and Management Department (Nairobi, Kenya)
WCS: World Conservation Strategy
WCI: Wildlife Conservation International (part of NYZS)
WWF: World Wildlife Fund (changed its name in 1988 to World Wide Fund for Nature. Still World Wildlife Fund in Canada and U.S.A.). International headquarters at 1196 Gland, Switzerland.

CHAPTER ONE

INTRODUCTION

> In the savannas today pastoral herds and wildlife coexist, if less comfortably than formerly, then at least, still as the centerpieces of the ecosystem. Changes, already well advanced, are underway that will soon transform the ancient subsistence pastoralists into commercial ranchers. In the transition, the inevitable economic yardstick of progress will deny any place for wildlife and, unlike in the past, the technology is widely available to ensure its eradication. What prospects exist, then, to bring about an orderly transition and continued place for wildlife?
>
> Western (1981:1), ecologist

1.1 General Introduction

Wildlife[1] and indigenous peoples[2] in different parts of the world have co-existed for many years, usually with limited conflict (Goodland 1992; McNeely and Pitt 1985). In recent years, conflict has increased, particularly in the developing countries, mainly due to increasing human and livestock populations and changing socio-economic and land use patterns. Recent conservation policy changes have emphasised the need to integrate socio-economic development with protection of wildlife (IUCN 1980, 1991; UN 1992; WCED 1987), but with little success (Adams and McShane 1992; Wells and Brandon 1992; West and Brechin 1991). Although the conflict and its implications (especially for wildlife) are now widely recognized (Hannah 1992; McNeely and Miller 1984; Western and Pearl 1989), effective integrative strategies are still rare, especially in African arid and semi-arid lands (Bonner 1993; Kiss 1990; Lusigi 1992).

The purposes of this study are: (1) to examine the causes and nature of the wildlife-human conflict in the Maasai[3] rangelands of Kenya, and (2) to determine how wildlife

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[1] The term wildlife in this study refers only to wild animals, as is common practice in East Africa. Scientific names of wild animals mentioned in the text are provided in Appendix A. Those of plants are included in the text. A glossary of definition of terms and concepts used in the thesis including some Kiswahili and Kimaasai words is provided in Appendix B.

[2] "Indigenous peoples" as used in this thesis, refer to those individuals, families, and communities - "traditional" or "modern", (in this case, the Maasai) - who occupy ancestral land. It is used in this thesis interchangeably with "local people", or "local residents". No political connotation is intended in the use of the terms.

[3] The name Maasai has been used with different spellings. One with double aa the other with one a. In this thesis both spellings are used. When referring to the protected area, I use the one a, as in the official documents. I use double aa when referring to the Maasai people.

conservation and human development needs can be integrated. The Masai Mara Region is an area of about 5,668 sq. km of savannah wildlife ecosystem[4], located in a semi-arid zone in Narok District, south-western Kenya (Map 1.1). About 18 per cent (1,368 sq. km) of the region is a gazetted wildlife protected area known as the Masai Mara National Reserve. The rest of the region, traditional Maasai rangeland, is composed of group ranches on private land belonging to the local people. The study focuses on the group ranches adjacent to the reserve. The ranches form important wildlife dispersal areas[5], not only for the wildlife in the Masai Mara reserve, but also for those in the Serengeti National Park in Tanzania (Dublin 1986; Lamprey 1979; Sinclair and Norton-Griffiths 1979). Group ranches are areas inhabited and owned by a group of local people (the Maasai); through the groups the Maasai hold pastures as collectivities, but herd in small residentially-based work groups (Ayuko 1981; Galaty 1980). Membership is based on kinship and traditional land rights.

The Masai Mara region was chosen as the site for this study for three major reasons: it is an important wildlife ecosystem and a tourist area; it represents one of the most critical areas of wildlife-human conflict in Kenya and perhaps the whole of East Africa; and finally, ample baseline data on land use, human, livestock and wildlife statistics were available for the study. Although much research has been undertaken on wildlife ecology in the region (Dublin 1986; Lamprey 1984) and most other parts of Masailand of East Africa, especially in Amboseli National Park, Kajiado (Berger 1989; Western 1982), and also in Tanzanian

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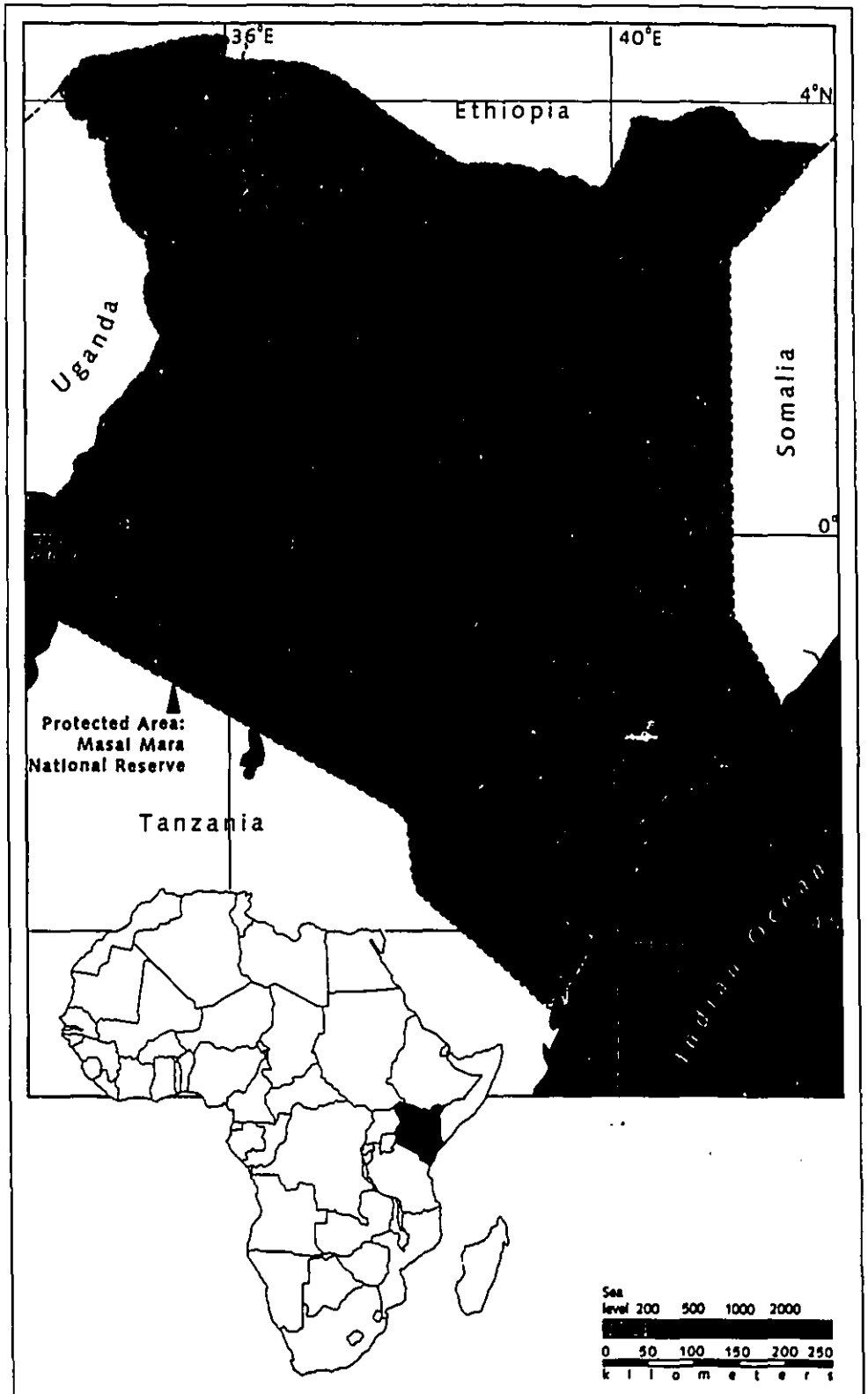
[4]. The term "savannah wildlife ecosystem" is defined here as an area (of savannah vegetation) covering dry and wet season dispersal areas, whose extent is determined mainly by the migratory limits of its major wildlife species. In the case of Masai Mara, the range is determined mainly by wildebeest migration. The region, as adopted in this study, has been defined with both reserve and surrounding group ranches by various researchers (see for example, Lamprey 1984; Douglas-Hamilton et al. 1988). But the regional definition is not official, only the protected area portion is legal.

[5] Dispersal areas are sometimes referred to as "surrounding areas" or "parks adjuncts" or "buffer zones". These terms are used interchangeably in this study. Protected areas are not ecologically self-sufficient ecosystems and wildlife often disperse to surrounding areas for part of the year (Garatt 1984; Ramberg 1993). Maintaining the present size and diversity of those wildlife populations depends on their having continued access to traditional seasonal dispersal areas. In addition, the biogeographical island effect means that in isolation, not even the biggest African national parks are big enough to maintain viable populations of the larger herbivores (Ramberg 1993). Conservation efforts need therefore to be directed to the rural areas which surround the protected areas. Contemporary conservation efforts concentrate mainly on protected areas.

Map 1.1 The Study Area: The Masai Mara National Reserve and The Surrounding Group Ranches



Location of the study area within the Kenyan and African context: 18% of the area is a protected area, the Masai Mara National Reserve; the rest belongs to the local people and forms crucial wildlife dispersal area

Serengeti/Ngorongoro Conservation Area (Homewood and Rodgers 1991; Kruuk 1972; Schaller 1972), little detail exists on the wildlife-human conflict in Masai Mara region.

The Masai Mara region has a unique land use profile. The lowland areas have low agricultural potential lands, while those in the upland zone are of high potential. This thesis explores how differences in the land potential (a result of high rainfall and good soils) have influenced land uses, human, livestock and wildlife population densities, and how these in turn, influence the types, spatial pattern and the degree of wildlife-human conflict in the region. It considers how these conflicts vary seasonally and with distance from the protected area, what opinions and attitudes the local people hold towards conservation and government wildlife programs, and how these attitudes are influenced by their socio-economic backgrounds and experiences. Understanding how the differences in land potentials in the region and the resultant land uses influence wildlife-human conflict will help in deciding on the best zonation for appropriate multiple land use programs that will reduce the conflict. At the same time, understanding the opinions and the attitudes of the local people will help identify how the local communities can be encouraged to support and participate in conservation activities and decision making. These details are crucial in developing a program for integrating wildlife conservation with human development needs in the region.

Only integrating conservation needs with human development needs in the region will ensure long-term sustainable protection of wildlife and the fragile rangeland ecosystem while benefiting the local people. Instead of being an isolated island, the protected area would be an integral part of the land use in the whole region, contributing to the socio-economic development of the area. Only this will ensure the continued viability of the nature reserve and its wildlife, especially the migratory species that spend part of their annual migratory cycle with livestock in the inhabited dispersal zones. At the same time, loss of property such as crops and livestock and the resultant poor attitudes towards wildlife and

the protected area will be reduced and government expenditure on game control and wildlife compensation will be bearable. In addition, rehabilitation of the region's degraded landscape will be feasible.

This thesis is organized into five chapters. Following this general introduction, the rest of Chapter 1 examines the situation in Masai Mara region, outlining the principal issues involved in the wildlife-human conflict in the region. Specific study objectives, assumptions and study organizing hypotheses are outlined. The chapter ends by describing the research methods employed in this study. Chapter 2 reviews the literature on wildlife, protected areas, and related development issues. Examples of areas where attempts are made to integrate conservation with development from different parts of the world in both developed and developing countries, with a concentration on the latter, are outlined. The chapter also describes the theoretical considerations upon which this study is based.

Chapter 3 presents the Kenyan context of the study problem, examining the relationship between wildlife and humans in Kenya from a historical perspective. It also describes the study area to set the background for the empirical case study and detailed examination and analysis of conflict in Masai Mara region. The five group ranches sampled for the study are introduced. The physical characteristics of the area, its wildlife and history of human use, demographic and socio-economic profiles of the inhabitants, existing land uses and land potential are outlined. The history of the Masai Mara National Reserve is described. The chapter also introduces the different interest groups involved in wildlife conservation and management issues in Kenya and the Masai Mara region. A synthesis of the environmental requirements for wildlife, humans and livestock in an ecological context in the region is made. In addition, previous research concerning attempts to integrate wildlife conservation with human needs in the region, including the Serengeti ecosystem in Tanzania, are outlined.

Chapter 4 presents the study results and data analysis of the causes and nature of

wildlife-human conflict in Kenya's Masai Mara Region. The types, intensity, frequency, spatial and temporal patterns, causes, effects and suggested solutions to the conflict are described both quantitatively and qualitatively. The chapter also explains the research methods used in the field data collection and analysis of results. Factors affecting, the (1) degree of conflict, and (2) attitudes of local people towards wildlife conservation and government wildlife programs are analyzed.

The final chapter is a summary of the study findings and presents the proposed program for integrating wildlife conservation and human needs in the region. Implications of the study findings, recommendations and conclusions are outlined and briefly discussed in the context of current international conservation and development thinking. Areas requiring further research are identified, and the implications of the study in Masai Mara region and at a national and international level are briefly indicated.

1.2 The Situation and Principal Issues in Masai Mara

Over the past 30 years, considerable changes have occurred in the Masai Mara region. In the past, like many parts of Kenya's arid and semi-arid areas, the region was less populated; the main land uses were nomadic pastoralism and land belonged to the community (Beaumont 1989; Campbell and Migot-Adhola 1981; Pratt and Gwynne 1977). Today, the land tenure system has changed from communal "free" open ranches to group or individual ranches. Human population is rapidly increasing and permanent human settlements, agriculture, and livestock production are expanding (Douglas-Hamilton et al. 1988; Lamprey 1984). As a result, areas hitherto occupied by wildlife and/or used for semi-nomadic pastoralism activities are being rapidly reduced. In some areas increased fencing of privatized land blocks wildlife corridors between wet and dry-season ranges. Encroachment on the Masai Mara national reserve by people living in the surrounding areas is increasing (Douglas-Hamilton et al. 1988; Myers 1972; Glaesal 1992). Grazing pressure is

also increasing in the surrounding areas as both wildlife and livestock are confined to smaller areas due to expanding agriculture. This circumstance is common in Kenya and many other countries where protected areas[6] are rapidly becoming "islands" as the wildlands around them are converted to alternative, often incompatible uses (Ayieko 1977; Lusigi 1981; Wells and Brandon 1992). Bonner (1993), a journalist/author, notes with reference to the situation in Africa:

> People were once an island in a sea of wildlife. Now wildlife survives in parks that are islands in an ocean of people (Bonner 1993:8).

As the intensity of contact increases, wildlife depredation of crops and livestock, human deaths or injuries, disease transmission to domestic stock and competition for pasture and water also increase (Darkoh 1990; Njoka 1990). The establishment of protected areas has often denied local people access to their traditional resource areas[7]. Wildlife is often seen by the local people as belonging to the government; they see the government alone as being responsible for its care (Berger 1989; Korfage 1985; Scott 1983). Moreover, wildlife agencies emphasise law enforcement, administrative procedure, and education of the local populations but often fail to control wildlife damage. The local people are hardly compensated for the losses of property or human life incurred due to wildlife. It is not, therefore, surprising that local people often support poaching and are indifferent or hostile to wildlife conservation policies (Balakrishnan and Ndhlovu 1992; Berger 1989; Bonner 1993). To many local people, conservation authorities are more interested in the protection

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[6] For purposes of convenience, parks or reserves will be referred to in this thesis as "protected areas". Categories and conservation objectives of the different protected areas as perceived by the IUCN is outlined in chapter two. The difference between a national park and reserve is that in a park, the complete protection of fauna and flora is the paramount purpose and the human utilization of the resource is precluded, while in a reserve, although the preservation of wildlife is the primary purpose, human activities such as the grazing of livestock, or in the case of marine reserve, fishing by traditional methods, are sometimes allowed. Also parks are often administered by central governments while reserves are administered by local authorities. The Masai Mara National Reserve is managed by the Narok County Council with technical advice from the Kenya National Wildlife Service (KWS), a national government parastatal agency responsible for wildlife all over the country. Although Masai Mara is a National Reserve, use by human activities is completely prohibited.

[7] These wildlife sanctuaries normally include sources of dry season water and pasture which were traditionally available to domestic livestock owned by pastoralists (see, for example, Lindsay 1987; Lusigi 1978; Western 1982).

of wildlife than the loss of human lives, bodily injury, and damage to crops and livestock. Local people often claim that the government values wildlife more than it does human well-being. One member of parliament, for example, stated his belief that government priorities were arranged in the following order of decreasing importance: wildlife, tourists and citizens (Daily Nation Newspaper 1984).

The conflict is most acute in areas close to the protected area where wildlife densities are high. This may undermine wildlife-based tourism. Approximately 8 per cent of Kenya's total land area has been set aside as national parks and reserves (Kioko 1992; KWS 1990). Outside the protected areas, wildlife receives partial protection through the enforcement of conservation policy by law including the restriction of subsistence hunting by the local people (GOK 1977; Myers 1972). This protection is required for viable wildlife populations but exacerbates conflict.

Wildlife is the principal attraction of the tourism industry which is a most valuable commodity to the country for the foreign exchange earned and the jobs provided[8]. Tourism also provides markets for other economic sectors (Boo 1990; Milne 1990), and can broaden the base of rural development, especially in the arid and semi-arid areas (Bachmann 1988; Rajottee 1987). However, the local communities who share their limited resources and space with wildlife rarely benefit from the tourism revenue (Ramberg 1993; Western 1981). Most revenue goes to the central government and a small proportion to the local authorities in cases of national reserves. Few local people are employed in wildlife related jobs or protected area management. The majority of park/tourism employees are brought into the areas, sometimes from urban centres, with the justification that they possess the level of education and skills required that are not available among the local people.

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[8]. Tourism is Kenya's leading foreign exchange earner, ahead of traditional export crops of coffee and tea (Dieke 1991; KWS 1990). Currently, about 700,000 tourists visit Kenya per year (CBS 1991). In 1990, it earned the country US $18 million foreign exchange, a growth of 23.4% from about US $15 million in 1989. About 110,000 people, or 8.3% of wage earning population of 1.3 million are employed directly or indirectly in tourism (CBS 1991).

Wildlife conservation also has other benefits, such as the protection of water catchment areas and genetic resources, cultural and natural heritage, and biological and scientific values. But the negative value of wildlife to the local people can be enormous. The value of the property destroyed or damaged by wild animals and costs incurred to limit damage through fencing, night guards and other means substantially reduces its benefits.

The need for a solution to this environmental conflict has become more clearer over the past decades with the publication of widely read documents such as the World Conservation Strategy (IUCN 1980), Our Common Future (WCED 1987), and more recently, Caring for the Earth (IUCN 1991) and Agenda 21 (UN 1992). A number of papers presented during the IV World Congress on National Parks and Protected Areas (IUCN 1992) indicate this trend, with some authors documenting failures of the attempts being made on the ground (Sharma and Shaw 1992; Stevens and Sherpa 1992).

Previous studies on wildlife-land-human interactions have noted the existence of conflict[9] (Berger 1989; Capone 1972; Korfage 1985; Mukhebi 1985). The emphasis has been increasingly on the need to integrate conservation with sustainable development (IUCN 1991). Most studies propose that the public could become partners with conservation authorities in managing wildlife (Berger 1989; Batisse 1982; Clark 1981; Lusigi 1978; Western 1981).

A number of models have been put forward to help integrate wildlife conservation with the development needs of the local people. Some of the better-known examples include the Biosphere Reserve (UNESCO 1974), Conservation Unit approach (Lusigi 1978), buffer zones (Shafer 1990), ecosystem management (Agee and Johnson 1988), wildlife corridor (Newmark 1985), and what Wells and Brandon (1992) call integrated conservation

[9] Conflict in this study denotes both manifest (occurring and causing concern) and perceived competition for space and resources such as land, water and pasture. Two types of conflict are considered: (1) "place-based" - that which is spatially defined; and (2) non-spatial types, such as, attitudes towards wildlife, by extension conflict.

development projects. Recent studies, however, suggest that none of these models have been successfully implemented (West and Brechin 1991; Wells and Brandon 1992). In a recent world-wide evaluation study of the World Bank, the WWF, and USAID projects aimed at integrating the needs of the local people with protected areas, Wells and Brandon (1992) noted that:

> It is apparent that many of the projects had began with only a very limited understanding of the root causes of the threats to the protected areas that they were attempting to conserve (Wells and Brandon 1992:ix).

Conflict still exists and has, in fact, increased even in areas where attempts are being made to reduce it (Brower and Carol 1987; Bunting et al. 1991; Collett 1987; Sharma 1991).

One reason for this lack of success may be an inadequate understanding of the processes involved in the wildlife-human conflict. The problems posed by wildlife damage are difficult to investigate, and to quantify. Annual government and project consultancy reports, and local people often stress the severity and great frequency of the problems caused by wildlife but these are mainly qualitative statements. They tell little about the exact magnitude of these problems, how often they occur and in which specific areas. To date, specific problems caused by wildlife have not been adequately defined, nor the specific animals responsible identified. Crop and livestock loss has not been adequately quantified, especially at a local regional level. We know very little as to whether conflicts vary with seasons and time and what local people do to prevent wildlife damage to themselves and their property. It is obviously difficult to obtain precise and reliable information concerning damage done, but an indication of the degree can be gathered through interviews with local people and supplemented with data collected by the wildlife conservation authorities. These sources combined with anecdotal information can provide fairly accurate analysis of the dynamics of wildlife-human conflict at a local level.

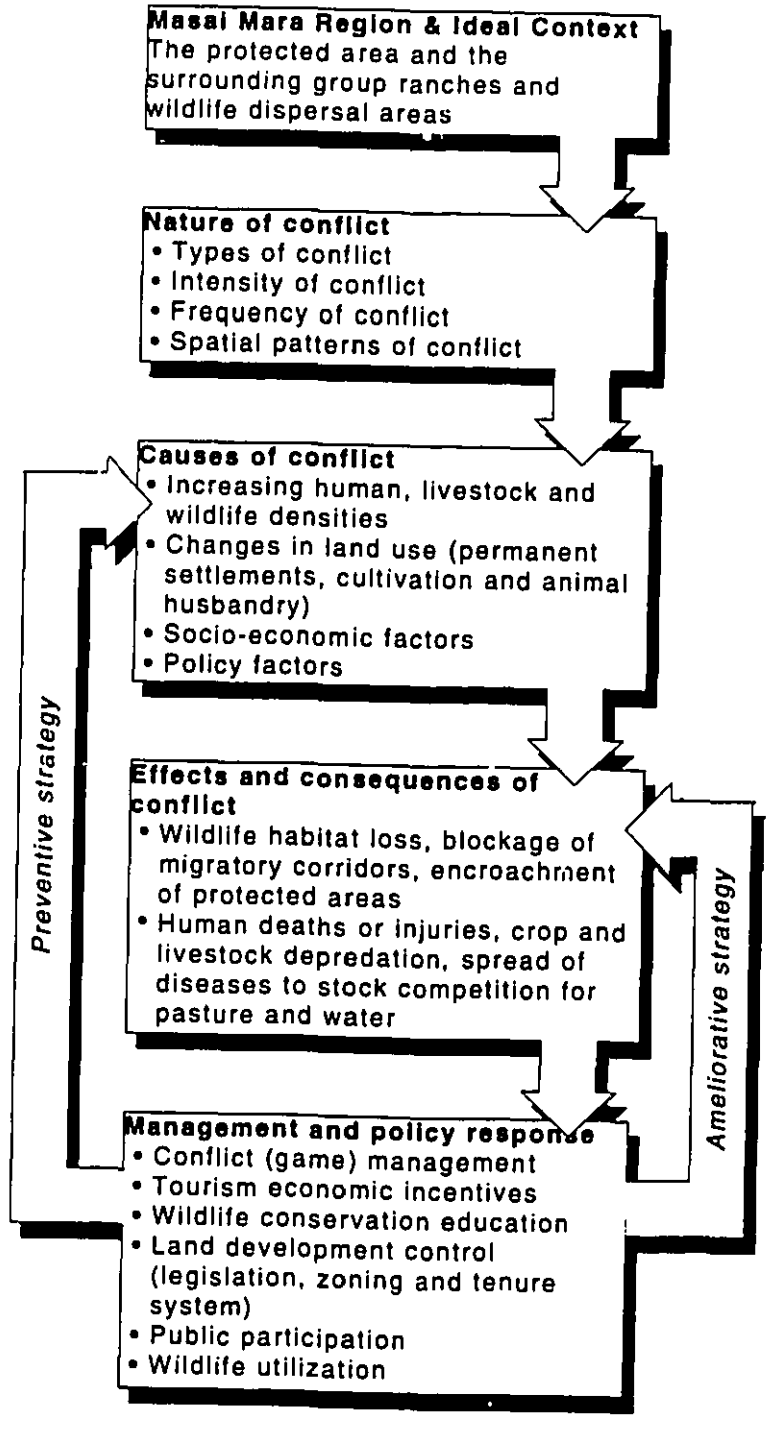
1.2:1 The Study Objectives

This study aims to provide a better understanding of the processes involved in wildlife-human conflict, thus aiding development of a program for integrating wildlife conservation with human development needs designed to ensure sustainable utilization of the resources considering future as well as present generations. It has five specific objectives (Figure 1.1). The first is to examine other sites in different parts of the world where attempts are being made to integrate conservation with development needs (Chapter 2).

The second is to examine and analyze the nature, intensity, frequency, and spatial and temporal patterns of conflict between wildlife and humans in the Masai Mara region. The nature of conflict is investigated by recording actual conflicts and identifying specific species and human activities involved. The main forms of conflict are identified and the most widespread types of damage by wildlife in the region are described. The relative importance of problems with respect to crops, livestock, disease transmission and human lives in the region are discussed. Intensity refers to the degree of significance of consequences, while frequency is the number of times respondents encounter wildlife problems. The spatial patterns are examined to determine whether or not conflict varies within the region and with distance from the protected area.

The third objective is to identify major determinants of conflict. Factors which may influence the occurrence and perception of conflict are measured and correlated with the intensity of conflict and attitudes towards conservation and government wildlife programs. The views of the local people towards government wildlife programs are described. The question of why the local people in Masai Mara region, and Kenya in general, do not support conservation efforts as currently presented is addressed. Central to these programs are the wildlife damage control, conservation education and extension services, and the wildlife-damage compensation scheme. In chapter three the compensation scheme, conservation

Figure 1.1 Flow Chart Showing the Study Focus Areas[10]



[10] The first box on Masai Mara Region & Ideal context views the situation in Masai Mara in relation to other sites in different parts of the world which demonstrate the relationships between a protected area and the surrounding areas where attempts are being made to integrate conservation with developments.

education and the government wildlife damage programs (including control shooting and game proof barriers) meant to protect local people are outlined to provide the background of the assessment of the views of the local people in chapter four.

The Kenyan government's wildlife conservation policies reflect the need for balancing the conservation of wildlife with the development needs of the local people. The policy focus includes "to .. protect people and their property from damage caused by wildlife" (KWS 1990:ii). For this objective to be fulfilled, accurate data are needed. The need to gather more information about the processes involved in the wildlife-human conflict has been underscored in many government and private documents (Ayieko 1977; Berger 1989; GOK 1989; Lusigi 1980). As Lusigi states:

> ..the present wildlife/human conflicts resulting from increased pressures of humans on wildlife habitats must be thoroughly investigated in order to give information as a basis for a solution (Lusigi 1980:106).

It is hoped that this study will contribute towards the provision of the required data.

The fourth objective is to assess the effects of conflict both on wildlife and on humans. Effects on humans are measured as claims for losses and dissatisfaction with the imposition of wildlife conservation regulations; effects on wildlife are measured as range (habitat) reduction and disruption, population reduction and/or changes in wildlife distribution and movement patterns. This requires quantifying how often the local people encounter wildlife damage, and what the actual losses they incur are, for instance, the number and monetary value of livestock killed, and the amount and monetary value of crops destroyed. These estimates are collected from the local people through interview survey, but are cross-checked with the district figures collected from the government records. Data from the government records are presented in chapter three. Finally, wildlife damage prevention techniques used by local people to protect themselves and their property from wildlife are described. Some of these traditional tactics may prove useful in designing game damage control programs which could reduce conflict, thus improve local attitudes towards

wildlife conservation authority.

The final objective is to develop management and policy strategies aimed at minimizing conflict and mitigating impacts while conserving wildlife and enhancing the well-being of the local population. Views of both the local people, government officials and wildlife experts are considered. In developing the program for integrating wildlife conservation with human needs, issues outlined in the literature review (presented in Chapter two) and the realities on the ground in the Masai Mara region (and within the context of Kenya as outlined in Chapter three) are also considered.

1.2:2 Study Assumptions

The concept of "conflict" is diffuse, and not all aspects of what might be considered as conflict can be examined. For the purposes of this study, an anthropocentric notion of conflict is accepted. Conflict can therefore be identified by existing records of claims for damages resulting from wildlife and verbal accounts collected from residents of the Masai Mara region. The intensity of human experience of conflict can be measured by frequency of events, material losses arising from damage, and subjective verbal assessments of intensity.

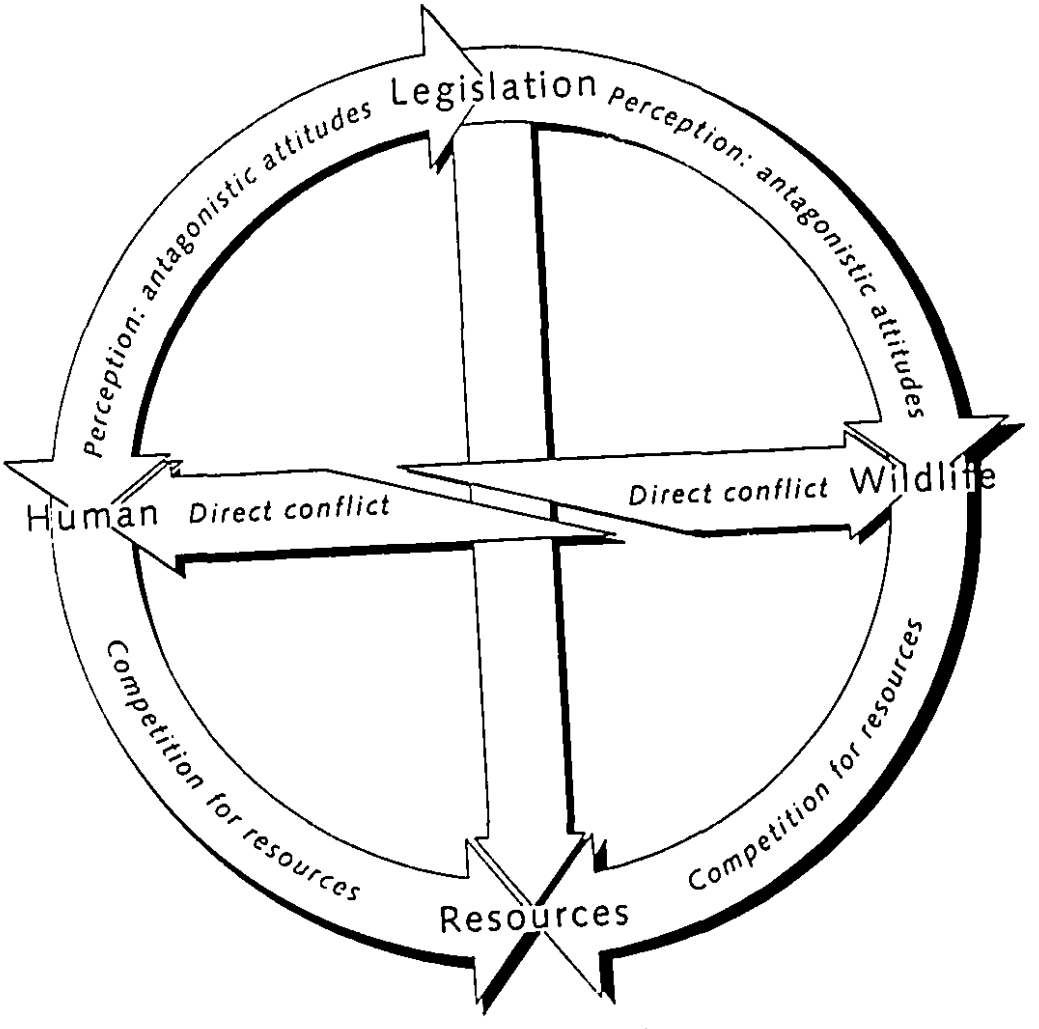
Conflict within wildlife resource management can arise in one of these five situations (Figure 1.2):

1. where human activity impinges directly on wildlife well-being, for example, hunting and poaching;
2. where wildlife activity impinges directly on human well-being such as attacks leading to bodily injury or death, livestock or crop depredation;
3. where there is competition between humans and wildlife for limited resources, notably: land (space), water, grazing, and shelter (natural landscape);
4. where the wildlife protection legislation or aspects of the wildlife-based tourist industry impinges on local land users' access to resources or freedom of land use; and

5. where the population perceives wildlife conservation in antagonistic ways, that is, in the form of negative attitudes towards wildlife, protected area and wildlife authorities.

Figure 1.2

Diagrammatic Representation of Wildlife-Human Conflict

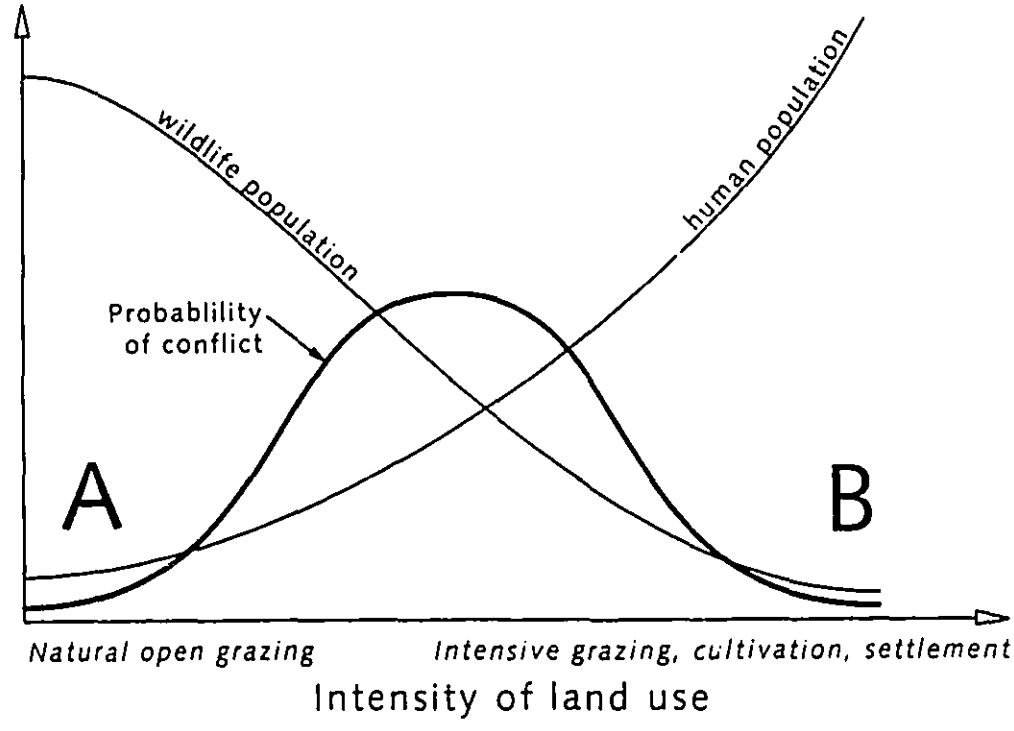


Simplified diagram showing different conflict situations: direct conflict includes hunting or poaching of wildlife, or attacks on people. Indirect conflict involving competition for resources (space, pasture and water), inappropriate strategies such as restrictive legislation (for instance, denying local people access to resources in the park), or on the side of the local people, antagonistic attitudes to and perceptions of wildlife.

Traditional modes of land use were such that free ranging wildlife was not incompatible with the long term survival of local culture (Dasmann 1984; Boyd 1968). Modern urban or commercial land uses make cohabitation with wildlife impossible. A period of transition in land use patterns or practices probably represents the time of greatest conflict. A lack of conflict may indicate successful cohabitation but it may also indicate exclusion of either human or viable wildlife populations from an area. Figure 1.3 illustrates what appears to be temporal transition of the relationship between wildlife and human populations. The existence of conflict spreads the transition to local exclusion of wildlife. Effective management must aim to reduce the probability of conflict.

Figure 1.3

Evolution of the Wildlife-Human Relationship



Conflict is low or non-existent in the absence of humans (A) or wildlife (B). It may be at its greatest during periods of land use change when new humans are most likely to impinge existing wildlife resources or behaviour.

1.2:3 Organizing Hypotheses

Two broad categories of hypotheses are developed to help operationalize the study objectives and structure the research methodology. One set concerns the occurrence of conflict, the other concerns perceptions of conflict. Table 1.1 shows the links between the specific study objectives, the main survey questions, the hypotheses, the analytical techniques employed and the expected results.

The first hypothesis is that there is a correlation between occurrence of wildlife-human conflict in the Masai Mara region and human population density, livestock population density, wildlife population density, percentage of land under cultivation, percentage of land under permanent human settlements, distance from the protected area, and seasonal variations. The general expectation is that the occurrence of conflict will increase with the scarcity of vital resources for which the two compete, namely: water, biomass (grazing land), and space (natural landscape). If this is so, there will be spatial and seasonal variation in conflict, with conflict being greatest when and where space, forage and water are scarce. Conflict will increase with the intensity of the demand made on resources. Wildlife demands will be proportional to wildlife population density, while intensity of human demands on resources is proportional to human population and livestock densities. It is expected that the compatibility of humans and wildlife is least when and where modification of natural landscape through land use is greatest. The extent to which a ranch is developed and managed (for example, number of permanent homesteads, percentage of land under cultivation, and infrastructure), or has fixed assets (such as, crop cultivation, wheat, paddock grazing) - as opposed to movable land uses (pastoralism) will determine the occurrence of conflict.

The second category of hypotheses is that there is correlation between the perceptions, interpretations and responses to wildlife-human conflict in Masai Mara region and various factors of background, economic status and experiences of wildlife issues.

Table 1.1 Study Objectives, Hypotheses, Survey Questions, Analyses and Expected Results

OBJECTIVES	HYPOTHESES/ QUESTIONS	SURVEY QUESTIONS	ANALYTICAL TECHNIQUES	EXPECTED RESULTS
•Examine and analyze nature, intensity, frequency, and spatial patterns of conflict	•Occurrence of conflict is spatially varied within the region •That conflict is a function of distance from park •Conflict varies with seasons	•What types of conflict occur in the region? •In which areas are conflicts occurring?	•Contingency tables and analysis of significance •Mapping	•Common types of conflict •Rates of occurrence of conflict •Sites and spatial configurations of conflict
•Identify determinants of conflict	•That occurrence of conflict varies with human, livestock and wildlife population densities, and levels of land use developments •That response to and perception of conflict varies with socio-economic factors and past experiences of wildlife issues	•What is causing the conflict?	•Contingency tables and analysis of significance	•Most significant causes
•Assess effects of conflict both on wildlife and humans	•Conflict has effects on both wildlife and humans	•How does conflict affect people and wildlife?	•Contingency tables and analysis of significance	•Most important effects
•Develop management and policy strategies for reducing conflict	•Conflict can be reduced through integrated planning. •Local people may have the answers	•What should be done to reduce conflict?	•Contingency tables and analysis of significance. •Cross-tabulation	•Best integrative alternatives

Factors considered include benefits from wildlife-based tourism, knowledge of wildlife conservation education, loss due to wildlife damage, lack of wildlife damage compensation, age of respondents, level of education, wealth, ethnicity, occupation, land tenure system and ownership of livestock. The wealth of an individual, for example, will influence the relative interpretation of damage or loss from wildlife. Wealth is defined in terms of amount of land owned and the number of livestock possessed. The extent to which tourism benefits accrue to the local population and the extent to which local people are offered special employment opportunities in the wildlife-based park tourism activities may influence their attitudes towards and perceptions of wildlife problems. It is also expected that those who suffer loss due to wildlife damage, and those who have not received wildlife damage compensation or have knowledge of wildlife conservation education may perceive wildlife, and by extension conflict, differently.

1.3 Study Methods and Data Analysis

1.3:1 The Methodological Approach

Many studies of human-environment relationships, such as the present one, have been criticized for concentrating on a single discipline, while the issues being studied are often inherently interdisciplinary. Abel and Blaikie, referring to wildlife studies in Africa, observe that:

> ... methods of analyzing wildlife conservation problems in Africa are inadequate for the analysis of complex issues of policy. Much of the analysis of conservation policy attempts to be apolitical on issues charged with social conflict. Analyses are too often ahistorical when history can say a great deal about the origins of present-day ecological problems. Furthermore, problems are commonly analyzed with narrow discipline frameworks which predetermine the nature of conclusions and lead to professionally biased proposals (Abel and Blaikie 1986:735).

Furthermore, Castri and Hadley point out that:

> Experience from many countries, ... has shown that three main groups of people should be involved in research efforts to tackle complex land-use problems - the decision-maker, the local populations and the scientist (Castri and Hadley (1983:372)

The approach adopted in this study therefore recognizes that it is not possible to establish the nature and basic causes of wildlife-human conflict and generate integrative strategies within a monolithic framework. It uses a "multi-data sources approach" (Anderson 1990; Crano 1981). This has been called a triangulation approach[11] for collecting and analyzing data (Campbell 1963). The general methods for data collection are outlined below.

1:3.2 Data Collection

Data were collected in four ways. First, substantial secondary data were extracted from various sources including: maps, aerial photographs and landsat images, and government and private documents. Second, informal, in-depth discussions were held with selected government officials and conservation experts. Third, structured interviews based on a questionnaire guide sheet (see Appendix C) were used to collect information from a sample of 500 heads of household. Fourth, anecdotal information was collected from older members of the community through open discussions. This included detailed information on three case scenarios of actual conflict in the study area. Further explanations on collection of specific data is provided here below.

1.3:2.1 Secondary Data Collection

Secondary data were collected from both civil and private sources. Civil sources include the Narok County Council planning documents, the Masai Mara National Reserve Offices, the Kenya Wildlife Service (KWS) and Central Bureau of Statistics (CBS). The other sources were: the Department of Resource Surveys and Remote Sensing (DSRS, formerly KREMU), the Kenya Survey, ministry of Agriculture, ministry of Livestock, and the ministry

[11] Triangulation is a reasonable methodological approach calling for the application of multiple data sources (through the use of multiple indicators), all of which "home in" or triangulate on the central interests (Campbell 1963; Crano 1981). It is the use of multiple indicators to assess the study problem.

of Reclamation and Development of Arid and Semi-Arid Areas and Wastelands.

Generally, these sources provided details on the historical and physiographic factors of the study area, human, wildlife and livestock statistics, wildlife migratory routes, habitat types, tourist activities, infrastructure, land use (existing and potential), and the general environment. They also provided records on wildlife damages, types of damage, person(s) affected and the wild animal species responsible for the damage, especially at the national level. The data provided a good starting point for the detailed field survey, although collection of this data continued throughout the period of field work. These data were supplemented by notes recorded on various features during the field work. The information has been reduced into maps, figures and tables for analysis of the patterns of land use, as well as human, livestock and wildlife population densities in the study area.

1.3:2.2 Survey of Officials and Wildlife Experts

Twenty-six government officials and politicians were interviewed. They were employed as Narok District administration officials, staff of the Kenya Wildlife Services, Ministry of Agriculture, Ministry of Livestock, Chiefs and Councillors of the locations and county councils, respectively[11]. The selection of the agencies was based on their involvement with wildlife issues. The choice of the officials to be interviewed was based on their position as heads of the agencies. In case of the absence of the head the deputy or next responsible person was approached. The purpose of the study was communicated to the officials through administrative channels, from which permission had earlier been acquired. Appointments were made with the officials. They were mainly asked to comment on the study problem and possible solutions.

[11] Although the Masai Mara is divided into group ranches, there are also the central government administrative units, locations and sub-locations, usually headed by chiefs and assistant chiefs respectively. The boundaries of such units may not necessarily be the same as of group ranch. The region is also organized into county councils represented by councillors that make up the political structure headed by the chairman of the District county council, based at Narok town.

Eight wildlife scientists who had worked in the Masai Mara region or areas of similar situation were also interviewed. Selection of such scientists was based on their past records. The focus of the discussions was the process involved in the conflict and the assessment of the alternative management and policy responses.

1.3:2.3 Field Data Collection

Conflict is not a strictly objective phenomenon. Perception and interpretation by the people involved is an important determinant of the nature of conflict. Therefore, in addition to the quantitative results of a field survey, this analysis also includes anecdotal information. Three methods were employed in collecting the field data. The first was a head of household survey, the second, a survey of government officials and wildlife conservation experts as described above, and finally, case scenarios and informal interviews with the older members of the Masai Mara residents.

The field survey was carried out from March to September 1991. The first two weeks were spent sorting out maps, aerial photographs and landsat images in Nairobi for the field work, and seeking a research clearance permit from the office of the president. The next two weeks were spent in the field on pre-survey. During field work, I lived within the Masai Mara region in four different locations. The main centre of operation was at the Sekenani Gate, the main gate of the park (situated at the boundary of Koyaki and Siana group ranches), but I spent time at Lemek, Lolgorian and Kirindoni, local centres for Lemek, Angata Baragoi and Kimentet group ranches, respectively (see Map 3.2). The field study methods are explained below.

1.3:2.3:1 Head of Household Survey

The five sampled group ranches and the 500 respondents were selected as follows. First, a list of all group ranches was established (thirteen in total) from existing records,

then five ranches were chosen to provide a range with respect to location (either on the upland or lowland), predominant land uses (either cultivation or pastoralism), and distance from park or wildlife migratory routes. Total number of settlements was determined and the approximate number of households per settlement calculated. Sketch maps showing locations of homesteads were produced during the pre-survey, forming a base for random choice of respondents. In the field, the field worker selected individuals from non-neighbouring homesteads. When a head of household was absent, another member, the next most senior, was interviewed. Interviewing was guided by a questionnaire whose purpose was to gather specific information but, perhaps more importantly, to stimulate discussion. The sample group ranches were: (1) Angata Baragoi; (2) Kimentet; (3) Lemek; (4) Koyaki; and (5) Siana (see Map 3.2 and Table 1.2). Details on the other group ranches in the region are presented in chapter three.

Table 1.2 Group Ranches Sampled for Local People Interviews in Masai Mara Region, 1991

GROUP RANCH	AREA SQ. KM.	DISTANCE FROM RESERVE[12]	TOTAL POPULATION	NUMBER OF HOUSEHOLDS	SAMPLE SIZE	% POP. SAMPLED
Angata Baragoi	82	7	6500	908	91	10.2
Kimentet	368	20	9800	1382	98	7.09
Lemek	610	35	7000	795	111	13.96
Koyaki	876	17	6000	748	100	13.36
Siana	982	18	8600	1226	100	8.15
Total	2915	19	37,900	4,311	500	11.6

Source: Derived from 1979 National Population Census[13]

[12] Distance from the protected area was measured from the boundary of the protected area to the central position of the group ranch.

[13] At the time of the field work for this study, the results for the 1989 National Population census were not yet available. I therefore used the 1979 figures as a base for estimates. However, the Economic Survey: 1991 published by the Central Bureau of Statistics, Nairobi, contains some provisional and unofficial statistics for the country and districts. This document states that the total population for Narok District in 1979 was 210,000 and this had risen

The population of the Masai Mara region was approximately 72,000 by 1991 estimated from the 1979 National Population Census of the region of about 35,000 (CBS 1980). The number of households was about 12,000 by 1991. The five group ranches selected for interviews constituted 53% of the total population and 35.9% of the households of the region. Response rates for each group ranch was 100%. There were no reports of refusal or termination of the interviews before completion.

Before interviews were conducted with the local people, they were informed about the research and its objectives at public meetings (baraza), through chiefs, councillors and group ranch officials. The main survey was conducted following an intensive two week period of pre-testing of the interview schedule. Both closed and open-ended questions were asked. Open-ended interviews were used because they can provide exhaustive coverage of issues and are independent of literacy skills (Fowler 1993; Sheskin 1985). The interviews occurred during both the wet (March to May) and dry (June to August) periods.

Six research assistants participated in the interviewing. They were selected for their level of education. All of them were native to the study area. Four of them were Maasai and were assigned to cover the predominantly Maasai group ranches; Lemek, Koyaki and Siana. The other two were non-Maasai and covered Angata Baragoi and Kimentet group ranches, dominated by non-Maasai communities. All of them spoke and wrote in English and Kiswahili and one was female. They travelled on bicycles or were dropped off by me in a four-wheel drive vehicle. I was in the field full time and worked very closely with the research assistants. One assistant was placed at each group ranch. Most of the interviews were conducted in local languages and directly translated into English.

The research assistants met with me to discuss the purpose of the research and the nature of the interview task. They were trained in two parts. The first was lecture, explaining

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to 402,000 by the time of the 1989 Census. This gives Narok, the highest growth rate in the country of all the 42 districts, an annual growth rate of 6.5% over the ten year intercensal period.

each question in the questionnaire, why it was asked and what was expected of it. To minimize errors arising from misinterpretation of the questions or translation, questions were again explained in Kimaasai. Names of the common wild animals species found in the study area were also explained in Kimaasai, Kiswahili, as well as in English (See Appendix A). The assistants were also advised on how to approach the respondents. The second part of the training was testing the questionnaires with the assistants. Every assistant was taken to the field and I interviewed at least two respondents with them before leaving them on their own[14]. All assistants met with me once a week or as necessary during the field work to assess progress. The assistants were given note-books for additional information.

The survey instrument used was a questionnaire, administered through face-to-face interviews. Its purpose was to gather specific information and stimulate discussions (Fowler 1990; Sheskin 1985). Initially, the interview was to be conducted in two visits. The first was introductory, collecting information regarding the respondents' household and making appointments for the next interviews. The second visit was to ask specific questions on wildlife-human conflict. During the pre-survey it was realized that interviewing would have more success if the two visits were combined. Three reasons accounted for this change in procedure: the first was that the respondents were consulting with others before the second visit, thus possibly giving a group response on the wildlife-human questions (see Plate 1.1). Some of them were consulting with the officials of the group ranches. The second reason was that many of the respondents were willing to continue with the interviews during the first visit or were giving appointments for the second visit later the same day. Finally, Maasais homesteads are located far apart with difficult accessibility, making return visits troublesome.

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[14] It was feared that the female interviewer would have difficulties with respondents not willing to talk to her due to gender difference, especially asking questions about a generally a "male issue". It was realized that because of her education, having introduced the exercise as being for purposes of education, some older respondents volunteered even more educational response to her. This may reflect the increasing appreciation of education (especially for females) amongst the rural society (Holland 1992).

The questionnaire was organized into two parts divided further into several sections (Appendix C). Part I sought information on wildlife-human conflict. Section A contained introductory questions, name of group ranch, season and month the interview was conducted, and distance of respondents from the protected area. Section B, pertained to the nature, intensity, frequency, and spatial and temporal patterns of the conflict. Sections C and D, were on the causes of the conflict, E and F were on the effects, and G, H and J were on the solutions and on perception of wildlife. Questions on effects included the extent of crop damage and depredation of livestock due to wildlife. Part II of the questionnaire asked questions pertaining to the demographic, social and economic characteristics of the respondents such as age, sex, level of education and occupation. Additional questions were asked about land ownership (for those living in group ranches, amount owned was estimated by dividing the group ranch land by number of households per ranch), place of origin, length of residency in the region and livestock owned.

Because the government (or Narok County Council) was taking measures to control and manage wildlife inside as well as outside the protected areas, respondents were asked what they thought about the measures taken by the government to help reduce conflict. Questions on game-meat consumption, often raised in related studies (Balakrishanan and Ndhlovu 1992; Infield 1988), were not asked since previous information indicated that the Maasai communities do not feed on game meat (Berger 1989; Simon 1962). The questionnaire was deliberately simplified to minimize possible distortion due to interview length. Most of the answers were recorded by a tick or a number. At the beginning of each interview there was a briefing which included an outline and objectives of the survey and a statement about confidentiality of the information provided. The interview required 90 to 120 minutes to complete. Only one or two questionnaire(s) was/were administered in a day. Throughout the interview, care was taken to avoid giving the impression that any benefit

Plate 1.1 A second visit during the pre-survey. Respondents often formed groups making independent second interviews difficult.

Plate 1.2 An informal interview with an elder resident. The interviews were very friendly and were conducted without time constraint.

might accrue to the local people from the survey.

1.3:2.3:2 Anecdotal information

Three categories of cases were recorded to illustrate various real experiences of the wildlife-human conflict in the region. These were cases of: (1) crop damage; (2) livestock depredation; and (3) human death, representing the main sources of conflict occurring in the region. The cases offered insightful illustrations of the study problem and were selected in consultation with the game warden and the local people.

Oral histories were conducted with thirteen older people. They were selected on the basis of their age (see Plate 1.2), experience, and advice from the game warden and local people. The purpose was to collect a narrative explanation of the historical evolution of the study area, focusing on the relationship between wildlife and local communities. These interviews were tape recorded with the respondents' permission. In fact, many did not mind being recorded and asked if at least part of their conversation could be played back to them.

1.3:3 Data Treatment, Processing and Analysis

During the fieldwork qualitative and quantitative data were collected. Salient points from the recorded interview are presented as quotes. Quantitative responses from the field surveys were numerically coded and entered into QUATTRO PRO, a spread-sheet computer package and then transferred to SYSTAT, a statistical package for analysis. To prepare data for further analysis, percentage variables were arc-sine transformed to compensate for non-normality near the extremes (0 and 100%). Relative frequencies are presented because of unequal sampling fractions per group ranch. For questions on wildlife problems, relative frequencies are presented based upon the number experiencing the specific problem rather than upon the total number of people surveyed. For all other questions, relative frequencies

are based upon the total number of people surveyed. Some continuous variables including distance from the park, age of respondents and number of livestock were broken into categories for further analysis.

Approximate land-prices were available from the district offices. Livestock prices, although provided by respondents during the interview, were calculated based on the local livestock markets (details were provided by Narok district offices). The stock prices are highly variable, depending on the age, type and sex of the animal, but as there was not sufficient time to survey and estimate the value of each animal owned by each respondent I estimated each individuals total loss by multiplying the total number of animals lost by the average price for that species. This also took into account the possible undervaluation of the market prices, especially for calves. Shoats (goats and sheep) were converted to the rate of 4 for a cattle, but in case one lost less than four shoats, then half the price of cattle was used. Wealth per household was calculated by multiplying the total land-holdings and number of livestock owned per household by average prices. The calculated figures were in Kenya shillings at the then rate of Kshs. 25 = 1 US $. The values were: cattle (zebu) Kshs 2,000, goats Kshs. 500, sheep Kshs. 600, donkeys Kshs. 700, and chickens Kshs. 40. Costs of crop damage was calculated by multiplying the estimated amount lost (measured in terms of bags - sacks, 1 sack = 90kg) by prices per bag or kgs. The values were: maize Kshs. 220 per bag, wheat Kshs 480, beans Kshs 520. The statistical analysis was undertaken as follows:

1.3:3.1 Data Analysis

One-way frequency (univariate) distributions and descriptive statistics for the responses in each interview schedule were generated. Responses were summarized at the level of group ranches, stratified into upland and lowland zones. ANOVA and Chi-square tests were used to test the significant differences and relationships. Any Chi-squared

results which had an expected all frequency of <5 were re-analyzed using either the Mann-Witney "U" test in the case of independent variables with two classes, or the Kruskal-Wallis "H" test in the case of independent variables with more than two classes (Fienberg 1980). Levels of significance are indicated inside or at the bottom of the Tables by * symbols as follows:

* significant at 0.05 level,
** significant at 0.01 level, and
*** significant at 0.001 level.

The group ranches were later aggregated into two strata (upland and lowland) for further comparison.

Continuous variables were examined by use of Pearson Product-Moment correlations matrix, while ordinal and categorical data mainly on attitudes towards conservation and government wildlife programs were analyzed using cross-tabulation (Fienburg 1980). Additional analyses and tests of significance were performed using ANOVA and Chi-square. Cross-tabulations were used to establish any relationships between respondents' experiences and socio-economic factors with measures of attitudes towards conservation and government wildlife programs. Attitudes towards conservation and government wildlife programs were the explanatory variables and respondents' socio-economic factors and experiences were the response variables. Only statistically significant correlations are discussed. The choice of various statistical techniques used in this study was guided largely by (1) the type of the data, (2) the measurement levels of the variables, and (3) the nature of the technique. More specifically, the techniques were chosen based on the objectives of the analysis.

1.3:3.2 Interpretations of the Survey Results Tables

In all Tables used to report field survey findings a standard format is used (See Table 1.3). There are six columns. The first shows the variable name or response level. The

Table 1.3 Sample of Format Results Table Showing how results are presented

VARIABLE NAME	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Ethnicity of Respondents***						
Maasai	4 (4.4%)	10 (10.2%)	104 (93.7%)	98 (98.0%)	96 (96.0%)	312 (62.4%)
	14 (7.6%)		298 (95.8%)			
Non-Maasai	87 (95.6%)	88 (89.8%)	7 (6.3%)	2 (2.0%)	4 (4.0%)	188 (37.6%)
	175 (92.4%)		13 (4.2%)			
Total	91 (100%)	98 (100%)	111 (100.0%)	100 (100.0%)	100(100.%)	500 (100%)
	189 (100%)		311 (100%)			
Chi-squared 459.063						
Sex of the Respondents*						
Male	84 (92.3%)	84 (85.7%)	105 (94.5%)	89 (89.0%)	87 (87.0%)	
	168 (88.9%)		287 (90.2%)			449 (89.8%)
Female	7 (7.7%)	14 (14.3%)	6 (5.5%)	11 (11.0%)	13 (13.0%)	
	21 (11.1%)		30 (9.8%)			51 (10.2%)
Total	91 (100%)	98 (100%)	111 (100.0%)	100 (100.0%)	100(100.%)	
	189 (100%)		311 (100%)			500 (100%)
Chi-squared: 7.072						
Level of Education of Respondents***						
None	61 (67.0%)	58 (59.2%)	78 (70.0%)	87 (87.0%)	76 (76.0%)	360 (72.0%)
	119 (63%)		241 (77.6%)			
Primary	21 (23.1%)	23 (23.5%)	20 (18.0%)	7 (7.0%)	16 (16.0%)	87 (17.4%)
	44 (22%)		43 (13.6%)			
Secondary	9 (9.3%)	17 (17.3%)	8 (7.2%)	3 (3.0%)	7 (7.0%)	44 (8.8%)
	26 (13%)		18 (5.8%)			
College	0 (0.0%)	0 (0.0%)	3 (2.7%)	3 (3.0%)	1 (1.0%)	6 (1.2%)
	0 (0.0%)		7 (2.3%)			
University	0 (0.0%)	0 (0.0%)	2 (1.8%)	0 (0.0%)	0 (0.0%)	3 (0.6%)
	0 (0.0%)		2 (0.6%)			
Total	91 (100%)	98 (100%)	111 (100.0%)	100 (100.0%)	100(100.%)	500 (100%)
	189 (100%)		311 (100.0%)			
Chi-squared: 45.090						

next five show numeric responses for each of the ranches. The last shows the total for the sample. In some cases, an extra column is provided to show the prevailing knowledge about the results largely to corroborate the findings. For instance, if the survey findings indicate that wildlife transmit disease to livestock, established research on this is indicated. For each numeric responses, a percentage value is shown in brackets. Between the Angata Baragoi column and the Kimentet column is shown the average value for the upland zone, between the Lemek column and the Koyaki column is shown the average value for the Lowland zone.

In the first cell in each row asterisks are used to show levels of the significance of differences and the name of the test used to determine significance is given along with the computed tests value (eg. "F", "x^2", "U"). Test for significance is between the five individual group ranches not between upland and lowland zones. Levels of significance are indicated by an asterisk on the variable in question. ANOVA results are on continuous not aggregate data.

CHAPTER TWO

Chapter 2

WILDLIFE CONSERVATION AND HUMANS: INTEGRATING CONSERVATION WITH DEVELOPMENT

> Increasingly we are drawing lines on the map, attempting to separate the wild from the tamed. We designate lands as wilderness areas, nature reserves, national parks, and we say that these are no longer places where people can live, or take from, or use in any way except the way of the visitor who comes to look, out not to interfere. This is difficult for people who have always lived in wild country and consider themselves as a part of it.
>
> (Dasmann 1984: 342), ecologist

2.1 Introduction

The integration of wildlife conservation and human development needs has, in the last two decades, become a topic of major concern amongst conservationists, development agencies and researchers. This chapter reviews recent work on the topic. It places the study problem within a global context. The evolution of the idea of integrating conservation with development is traced. Origins of wildlife conservation and specific initiatives that deal with integrating wildlife, protected areas and local communities in different parts of the world are outlined. The chapter also describes the theoretical context within which the study is based. Two theories are considered: (1) Conflict and Conflict Resolution Theory, and (2) Firey's (1960) Man-Mind-Land: A Theory of Resource Use.

2.2 Wildlife, Protected Areas and Local Populations

Conflict between wildlife, protected areas and local populations has received considerable attention in recent years (McNeely and Miller 1984; West and Brechin 1991; Western and Pearl 1989). Traditionally, conservation of wildlife primarily involved the creation of national parks and other protected areas from which all human activities were excluded, except those associated with reserve management and accommodation of

tourists[15] (Howell 1987; Mackinnon et al. 1986; McCabe et al. 1992). Local populations that traditionally used the park areas for subsistence or spiritual needs were often displaced and/or denied access of resource use once the areas were declared parks (Calhoun 1991; Clad 1985; Mishra 1984). In addition, the local people, especially those living adjacent to parks, suffer losses in crops, livestock and human life due to wildlife interactions (Bell 1984; Lewis et al. 1990; Parker 1972). At the same time, they benefit minimally from the wildlife-based tourism revenue, nor are they compensated for property damage attributable to wildlife (Aboud 1989; Borg 1977; Lindsay 1987). Traditionally, the benefits of wildlife conservation and protected area management have been enjoyed nationally and internationally while costs were borne locally.

Many researchers have challenged the idea that conservation of natural resources can be achieved by excluding human activity from protected areas (Anderson and Grove 1987; Zube and Busch 1990; Homewood and Rodgers 1991; Kiss 1990). Similarly, the assumption that traditional forms of land use, such as Maasai indigenous systems of livestock management (nomadic pastoralism) are environmentally destructive, has been vigorously challenged (Brokensha and Riley 1989; Homewood and Rogers 1991; McCabe et al. 1992).

Internationally, official bodies' and individual researchers' views of conservation have changed over the years. Table 2.1 shows how the idea of conservation has evolved since the late 19th century. Early conservation views represented the narrow ecological focus of conservation with little concern for human interests (Adams 1962; Leopold 1933). Conservation was synonymous with preservation and there was little tolerance for resource utilization or exploitation. Many conservationists argued that nature had the right to exist independently of human wants and needs (Leopold 1933; Ehrenfield 1983) and discounted

[15] According to the internationally accepted "1969 New Delhi definition" a national park is an area where the highest competent authority of the country has taken steps to prevent or eliminate as soon as possible exploitation or occupation in the whole area .. (IUCN 1985).

Table 2.1 Changing Views of the Conservation Idea with reference to Wildlife[16]

APPROXIMATE DATES	BASIC CONSERVATION IDEA	SELECTED REFERENCES
Late 19th to Early 20th Century	•Strict wildlife protection, exclusionary protected areas, wilderness movement, especially in the USA	
Between 1960 and 1970	•1st World Parks Congress (1962): Awakening of environmental movement. Early suggestions for integration	Adams 1962; Firey 1960
Between 1970 and 1980	•2nd World Parks Congress (1972): Concern for local people. Emphasis that economic use of parks need not be at odds with other goals of conservation (Dasmann 1972) •MAB Biosphere Reserves (1974): Early attempts to integrate conservation with development, protected areas with surrounding human uses. Research and monitoring emphasised. Requirements of parks in Savanna Africa must be balanced against socio-economic constraints in their environment (Myers 1972)	Elliot 1974; Lusigi 1978; Myers 1972; Olindo 1974; UNESCO 1974; Western and Henry 1979
Between 1980 and 1990	•1st World Conservation Strategy (1980): Emphasised need to balance conservation with development. The aim is to reconcile nature conservation with economic development. The human dimensions. Kenyan conservation must be balanced against local human needs (Lusigi 1981). •3rd World Parks Congress (1982): Theme parks for sustainable society •Bali Declaration: wildlife must pay its way to co-exist with local communities. Need for local participation stressed. •WECD Our Common Future (1987): need for sustainable development clarified and stressed	Anderson and Grove 1987; IUCN 1980; Lusigi 1981; Marks 1984; McNeely and Miller 1984; McNeely and Pitt 1985; WECD 1987; Yeager and Miller 1986; Brownrigg 1985; Dasmann 1984; Infield 1988;
1990s	•2nd World Conservation Strategy (1991): Caring for the Earth. Theme conserve to develop. •4th World Parks Congress (1992): Theme "Parks for life". Wildlife, protected areas to support overall fabric of socio-economic development. Wildlife conservation to be matched with rural development. Emphasis on empowerment and participation of local people. Emphasis on consumptive utilization of wildlife and conservation education. •Agenda 21 (1992): continued emphasis on sustainable development •Restoration Ecology: how to rehabilitate the degraded ecosystems	Bonner 1993; Gray 1993; Hannah 1992; IUCN 1991; West and Brechin 1991; Wells and Brandon 1992

[16] It should be noted, however, that even at the initial stages of the conservation idea, some people advocated for integration. Zube and Busch (1990) report that the first expression of the national park concept by George Catlin in 1832 (which was never adopted) did involve native Americans. Catlin proposed a creation of "A National Park, containing man and beast, in all the wild and freshness of their nature's beauty" (Catlin 1968 quoted in Zube and Busch 1990:118)

the notion that undeveloped sites had actual or potential economic benefit to humans (Frankel and Soule 1981)[17]. This view had evolved by the 1970s, as illustrated by the proceedings of the Second World Parks Congress (Elliot 1974), the UNESCO's Man and the Biosphere Program (1974) and views of many individual researchers (Myers 1972; Dasmann 1972; Western and Henry 1979), to include discussions of conservation in relation to human needs. The 1980s saw further changes in conservation thinking, punctuated by the publication of the World Conservation Strategy (IUCN 1980), the proceedings of the Third World Parks Congress (McNeely and Miller 1984) and Our Common Future (WCED 1987).

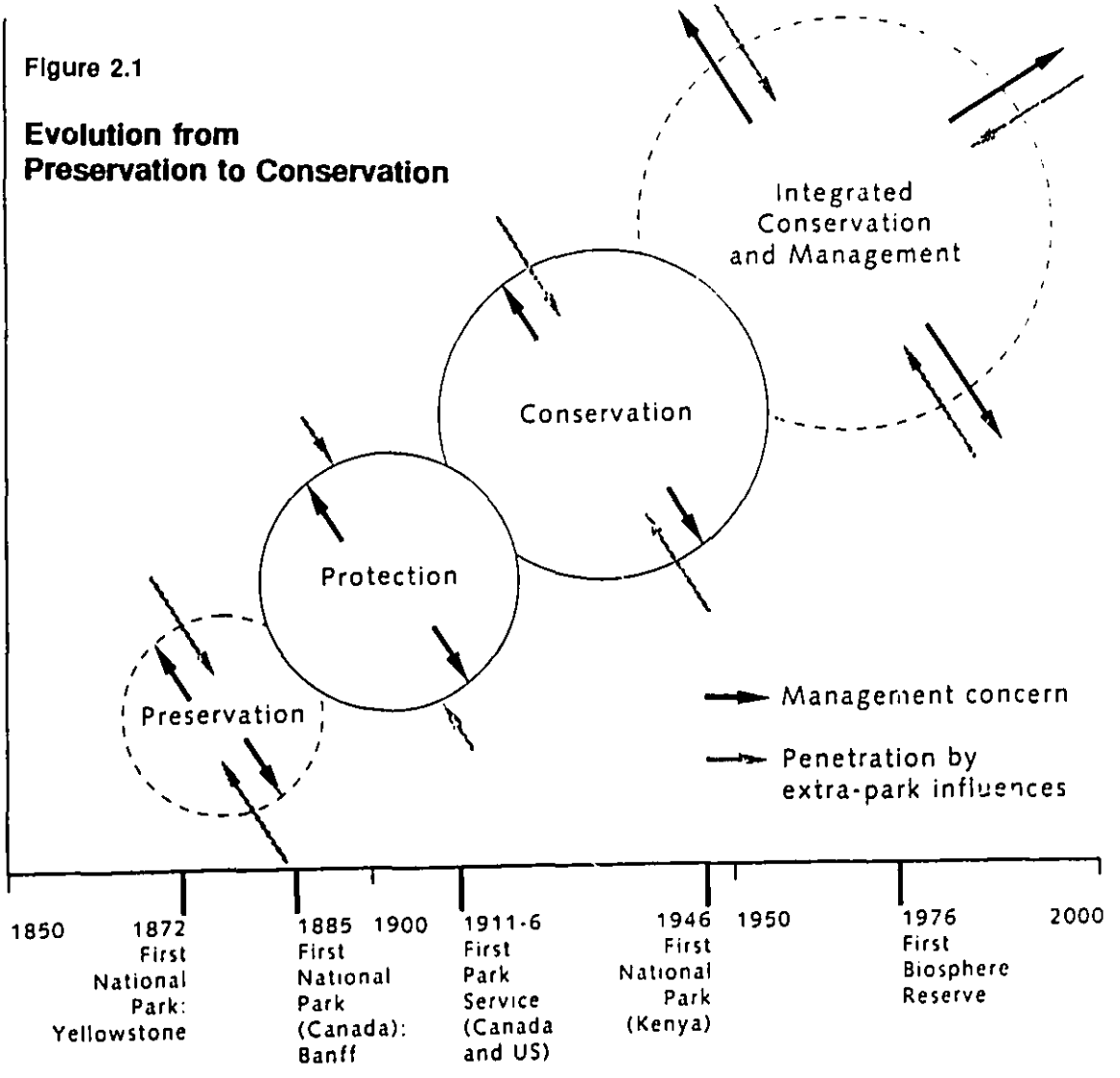
Today, conservation is a much broader and more dynamic concept. It has evolved from restriction of use to rational utilization (see Figure 2.1), welding resource utilization and resource preservation firmly together into new concept of intelligent resource use aimed at meeting society's short and long-term needs (Asibey 1974; Dearden 1991; McNeely 1989). It has become an issue in many social and natural sciences, and is considered in social, economic and cultural contexts (Arhem 1985; Marks 1984; McNeely and Pitt 1985; UN 1992).

Wildlife conservation and protected areas, are increasingly perceived as important players in the issues of needs, beliefs and aspirations of people living in and around the parks (Western and Pear 1989; Garratt 1984). It is now widely accepted that although the preservation of world ecosystems, species, genetic diversity, and natural wonders is a noble and important goal, the protection of local human cultures and the implementation of appropriate rural economic development in the face of rural poverty is also an important goal and moral imperative (Gray 1993; McNeely 1989; West 1991; Western and Pearl 1989). Some background questions may be asked: When and where did conservation begin? What

[17] There exists a long-running controversy over whether or not preservation of natural resources, for preservation's sake, is a viable strategy, especially in developing countries. The conservation idea, which involved the development of national parks and forests was influenced by a North American view that led to the establishment of the first world protected area, the Yellowstone National Park in 1872 in the USA. This vision was inspired by such people as John Muir, Gifford Pinchot and Theodore Roosevelt (Klee 1991; Udall 1963). The aim was to preserve the areas as natural, separating them from daily human activities.

Figure 2.1

Evolution from Preservation to Conservation



(Modified from Dearden 1991 and Eidsvik 1985)

Moving beyond protected areas' boundaries to incorporate surrounding areas. The alternative would be *ex situ* care (zoos), conservation or biotechnology which are limited in conservation of biodiversity. These alternatives can be very expensive, requiring continuous research, specialized training and equipment.

are the basic methods of conservation? And why conserve wildlife, anyway? The next sections present some answers to these questions, highlighting the historical relationships between wildlife and humans to show how the evolution of wildlife conservation philosophy neglected local participation.

2.2:1 Origins and Principles of Conservation

Conservation, as an influence on human activities, has a history reaching far into the past. Small areas of land were designated to protect certain species valuable for hunting or other purposes (for example by the Assyrian noblemen) as far back as 700 B.C[16]. In Lithuania a reserve for the European bison was established in 1541; while in Switzerland, a reserve to protect the chamois was set up in 1569 (Boardman 1981; Dixon and Sherman 1990). Gilbert and Dodds (1992) have traced the history of wildlife management (Table 2.2), updating Aldo Leopold (1933). They found that these early wildlife conservation and management strategies, especially between 1200 and 1800 BC were primarily regulatory in nature (Gilbert and Dodds 1992). Emphasis on regulatory measures has continued to-date.

Table 2.2 Early Wildlife Protection Strategies in Relation to People

SOURCE	APPROXIMATE DATES	ORIGINAL CONCERN	TYPE OF ACTION	CATEGORY OF MANAGEMENT
Solon	About 600 BC	People	Forbade people to hunt	Regulatory
Marco Polo	Late 13th century	Animals	Restricted hunting and planted grain	Regulatory and habitat
Edward, Duke of York	14th century; recorded 1406-1413	Animal and privileged people	Controlled methods, seasons, sex & ages taken	Regulatory
Henry VII	1485-1509	people	Trespass protection	Regulatory
Henry VIII	1536+	Animals and privileged people	Closed seasons and areas	Regulatory
James I	1603-1625	Animals and privileged people	Trespass protection and closed areas	Regulatory and reservation of land
James I	1631	Animals	Artificial propagation	Stocking
William and Mary	1694	Animals	Prohibited burning of cover	Regulatory and habitat
Mulmesbury	1799	People	Cover control for efficiency of harvesting	Regulatory

Source: Gilbert and Dodds 1992 (Originally, part from Leopard 1933. Game Management. Scribners, N.Y.)

[16] The precise date and place where conservation started, especially the practice of creating protected areas is not clear. Mackinnon et al. 1986, for instance, refers to the earliest date as being 252 B.C. when the Emperor Asoka of India passed an edict for the protection of animals, fish and forests. WCMC (1992) also refers to the existence of protected areas in the Pacific since 4th century B.C.

As a publicly defined movement, sponsored and supported by government, conservation had its origin in the United States (Dasmann 1984; Klee 1991; Hough 1988; Zube and Busch 1990). The basic conventional principles and practices of wildlife conservation have largely involved the creation of national parks and other protected areas (Lusigi 1984; Machlis and Tichnell 1985; McNeely and Miller 1984). Outside the protected areas wildlife is protected through various enforcement activities including restricting people, for instance, from killing wildlife, even for the traditional subsistence hunting (Adams and McShane 1992; Myers 1972; Western and Pearl 1989). But why should wildlife be conserved?

There are several reasons for conserving wildlife (Table 2.3). One is the scientific and educational value of wildlife and of natural ecosystems. Knowledge of the workings of the natural savanna ecosystem, for instance, will be essential if the productivity of these marginal lands is to be maximized in a sustainable manner. Scientific knowledge derived from wildlife will be of great value not only in building human understanding of nature but also increasing human wisdom (Fillon et al. 1993; Kinoti 1980; Myers 1984). In addition, natural products derived from wildlife may also be used for medical purposes (Myers 1984; McNeely et al. 1990).

The results of some experimental ranching schemes indicate that the ranching of carefully selected species of wildlife may provide better returns than conventional domestic stock in terms of protein per unit area (Blankenship et al. 1990; Eltringham 1984; Hopcraft 1990). There is also the need to conserve wildlife and wildlife habitat as part of biodiversity (McNeely 1992; McNeely et al. 1990; Reid and Miller 1989). The world's biological diversity is increasingly concentrated in wildlife protected areas that have remained more or less unchanged by human activities (McNeely et al. 1990; Wilson 1988). With the increasing threat of global warming, these natural areas would act as stabilizers and monitoring grounds for climatic changes.

Wildlife is also conserved for its tourist value. Tourism, particularly in the developing countries, has been one of the most important reasons for conserving wildlife, valued primarily for its foreign exchange earning potential. Although a valid reason, it is not a dependable source. A decline in economic fortunes or political changes can easily negate the tourism motive (Mbithi and Buckens 1980; Boo 1990). If not properly planned, tourism can also cause enormous negative impacts on the environment and society (Liu and Var 1986; Milne 1990; Wall 1993). Through ecotourism, wildlife/protected areas and humans conflict can be resolved and local communities would have the opportunities to benefit and participate in tourism planning (Lindberg 1991; Richards 1980; Whelan 1991).

Table 2.3 Benefits of Wildlife Conservation and Establishment of Protected Areas

Benefits of Wildlife Conservation and Establishment of Protected Areas
1. Preservation of biodiversity for humankind as well as for national and local regions. These include protection of genetic resources, conservation of renewable harvestable resources, stabilization of hydrological functions, protection of soils, stability of climate (the global warming problem) and maintenance of high quality living environment - the natural balance of environment
2. Aesthetic and recreational values: promotion of tourism (often for state, little to the local people),
3. Scientific research and monitoring opportunities - medicine and other products (for example proteins and other future values) preservation of breeding stocks, population reservoirs and biological diversity
4. National/regional pride and heritage - preservation of traditional cultural values
5. Sources of food and game trophies
6. Employment opportunities - auxiliary services, tourist and general local and regional development, eg. road improvements, etc.

Although conservation of wildlife is beneficial, it has a number of costs often born by the local people. These costs are outlined in section 2.3 below.

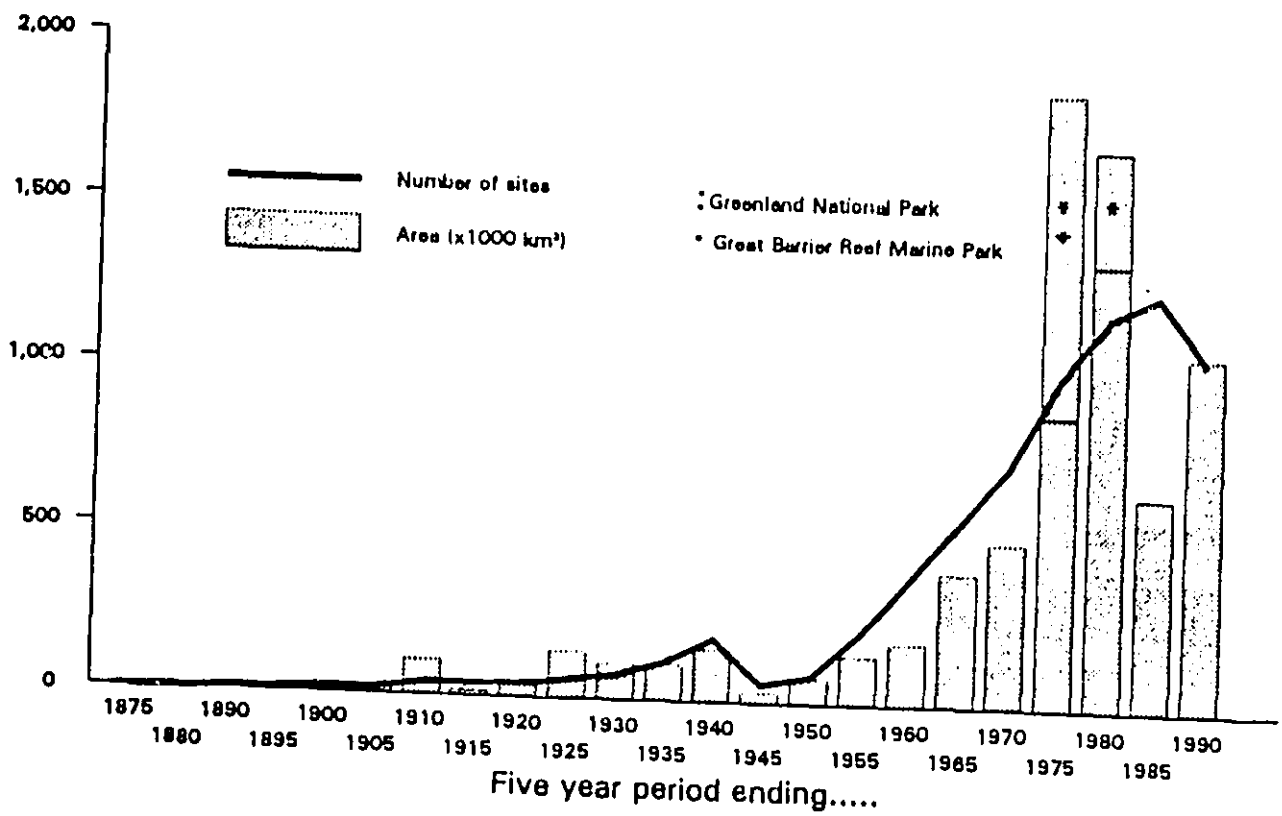
2.2:2 The Concept of Parks and Protected Areas

It is necessary here to introduce and explain the concept of parks and protected areas, an understanding of which is essential in this study as they form the main strategy for wildlife conservation. The national park or protected area concept originated in the

United States with the establishment of the world's first national park, Yellowstone, in 1872. Artificial boundaries were drawn around "special places" so they could be set aside from the "ravages" of ordinary use (Carr 1988; Hales 1989; Hiscock 1986) for visitors' inspiration and enjoyment (Barnes et al. 1992; Luard 1985; Wells and Brandon 1992). Over the years, this concept spread to different parts of the world, especially after 1962's first World Parks Congress held in Seattle, USA. Since then, over 80% of the world's protected areas have been established.

Today, there are 6,900 protected areas in more than 130 countries covering about 5% of the world land area (equivalent to twice the size of India) (McNeely 1992). Figure 2.2 shows global growth of protected areas over the years.

Figure 2.2 Global Growth in Numbers and Area of National Parks and Equivalent Protected Areas



Source: WCMC 1992

A substantial proportion of protected areas are in the developing countries, where human population is fast increasing and where the majority of people still depend on land resources. In Africa, there are now 426 protected areas covering about 88 million hectares or 4.4% of the land area (Hannah 1992; Kiss 1990; Omo-Fadaka; 1980; 1992). The goal of IUCN and other world conservation bodies are to include a cross-section of all major ecosystems in the protected area system, a task which calls for a total of 13 million sq.km., or some 8-10% of the earth's land surface (Western 1989).

The protected area system in different parts of the world faces numerous inadequacies. First, the 6,900 protected areas are too small and widely scattered to avoid massive biological discontinuities if disrupted by humanity (Shafer 1990; Western 1989). As McNaughton (1989) states:

> It is impossible to set aside an area sufficiently large as to be self-contained; there will always be spillover between reserve and surrounding areas (McNaughton 1989:110).

Second, few protected areas were designed biologically. Human enjoyment, in other words, tourism, was the driving force behind their establishment rather than ecology (Barnes 1992; Hough 1988; Western and Henry 1979). Parks and other protected areas were established, particularly in Africa and Asia, to protect the larger mammals that attracted international tourism (Hales 1989; Lusigi 1981; Anderson and Grove 1987). Finally, and most importantly, the protectionism policy does not sit well with development, especially in developing countries, where evicting people to save wildlife does more harm than good (Hales 1989; Mishra 1982; Mordi 1989). Protected areas in developing countries will survive only in so far as they address human concerns (Asibey 1990; McNeely 1989; Miller 1982). Enforcement activities alone will not protect wildlife and its protected habitats.

Studies have shown that the USA model may not always be relevant to other economic, social, and cultural contexts, particularly in the developing countries (Ayensu 1984; Mishra 1984; West and Brechin 1991). The concept ignored the local people in the

surrounding areas (Asibey 1988; Bell 1987; Lusigi 1984; Saharia 1984). As Lusigi puts it:

> National Parks are a western idea - the outgrowths of western conservation needs, fears and worries - introduced to developing countries by colonial powers and later copied by developing nations under pressure and encouragement from both international conservation organizations and conservationist members of local elite groups (Lusigi 1984:137).

Hough (1988) notes that this generates three particular problems. First, the institutions and agencies established to plan and manage national parks in non-western countries have to wrestle with a concept of strict protection which is ill-suited to their needs and problems. Second, conservation movements, especially in the developing countries, are heavily influenced by the international conservation community which is only just starting to promote alternatives to national parks (IUCN 1980; UNESCO 1974). Third, parks are bound to laws and by-laws which reflect regulations that are often locally inappropriate western concepts (Boshe 1986; Hough 1988). The establishment of national parks and other protected areas is often initiated through support of international organizations such as IUCN, UNESCO, WWF, NYZS. Rarely do local people themselves propose the establishment of protected areas, wherever they do, such as Kakadu National Park in Australia (Hill 1983), the motive often is to protect themselves and their land from other powerful interests.

Today the conservation community has acknowledged that local populations in the vicinity of protected area boundaries frequently bear substantial costs as a result of lost access, while receiving little in return (IUCN 1991; Kiss 1990; Wells and Brandon 1992). Local people living in areas adjacent to parks, who tend to be comparatively poor and have received little government attention than other societies, often perceive wildlife and their protected areas negatively (Wells and Brandon 1992; Berger 1989). Conservation policies have led to considerable conflict between conservation interests and local communities. Preventing local people from exploiting or occupying protected areas has also denied them access to traditionally-used resources (Bell 1984; Borg 1977), and often requires resettlement. This in itself has potential for disastrous side-effects (Calhoun 1991;

Bowonder 1983; Hough 1988). Many local people have suffered livestock depredation, crop damages, human bodily injuries or death and competition over resources (Bell 1984; Brown 1968; Mishra 1984; Pearse 1968; Pearson and Caroline 1981).

One other problem with the traditional wildlife conservation practice, as identified in the literature, is its emphasis on tourism, particularly in developing countries, and the consequent association of wildlife conservation through protected areas with benefits for the national economy. As Hough (1988) notes, "wildlife conservation and protected area management tends to focus on the requirements of tourists rather than on the requirements of local people". Wildlife is protected mainly for tourists to come and watch. Hotels and camps are often situated within the parks rather than on the boundary. Even those employed to work in the wildlife-based tourism are brought in from the towns and cities, because they are better educated and trained than the local people. Often they live within the protected areas and have little interaction with the local economy.

Although national parks following this agenda are perhaps the best known, there are other types of protected areas (Table 2.4) established mainly to maintain biological diversity and to allow for recreation. Some areas allow some degree of human use and controlled exploitation while others do not. Some objectives have never been made use of, especially those that allow human use. Despite the regulations, most of the protected areas are experiencing degradation as a result of expanding human populations and agricultural frontiers, illegal hunting and various human pressures. If this trend continues, wildlife in and around many protected areas in different parts of the world will diminish dramatically in the next decades. In the next section, major factors influencing wildlife-human conflict and the effects of the conflict on wildlife and on humans are outlined.

Table 2.4 Protected Area categories[19] and management objectives

Category/Type	Objectives
I. Scientific reserve/strict nature reserve	Protect nature and maintain natural processes in an undisturbed state. Emphasize scientific study, environmental monitoring and education, and maintenance of genetic resources in a dynamic and evolutionary state.
II.National park	Protect relatively large natural and scenic areas of national or international significance for scientific, educational, and recreational use.
III. Natural monument nature	Preserve nationally significant natural features and maintain their unique characteristics
IV Managed nature reserve/ wildlife sanctuary	Protect nationally significant species, groups of species biotic communities, or physical features of the environment when these require specific human manipulation for their perpetuation.
V Protected landscapes	Maintain nationally significant natural landscapes characteristic of the harmonious interaction of people and land while providing opportunities for public recreation and tourism within the normal life-style and economic activity of these areas.
VI Resource reserve	Protect natural resources for future use and prevent use or contain development that could affect resources pending the establishment of management objectives based on appropriate knowledge and planning.
VII Natural biotic area/ anthropological reserve	Allow societies to live in harmony with the anthropological reserve environment, undisturbed by modern technology.
VIII Multiple-use management	Sustain production of water, timber, wildlife, pasture and area/managed resource area outdoor recreation. Conservation of nature oriented to supporting economic activities (although specific zones can also be designed within these areas to achieve specific conservation objectives)

Source: International Union for Conservation of Nature and Natural Resources (IUCN 1985).

2.2:3 The Nature, Causes and Consequences of Wildlife-Human Conflict

In the last 15 to 20 years, as human numbers have increased, conflict between conservation and development needs have emerged. Many studies have shown an increase in the occurrence of conflict in different parts of the world, especially in the developing countries (Marks 1984; Matzke 1975; UNEP 1988; Zube 1986). However, little detailed documentation is available on the nature, and causes and effects of conflict, especially at

[19] The categories have been changed, and are sometimes classified into only five groups (Hannah 1992), but main types are basically the same.

the local regional level. Table 2.5 summarizes major factors influencing wildlife and human conflict according to most of the literature reviewed.

Table 2.5 Major Factors Influencing Wildlife-Human Conflict

Commonly Cited Possible Causal Factors	Selected References
PLACE-BASED/DEVELOPMENTAL FACTORS •Increase in human population growth and densities into originally wildlife areas •Increase in livestock population and density leading to grazing pressures •Increase in wildlife population densities	Lusigi 1978; McNeely and Miller 1984; Martin 1984; Talbot 1984
•Growing demands, scarce resources, poverty, and the inequality of access to resources	Dixon and Sharma 1990; Yeager and Miller 1986; Asibey 1990
•Changing land use patterns and increased demands leading to shortage of land, privatization of land, and economic policies that favour agriculture. These cause loss of wildlife habitat	Bonner 1993; Sharma 1990; Shaw 1978; Miller 1982; Ecosystem Ltd. 1992; Yeager and Miller 1986
PERCEPTUAL/ATTITUDINAL FACTORS •Antagonistic attitudes towards wildlife/protected areas and conservation authorities. These are generated by neglect of the local people, especially since the establishment of colonial powers	Abrahamson 1983; Aboud 1989; Infield 1988; Parry and Campbell 1992; Mordi 1987
•Inappropriate policies and ineffective law enforcement, protective strategies that deny the local people access to park resources	Boshe 1986; Okoth-Ogendo 1980; Little and Brokensha 1987
•Colonial legacy, especially in developing countries whereby indigenous communities still perceive programs as being imposed on them	Lusigi 1978; Marks 1984; West and Brechin 1991; Asibey 1988
•Lack of wildlife conservation education and ineffective education programs	Ashby 1978; Berger 1989; Nyahoza 1980
•Lack of economic benefits to local people. Lack of public participation, involvement of local people or use of traditional knowledge	Arhem 1984; McNeely 1988; UNEP 1988; Lucas 1984

2.2:3.1 Human population growth and density

One central and frequently mentioned cause of the wildlife-human conflict is population growth and density (Lusigi 1978; Yeager and Miller 1986). Population growth generates a demand for land in areas traditionally reserved for game. As a result, cultivation extends into ecologically marginal zones, and new farms encroach on game areas.

Ultimately, human and animals clash (Miller 1982; Capone 1972). The human tide is also pressing into the wildlife buffer zones i.e; the traditional dispersal areas that game move into and out of on a seasonal basis. In many developing countries, demographic pressure forces landless peasants, whose only chance for survival lies in subsistence agriculture, to occupy protected areas "illegally" (Halffter 1981). Talbot, a long time researcher on African wildlife, summarized the causes as follows:

> ... the burgeoning human population, the increasing rate of development activities, and the even more rapidly increasing needs for effective development combined with what is perceived as a preservationists' approach to conservation, have created increasing conflicts between those concerned with conservation and those with development (1984:15).

Ian Parker, a wildlife writer and researcher, referring to the situation in Kenya, noted that human population density problem is at the core of the issue.

> Population pressures will force rural people to break the laws more frequently, causing a great deal of social and political unrest, to the point that the government will in all likelihood have to back down from greater enforcement. Kenya will never go to extreme measures to maintain the game. At some point, the system must crash (quoted in Yeager & Miller 1986:72).

Matzke (1975) found that populations of large mammals are strongly influenced by the pattern of human settlement. Human settlement may restrict wildlife access to areas that are especially important to the maintenance of wildlife populations. An increase in the human population can also lead to an increase in livestock numbers, which in turn can lead to overgrazing and degradation of the range resource. Similarly, population increase can lead to an increase in percentage of land under cultivation which reduces wildlife range.

2.2:3.2 Attitudes to and Perceptions of Wildlife

Studies have found a wide range of attitudes towards wildlife, its protected areas, various conservation policies, and conservation authorities. The early studies by Harroy (1964) found that there was a broad understanding and support of the National Parks. However, Abrahamson (1983) found that the desire to protect wildlife, especially in

communities see conservation as a "white", middle-class preserve (Abrahamson 1983; Bonner 1993; Cowell 1984). For most of them, the pressure of feeding their families, educating their children, getting adequate health care, and many other day-to-day needs, takes precedence over what they perceive as the largely aesthetic considerations of rich foreigners. Marham (1981) and Parry and Campbell (1992) found that resistance to conservation areas was high and that rural Africa had little interest in wildlife conservation. Yeager and Miller summarized the conflicting perception, attitudes and interests in the case of Kenya as follows:

> ..rural dwellers are determined to defend their farming and grazing areas and to protect themselves, crops and their livestock from wildlife. Poachers and other wildlife exploiters treat game animals as an obvious and easily accessible source of profit. National elites look to wildlife-related tourism as a major producer of foreign exchange, which is badly needed both for economic development and for acquiring imported food and luxury for the Kenyan elite class. International visitors and wildlife advocates observe and preserve the animals, which they prize as irreplaceable aesthetic and scientific treasures. Little agreement is ever reached between those who contend with wildlife on a day-to-day basis and those who wish to protect them for other purposes" (quoted in Matowanyika, 1989:36).

2.2:3.3 Other Factors

Several other factors ranging from lack of wildlife conservation education and public participation to inappropriate policies are indicated as some of the causes of the conflict (Adams and McShane 1992; Lusigi 1984; McNeely and Pitt 1985). The colonial legacy, for example, affects local peoples' attitudes and participation (West and Brechin 1991; Willock 1991). They believe wildlife conservation was forced on them and maintained for the whiteman and then the educated elites. The concept of protected areas (national parks) is an alien and unacceptable idea to local people. Dasmann (1976) has noted that conservation was probably at its most effective before the words "nature conservation" were spoken. Barbier (1990), Martin and Taylor (1983), and Marks (1984) have described how Africa passed through a period of integrated and healthy social systems, where activities and

decision making emerged from the environmental and cultural contexts within which peoples lived, to intensive wildlife slaughter by Europeans in the early part of the century, before the preservationist movement arose which demanded total protection through the establishment of national parks.

2.2:3.4 Effects and Consequences of Conflict

A substantial body of literature has documented the effects and consequences of conflict, especially the effects on wildlife and its habitat (Bell 1984; Lusigi 1984; Talbot 1984; Machlis & Tichnell 1985). Many species have become extinct due to either direct poaching or habitat degradation (Myers 1985; Shafer 1990; WCMC 1992). Researchers agree that a major long-term threat to wildlife is habitat degradation and over-exploitation of resources (Table 2.6) (Anderson 1991; Talbot 1984; Western and Pearl 1989). This also threatens the pastoral activities.

The decline of wildlife range is well documented (Carr 1988; Simon 1962; McNeely 1988). Currently, in most parts of the world, especially Africa, wildlife is mainly confined to parks and their adjacent areas (Fletcher 1990; Furnes 1982; Myers 1981). With increasing reclamation of land for farming and demand for wood as fuel and building materials, wildlife distribution has shrunk dramatically (McNeeley et al. 1990; Enghoff 1990). Mcgregor summarized the situation in Africa as follows:

> The decline of Africa's wildlife has as much to do with the competition for space between human and the animals as it has with poaching and the international trade in hides, ivory and rhino horn. Africa's human population doubles every twenty years, and the range land of elephants .. and of other wild animals is shrinking as pressures on arable land increases (1989:201).

Cumming (1981), Martin and Taylor (1983), and Myers (1972) also explain how the movement of wildlife has been increasingly restricted to protected areas. The national parks and reserves are becoming refuges into which animals concentrate, resulting in an accelerated habitat destruction in most African parks.

However, mention is rarely made of the effects of conflict on humans, such as crop destruction, livestock depredation, disease transmission, and competition for pasture and water resources (Myers 1983; McNeely et al. 1990) (Table 2.6). Emphasis has been on the impact on wildlife, the protected area, and the environment.

Table 2.6 Effects of Wildlife-Human Conflict on Wildlife and on Humans

EFFECTS ON WILDLIFE
•Habitat loss or modification, often associated with habitat fragmentation. This occurs as a result of encroachment into wildlife areas in the form of cultivation, pastoral development and permanent settlements, forestry operations and plantations, fire, and pollution. •Extinction of species due to over-exploitation to meet commercial or subsistence demands including poaching and collection of live animals. There are also diseases eg. rinderpest that could kill ungulates etc •Blockage of migratory routes •Stress on protected area through encroachment
EFFECTS ON HUMANS
•Relocation: People physically moved to another location without consent. For example; in the Myika National Park in Malawi, the Phoka people relocated. The Ik of Uganda were also moved when Kidepo National Park was created. •Land alienation: People continue to reside within protected areas but are strictly controlled in the practice of livelihood activities causing substantial effects on their social and economic conditions •Restriction of access to resource use: People are barred from access to resources such as firewood or grazing and water areas, ritual sites, by nature of zoning or total exclusion from the protected area. There is also the restriction of personal pursuits and other aspirations •Damage to property: crops, livestock, sometimes human deaths or bodily injuries. •Spread of diseases to domestic stock. •Competition for resources pasture and water •Increased financial and administrative costs: for managing wildlife, eg. fencing costs or hiring guards, maintaining dogs to scare wildlife

The position of this study is that effects both on wildlife and humans must be considered if wildlife protection and human needs are to be integrated. Conservation must be sustainable just like development, that is conservation strategies must adopt a "give and take system", in order to be fair to local interests. In the section that follows, we look at the attempts to integrate conservation with local development. We map out where they are

located in different parts of the world and we summarize their aims.

2.2:4 The Need for an Integrated Approach to Wildlife Conservation

The need to integrate conservation with development has been widely recognized (IUCN 1980: 1991; UN 1992; UNEP 1988). IUCN (1980) suggested a comprehensive approach to what it described as "living resource conservation for sustainable development". It emphasizes a human-centred approach to conservation through three major conservation goals: (1) to maintain essential ecological processes and systems, (2) to preserve genetic diversity, and (3) to insure sustainable utilization of species and ecosystems. The management of wildlife areas (parks), for example, can no longer be restricted to problems within the boundaries, but must actively seek to influence activities outside the boundaries. That is, it must use an integrative or ecosystem management approach[20]. The goal of the strategy is the integration of conservation and development to ensure that modifications to the world environment are designed to secure the survival and well-being of all people.

Examples of attempts to integrate wildlife-protected area conservation with the well-being of local populations are dotted all over the world. Specific conservation areas, the countries in which they are found, and the programs being undertaken are summarized in Table 2.7. The location of some areas are shown in Map 2.1. Examples of such attempts include Kenya (Western 1984), Nepal (Mishra 1984), Australia (Hill 1983), Brazil, Costa Rica, and the U.S.A. (Swem & Cahn, 1984). They aim to modify restrictive preservation strategies to include indigenous people, their traditional forms of resource exploitation and occupation, and to harmonize them with the environment (Cartwright 1985; Hough 1989). One strategy is based on spreading the benefits of tourism to local people (Boo 1990; Child

[20] Conservation is therefore defined in this study as "specially planned management of a natural resource to prevent over- exploitation, destruction or neglect". It emphasises that development must be people-centred but conservation-based (Korten and Klauss 1984; IUCN 1991). The traditional approaches based on controlled use and preservation of wilderness, as "unspoilt temples" can no longer work.

Table 2.7 Examples of Attempts to Integrate Wildlife-Protected Area Conservation with Local Population

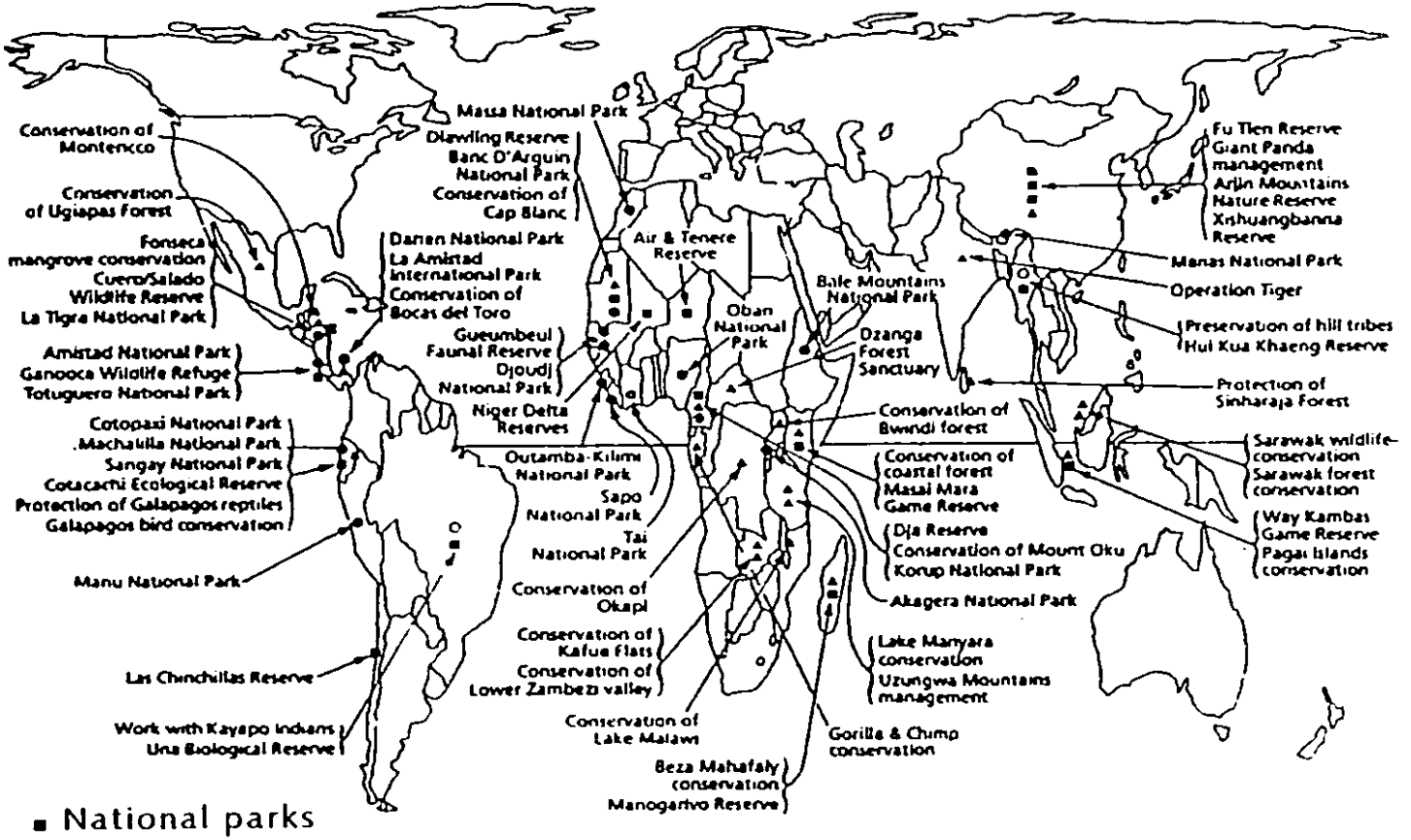
COUNTRY	PROTECTED AREA	MAIN ACTIVITY/PROGRAM (Year of initiative)	SELECTED REFERENCES
NIGER	Air-Tenere Nature Reserve	Emphasise conservation, protection and rural development	Newby 1990; Wells and Brandon 1992; Brown 1991
CANADA	Wood Buffalo National Park	Co-management programs created to provide active involvement of native peoples (Innvialuit and Cree) (1985/1988)	East 1991; West and Brechin 1991
USA	Pinelands National Reserve	Joint state and local land use planning and regulation, involving local land users (1981). Growth not prevented but effectively controlled	Hales 1991; Dasmann 1988
KENYA	Amboseli National Park	Water-point, community services to compensate local people for loss of access to the park. Improve local participation	Western 1982:1984; Lindsay 1987; Talbot and Olindo 1990
	Tsavo National Park	Focuses on resolving conflict between wildlife and local communities	Berger 1989; Snelson and Lembuya 1990
MADAGASCAR	Beza Mahafuly and Andohahela Reserve	Promote local development and conservation programs	Shafer 1990; Wells and Brandon 1992; Ghai 1994; Ghimire 1994
AUSTRALIA	Kakadu National	Promote local culture. Co-management involving government agencies and Aboriginal people (1979/1984)	Hill 1983; Shafer 1990; Weaver 1991
TANZANIA	Ngorongoro Conservation Area	Multiple use area aims to integrate conservation with the development needs of the local communities	Arhem 1985; Homewood and Rodgers 1991; Parkipuny 1981
	Serengeti National Park	Loliondo project (Neighbours as Partners' Program) aims to establish partnership amongst conservation authorities, local people and government agencies (1987)	Snelson and Lembuya 1990
NEPAL	Sagarmatha National Park	Multiple local small scale operations (1976)	Clad 1984; Sournia 1986; Weber 1991
	Annapurna Conservation area	Mitigate the effects of tourism, promote local development	Hough and Sherpa 1989
	Royal Chitwan National Park	Villagers permitted under control to collect grass for house construction and thatching from the park	Lemkuhl et al 1988; Mishra 1984
BURKINA FASO	Nazinga Game Ranch	Protect wildlife, provide rural communities with benefit from employment, hunting, tourism, and meat production	Lungren 1990; Wells and Brandon 1992;

INDIA	Gir Sanctuary	Provision of monetary subsidies and health services	Sahari 1984; West and Brechin 1991
RWANDA	Volcanoes National Park	Protect the parks Gorillas and promote tourism	Hannah 1992; Vedder and Weber 1990
ZAMBIA	Lupande Game Management Areas (ADMADE)	Promote return of safari hunting to local communities, job creation and anti-poaching in game management areas.	Lewis et al. 1990; Lungu 1990; Marks 1991
ZIMBABWE	CAMPFIRE	Communal lands. Sharing monetary gains through hunting with local people	Martin and Taylor 1983; Murindagomo 1990
BURUNDI	Bururi forest	Promotes conservation and forestry activities	Hannah 1992; Kiss 1990
MALAWI	Michuru Mountain Conservation Area	Co-management by government and local land owners, land use zoning (basic needs approach) (1980).	Hough and Sherpa 1989, Hough 1991
THAILAND	Kao Yai National Park	Promote conservation through development	Mackinnon et al. 1986; Wells and Brandon 1992
COSTA RICA	Talamanca Region (Gondoca-Manzanillo Wildlife Refuge)	Promote small-scale development activities emphasizing sustainable development practices. Supports income generating activities and local organizational activities	Kutay 1991; McNeely 1995, Wells and Brandon 1992
MEXICO	Sian Ka'an Biosphere	Promote small-scale development and publicity Improvement of forestry	Shafer 1990; Wells and Brandon 1992
	Monarch Butterfly Overwintering refuge	Protects butterflies, promote tourism and education in local communities, reduce the high level illegal logging	Miller 1992; Wells and Brandon 1992
INDONESIA	Gunung Leuser National Park	Reduction agriculture encroachment through buffer zones	Shafer 1990; Wells and Brandon 1992
PERU	Central Selva, Yanachanga-Chemillen National Park	Maximize sustained productivity of watershed and increase local income	Wells and Brandon 1992

Sources: Dixon and Sherman 1990; Mackinnon et al. 1986; McNeely 1990; Rickinson 1993; WCMC 1992; Wells and Brandon 1992; West and Brechin 1991.

The examples shown in the table are some of the most popular ones, those that have been described as most prominent and effective. Recent studies (Wells and Brechin 1992), however, have revealed that many of these projects were initiated with only a very limited understanding of the root causes of the threats to the wildlife-protected areas that they were attempting to resolve. In virtually all the projects, the critical linkage between development and conservation is either missing or obscure.

Map 2.1
Areas of conflict between conservation and development



- ■ National parks
- ● Faunal/floral reserves
- ▲ Other consevation projects
- o Projects with indigenous people

Most areas of conflict occur in developing countries and in the arid or mountaneous parts of those countires inhabited by indigenous peoples

(Source: WWF 1987)

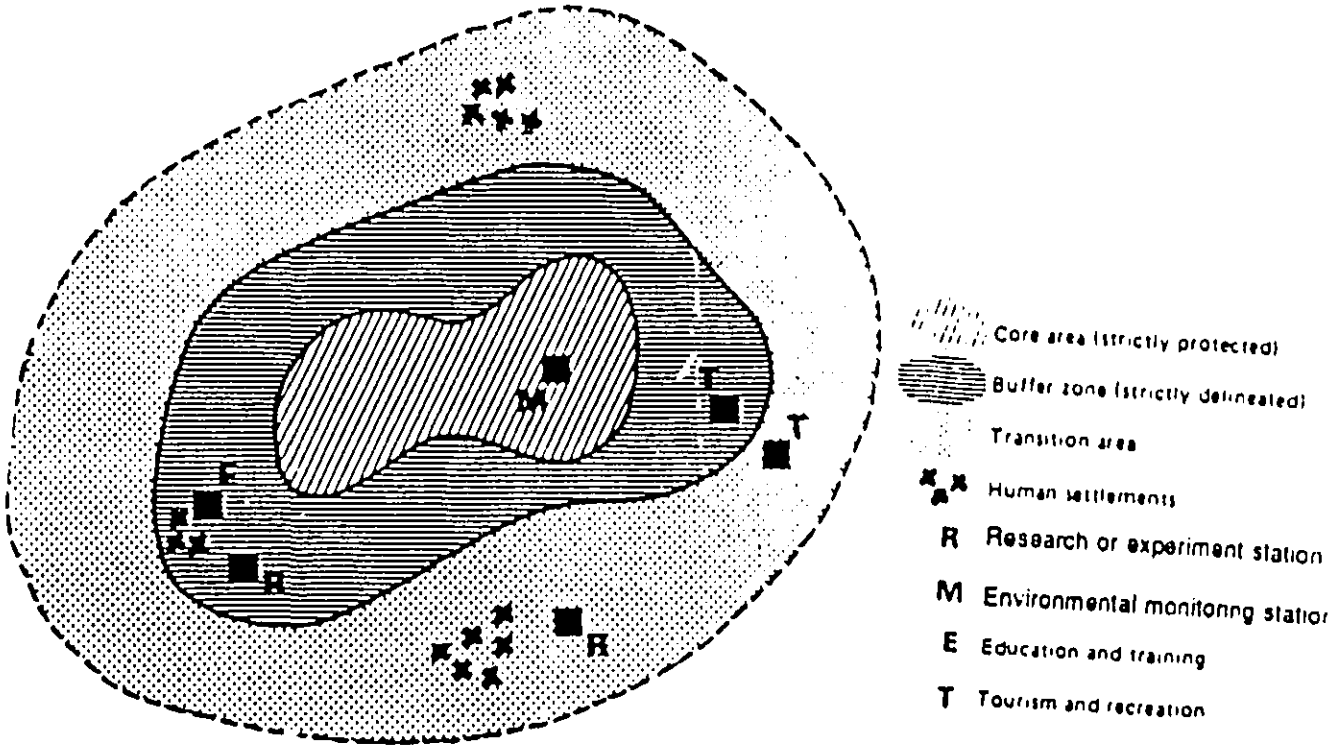
1984; Croft 1981). Western (1984) describes how economic benefits from Amboseli National Park in Kenya were directed to the local Maasai economy. Collett (1987) notes, however, that only a limited number of local people actually benefited and the program failed. In some cases, he notes, economic incentive may generate new problems in society such as the creation of conflict over biased distributions of the benefits. Mishra (1984) records how increased tourism benefits in a region artificially inflated some prices beyond the reach of the local people. Clearly, more than good intentions are required to successfully integrate conservation with development.

A number of alternatives to protected areas have been suggested and are actively being promoted. Examples include the UNESCO Biosphere Reserve (Figure 2.3a) (UNESCO 1974) and the conservation unit approach (Figure 2.3b) (Lusigi 1981). Here, core areas, possibly protected areas, are buffered by surrounding controlled areas where some forms of utilization are allowed (Batisse 1982; Hough 1991; Shafer 1990). This follows the realization that the traditional approaches to wildlife conservation, through (1) protected area systems, and (2) enforcement activities, have been unable to integrate competing objectives (Wells and Brandon 1992; Zube 1986). Enforcement alone will not preserve wildlife and the protected areas (Asibey 1984; West and Brechin 1991). Conservation requires a perspective that goes beyond park boundaries and must influence national policy and the programs affecting rural communities.

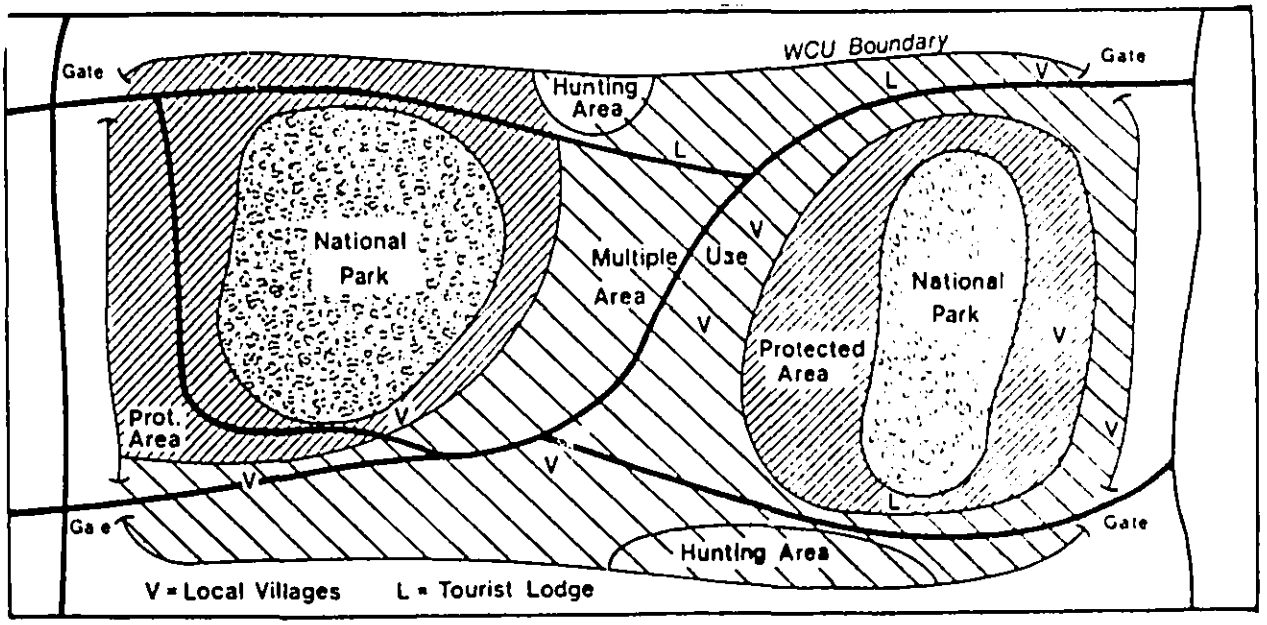
Other integrative models being tried include buffer zones, wildlife corridor, and a variety of other regional activities, such as provision of water, schools and other social infrastructure. For example, Zimbabwe CAMPFIRE, and Zambia ADMADE and LIRDP wildlife regions (Lewis et al. 1990; Martin and Taylor 1983), but they have various strength and weaknesses. They are all advocating less strict protective strategies that allow some human activities.

Nevertheless, these models fall short of being operational. Some of them such as

Figure 2.3 Biosphere Reserves and Conservation Unit Approach



(a) Biosphere Reserve (UNESCO 1974). After Batisse 1982



(b) Conservation Unit. After Lusigi 1981.

Figure 2.3(a)(b) Simplified diagrams suggesting the idealized modification of Protected Area concept. The two models are generally similar. The core is the least disturbed zone, where no development is permitted and human activities are strictly controlled.

the biosphere reserves are developed as general guidelines, initiated at the international level, and may not easily be applied to specific sites. Others, such as the Conservation unit approach advocate adherence to ecological tenants, and the formation of concentric zones for different land uses. This may not be practical. In the first place, establishment of most parks was largely influenced by political situations in the areas they were established. Almost none were established in completely unsettled areas. In most cases people had to be evicted. It is therefore imperative that a model must start with the situation as it is and manage it to maintain or improve it.

Success of these alternative strategies is yet to be proven. There appears to have been little concerted effort to apply the principles of conflict management to wildlife-park-local people relationships. Parks are not self-contained islands and cannot be managed in isolation from the surrounding areas (Lusigi 1978; Shafer 1990). Dasmann notes that:

> In considering the relationships of people to protected areas, ... we must look well beyond the boundaries of those areas and work with local people to create ecologically sustainable systems of land and resource use. Nature reserves must be seen as parts of those systems, not separate from them. Obviously, people must see the opportunity for economic stability in a context of ecological sustainability before they will take a serious interest in protecting the wild environments of protected areas (1984:348).

The preservationist's view of wildlife and wilderness must give way to a broader discussion linking conservation to the process of rural development and survival of the agrarian societies (Anderson and Grove 1987). Dasmann again notes:

> ... the national parks, nature reserves, and other protected areas of the world have most commonly been established without the advice or consent of the people most likely to be directly affected by their establishment. Without the support or at worst acceptance by these people, the future of any protected area cannot be considered secure, since in their search for the means for their own survival, the temptation to take wildland resources from the area or to encroach upon its boundaries will tend to be irresistible (1984:347).

A growing number of conservationists are now coming to believe that the only way to save wildlife, especially in Africa, is by making it pay for itself. The utilization of wildlife and the inclusion of the local people in planning and management of conservation areas are

now actively encouraged (Adams and McShane 1992; Brownrigg 1985; Dasmann 1985; Martin 1986; Mishra 1986).

Integrated land use management, including extension of tourism outside the protected areas, provision of water, and prompt payment of compensation, are considered strategies that may make the local people appreciate wildlife conservation efforts. A more important strategy, however, may be local participation and effective conservation education. The conventional conservation practices and policies have tended to be narrow, dominated by western views of the need for nature conservation (Adams and McShane 1992; Anderson and Grove 1987; Mcgregor 1989). Lusigi summarizes the dilemma, referring to the Kenyan situation:

> ..the idea of "national parks" as it is presently conceived is an alien and unacceptable idea to the African population. Making that idea culturally and socially acceptable to the people will require a transformation which has not yet taken place, and which, in my opinion, may never take place if present trends continue (1984:138).

Parks, protected areas and their wildlife must be seen to be relevant to the everyday social and economic needs and pursuits of the communities that surround and interact with them (UNEP 1988). The main message is that past conservation practices have negatively affected native communities. This is partly because technical experts seldom invite indigenous peoples to help formulate conservation projects. Native peoples have unique grass-roots insights acquired through decades of experiences with local habitats. Ignoring these insights is likely to bring inappropriate projects with few benefits and high risks to the habitat and the delicate balance that marks traditional resource use.

Further examples of integration have been presented. Martin (1986), drawing from a case study of Chirisa Safari Area in Zimbabwe, explains how through the provision of a pragmatic policy that views wildlife as a renewable resource, wildlife can be used for the benefit of the local people. The local people derive direct income benefits from the sale of wildlife products or hunting rights. Without such benefits, wildlife would have been

eliminated, either intentionally to make way for agriculture or through the destruction of its habitat. The local people would naturally turn to poaching - either directly or in combination with outsiders who would share the meat with them. East (1991) describes the efforts to provide native people who live in and around some of Canada's northern national parks with an opportunity to influence and determine how the parks are to be managed. However, he explains that joint management structures are still hampered since the decision-making continues to rest legally with the minister, and thus no real power is transferred to the local people.

In another study, Hough (1991) shows how an integrated approach to land use on which the conservation area was based could enable a degraded Michiru mountain in Malawi to (1) retain its traditional productivity; (2) increase its standing crop; (3) improve on abundance and diversity of its wildlife; and (4) provide an educational and recreational resource. Through proper management, a variety of demands both of the local community and traditionally conflicting agricultural, forestry, wildlife and watershed interests can be integrated. Hough has proposed approaches for managing relationships between wildlife, parks and the local populations including: (1) improving communications and building trust; (2) incorporating mechanisms for conflict management and local participation; and (3) addressing structural barriers to such approaches. Hough argues that the parks authority rather than the local people have the greater incentives and abilities to pursue improved relationships.

In summary, although there are many studies on wildlife-human conflict (Capone 1972; Ecodynamics 1982; Lusigi 1978; Mwenge 1980; Myers 1983; UNEP 1988; Western 1976), most have not yet adequately considered the views of those involved in the day-to-day consequences of the problem. In addition, the discussion has not been infused with a systematic inquiry into the nature, causes and effects of the conflict. Many of the studies have tended to derive from one discipline, and focus on end-product solutions rather than

the processes, while ignoring other important factors that may render implementation impossible.

Nonetheless, studies undertaken have noted a number of issues which need to be resolved if wildlife and humans are to be integrated. First, the conservation of nature must be seen as fundamental to human existence and the concern of all people everywhere (Dasmann 1984; McNeely 1988; Dixon and Sharma 1990). However, it is not to be accomplished only by the setting aside of protected natural areas as has been the traditional approach. "All areas must be protected, to some degree, since even the most heavily urbanized areas provide suitable living spaces for many wild species" (Dasmann, 1984). The second issue to be resolved is that of ownership, tenure, and resource use. As mentioned earlier, the establishment of a park is primarily a government responsibility, and the rights of the local people have most often been neglected (Kiss 1990; Newby 1990; West & Brechin 1991). It is now increasingly recognized that local people must be involved and allowed their traditional rights of use of the protected area resources (Mishra, 1984). Successful long-term wildlife conservation and management of its protected areas depend on the cooperation and support of local people. It is neither politically feasible nor ethically justifiable to exclude the poor from parks' resources without providing them alternative means of livelihood (Wells and Brandon 1992, West and Brechin 1991).

The definition of wildlife conservation must be extended to encompass human ecological problems. Emphasis should be placed on interdisciplinary approach to dealing with problems. Past studies, especially by biologists, have shown little empathy for and understanding of social issues and the historical contexts of their programs. While this is understandable it is regrettable, since wildlife survival is tied to diverse human interests and concerns at many different levels. Today, wildlife is abundant primarily in marginal areas or along development frontiers where its survival is challenged by interrelated economic and political interests. The precarious conditions of life on the frontiers (rangelands) provide

wildlife conservationists an opportunity for developing viable alternatives to their more orthodox practices. Decisions affecting wildlife survival and the welfare of small-scale rural societies, often existing on the same terrain, are increasingly made in bureaucratic institutions far removed from the consequences of their actions. Many of the studies state that long-term success of wildlife conservation and its protected areas requires a shift in management philosophy that combines resource management with a sensitive understanding of the social and economic needs of the local people.

In developing countries, the essential needs are food, clothing, shelter, and meaningful employment. It should aim at maintaining and managing natural resources for sustainable development, integrating socio-cultural land and economic activities in surrounding areas with land uses that complement rural development. Rural people have not fully accepted wildlife conservation efforts because conservation is identified with the protection of animals and habitats. Local people are usually seen as potential threats to these exclusive areas. They in turn look upon protected areas as systems that "lock away" resources by the powerful policy makers in society and look at wildlife as competitors with their stock. Many conservationists now acknowledge that communities next to protected area boundaries frequently bear substantial costs. The challenge is how to balance the demands.

2.3 Theoretical and Conceptual Considerations

The aims of this section are: (1) to describe the theoretical context upon which this research is based, and (2) to outline the conceptual framework adopted in the study. Two types of theories are utilized: conflict and conflict resolutions theories, and theories in natural resource management, specifically, Firey's (1960) theory of resource use. Conflict theories provide room for examining causes and nature of wildlife-human conflict, while theories in resource management provide base for considering how wildlife conservation

and human development needs can be integrated.

2.3:1 Theory of Conflict and Conflict management.

Conflict occurs when there is an incompatibility in interests, behaviour, goals, values, needs, expectations, and/or idealogies between parties (Boschken 1982; Brown 1983; Dennen and Folger 1990; Karz and Kahn 1987; Peperkamp 1986; Cox and Johnston 1982). Coser (1967) defines conflict as "... a struggle over values and claims to scarce status, power and resources....". Kelso (1962) notes that land use conflict occurs because land resources are limited, wants are limitless.

Conflict studies have attracted scientists of various disciplines: biologists (Dennen and Falger 1990); sociologists (Coser 1967); management scientists (Bisno 1988; Rahim 1986); political scientists (Vayrynen 1991; Wallensteen 1991), among others. Geographers and planners have traditionally been concerned with land use [spatial] conflict, and locational conflict, both in urban and rural areas (Cox and Johnston 1978; Gresch and Smith 1985). Recent conflict studies have included environmental disputes (Bacow and Wheeler 1984; Carpenter and Kennedy 1988; Marcus 1981; Susskind and Weinstein 1980) of which the focus has been to reduce the effect of human impact on natural resources. Planning has been seen as concerned with the management of spatial conflict (Gresch and Smith 1985). The increasing competition for use of scarce land has resulted in conflict management becoming a major issue of many developing countries. Effective conflict management requires adequate understanding of conflicts history, causes and how it affects the involved parties. This study hopes to contribute towards this need.

Different types and conditions of conflict have been noted (Brown 1983). For instance, parties can have incompatible interest and values yet not be in conflict, because their behaviour, also called "position" or stated interest, is compatible and they are not engaged in a "struggle" of any sort. Brown terms this "latent". Conversely, parties can have

compatible interests yet be in conflict in terms of behaviour, because they perceive themselves as having incompatible interests. These are described as "false" (Brown 1983) or "unrealistic" (Kriesberg 1982) conflict. They should be contrasted with "realistic" (Kriesberg 1982) or "real" (Brown 1983) conflicts where both interests and behaviours are incompatible and the parties are engaged in a struggle of some kind.

Peperkamp (1986) quoting Staps (1983) explains how conflict arises from a situation of tension: "tension related with the acquisition or maintenance of access to space can occur when more than one user wants to occupy land for a certain period and for planned activities (the same, similar, conflicting or dissimilar) on a certain location (the same, overlapping, bordering or distant)". He explains that such tension can manifest itself in various ways, usually termed as "competition or conflict". Both terms refer to a situation in which the potential users (actors) are aware of the existence of a certain amount of disagreement over the use of, or access to, a particular piece of land (Peperkamp 1986). Peperkamp differentiates between competition and conflict.

Competition is where one or more parties (actors) are being hindered while converting their production needs in spatial terms by the other party (parties) without feeling the need or having the will to take action against this. Conflict is where one or more parties (actors) are being hindered while converting their production needs in spatial terms, in such a way that one or more wish to take action at the cost of the other party. Conflict is sometimes distinguished from competition, in that the latter is governed by a set of shared goals or values, while the former is characterized by divergent goals and values between the parties involved (Paperkamp 1986). But this is a difference of degree rather than kind, since competitive social relations and situations will inevitably generate some degree of conflict or value divergence.

In this study, the two are treated as the same. The term conflict is used in two rather different senses which should be distinguished. One is that of a "conflict situation", which

might also be called an overt or expressed conflict, and the other is a "conflict of interests" or implicit conflict. It is important to establish the level of analysis of the conflict, and the levels at which the conflict occurs. In the case of wildlife and human, the conflict occurs at the local people's level. There could be conflict at the decision making levels, but in this study, the focus is at the ground, that is, competition between wildlife and the landowners who share their land resources with the wildlife.

A distinction may also be made between direct and indirect forms of conflict. The object of the struggle for space may make it a land (spatial) conflict (land-use) or a damage conflict. Moreover conflict can be deduced from causes which are located outside the area where the conflict is occurring. Peperkamp calls this secondary or shifted conflict; from causes primarily located within the same area (primary conflict). Conflict between actors (or parties) who practice the same kind of activity can be called "internal" conflict while conflict occurring between actors of different kinds of activity can be labelled "external" (Peperkamp 1986). Examples of some of those forms of conflict may be found in the Masai Mara region. This study, however, focuses on external conflict, that is, conflict between different parties as opposed to conflict within the same party.

Conflict management theory draws a distinction between reality and perceptions of reality. Though false conflict is based on mistaken perceptions of reality, such conflict is real to their participants. They reflect social constructions in the minds of the participants (Berger & Luckmann 1967). The methods used in examining the conflict between wildlife, protected areas and local people must be sensitive to the subjective perspectives of the participants (actors). In practice, conflicts are rarely pure, as most parties have some common interests and behaviours in addition to those which are incompatible (Kriesberg 1982). Consequently, conflict is generally "mixed" and there are areas of coexistence between parties and areas of conflict. For instance, studies have shown that pastoralism and wildlife can coexist with limited conflict, as compared to cultivation and wildlife.

Conflict can be regarded as functional as well as dysfunctional (Kriesberg 1982). Under certain circumstances it can be beneficial for a party to be engaged in conflict; however, a conflict which is functional for one party may not be functional for another. It should be noted that the actors involved in the conflict do not form homogeneous groups but are composed of individuals and coalitions of individuals within the larger social systems of institutions and society as a whole (Mitchell 1980). Since interest varies, any conflict actually consists of a series of crosscutting and overlapping conflicts (Freeman 1972). For instance, take the example of wildlife as consisting of ungulates and predators. The conflict with the ungulates, for example, zebra, eland may be less than the conflict with the predators, such as with lions, leopards or hyenas. Even within the ungulates, some animals, such as buffaloes, elephants, are less compatible than others, such as eland and zebra. Table 2.8 summarizes steps often followed in conflict resolution studies.

The term conflict, as used in this study, denotes both "actual" (occurring and causing concern) and perceived competition for resources (space, land, water, pasture) and the pursuit of mutually incompatible values and objectives. Two types of conflict are outlined. First, are those which are "place-based", and are geographically expressed. These are usually physical-biological relationships and are the subject of ecological studies, examples being herbivore-plant processes. The second set refers to relationships which do not necessarily have a spatial expression, and which can often only be inferred, for example, the ideology behind the policy of protected areas or restricting hunting. This set is typical subject matter for studies of political economy (Abel and Blaikie 1986). It is

Table 2.8 Steps Often Followed in Conflicts Studies

8 STEPS IN STUDYING CONFLICT SITUATIONS

- Know the characteristics of the parties in conflict (their values, their aspirations and objectives). In this case the requirements of wildlife conservation and those of humans must be known.
- Examine the history of the relationship, for instance, how the local people used to coexist with wildlife. The relationship changed with increasing human population, technology and the establishment of protected area concept.
- Identify the issues around which interaction occurs, including both conflict and cooperation; nature of the resources competed for.
- Determine the behaviours and interests of various parties that form around these issues.
- Determine the effects and implications of the conflict for all parties (Carpenter and Kennedy 1985; Bacow and Wheeler 1984; Hough 1989; Marcus 1981; Fisher and Ury 1981 Susskind and Weinstein 1980; Deutsch 1973).
- Determine the institutions and policy restraints including the nature of social norms and forms for regulating conflict.
- Establish conflict survival techniques employed by the parties, what the local people do to avoid conflict and what wildlife do to adjust to the changing environmental conditions.
- Propose solutions to reduce conflict.

Main Sources: Hough 1988; Brown 1983

necessary to combine both sets of understanding of conflict. Exclusion of the first leaves the analysis incapable of ecological explanation, while neglecting the second leaves the analysis in the realm of academic ecological relations where the effects of people and their institutions are unexplained and which assumes (wrongly) that the problems of Mara region, for example, start and can be solved in Mara itself.

In applying the theory of conflict in the study of wildlife/human situations, there is one factor complicating the analysis with respect to wildlife: what actors are involved in the conflict? Whose interests or goals are being injured? Wildlife cannot be called an actor, because it neither plans its own conservation, nor consciously claims its access to a given area. Conflict involving wildlife is often debated in terms of people versus animals.

This does not mean that wildlife-human conflict cannot be viewed in the same way

as human-human conflict. The basic underlying conflict situations are applicable in the wildlife-human equation. In any conflict, individuals act and respond differently. In the case of wildlife, the interface and effects of conflict differ from species to species. The species will respond differently, but this study does not consider individual species.

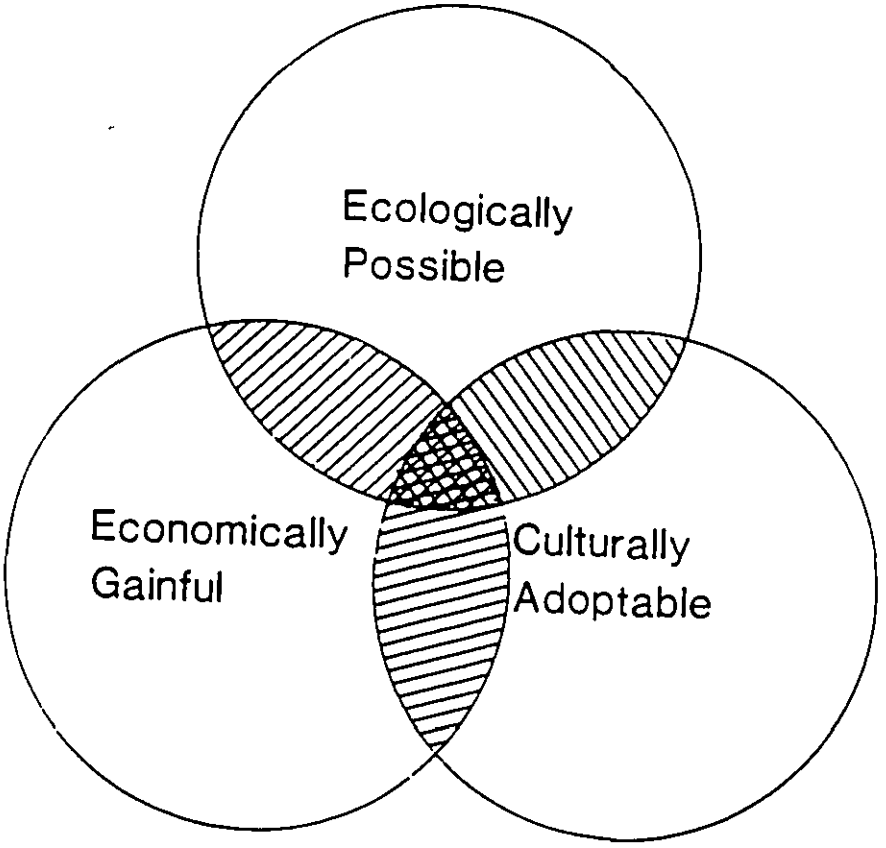
2.3:2 Firey's Man, Mind and Land Theory

In the foregoing section, we have outlined conflict theory which provides room for examining the processes involved in a conflictual situation. We now turn to outline the natural-resource management model for integrating conservation with development.

Firey's (1960) resource use theory provides an opportunity to incorporate ecological, historical, cultural, socio-economic and political aspects of wildlife resources into management and development programs. Proposed thirty years ago, the model has been found to be applicable in various wildlife management circumstances (Marks 1984; Saharia 1984; Zube and Busch 1990). Firey considers natural resources, including biological resources, as types of landed capital which are different from other types of capital primarily in the degree to which non-human factors have affected their evolution and development. In this view, wildlife are not just biological entities, they are as much social concepts as biological for they are the product of social and political processes that define them initially as potentially useful things and provide the means by which they are managed. He identifies three components that have to be addressed in developing and implementing resource management strategies (Figure 2.4).

First, the strategy must be ecologically possible, in other words, it must be in equilibrium with the environment and should recognize and protect the resources and identify reasons for which a natural resource conservation strategy (for example, a wildlife reserve) was established. Second, it must be culturally adoptable, that is, it must be compatible with local cultural values and behaviourial patterns of the local population. In

Figure 2.4 Firey's (1960) Theory for Natural Resource Management



Source: After Zube and Busch 1990

Firey's words, it must be "... valued by some population in terms of that population's own system of activities" (pp. 28). Third, it must be economically gainful, that is to say, it must have some degree of productive efficiency that should result in real benefits to the local population. For example, local people get some money from selling vegetables or crafts to tourist lodges or are allowed to hunt one or two impala(s) per month.

Firey takes a major step towards a unique theory of natural resources, but as Clawson (1986) noted, it is a beginning still awaiting completion. He sets a general theory to describe the ways in which man makes use of resources. A resource process is defined as a space-time coincidence of happenings in resource use which recurs in time with somewhat the

same combination of human and biophysical factors, for example ploughing with oxen. A natural resource is the biological or physical component of the processes, for example, the cropping system, the soils that are cultivated, or a system which imposes a special kind of constraint. The theory does not, however, give details of how the processes in resource management conflict can be comprehensively examined. Firey's analysis, however, is a landmark in the expanding terrain of thought about natural resources. Combined with the conflict and conflict resolutions theories, Firey's model provides solid ground for examining processes involved in wildlife-human conflict and generating strategies for integrating wildlife conservation and human development needs.

2.3:3 The Conceptual Framework

This section establishes a systematic framework for documenting the processes involved in the wildlife-human conflict and in designing how wildlife conservation and human needs can be integrated. It has two purposes. First, it explains the main concepts used in the thesis and their application to the study. Second, it pulls together the theoretical considerations and relates them to the methodological approaches of the study.

Several concepts have been highlighted in the literature review and the theoretical considerations which can set the conceptual approach in this study. First, although wildlife is narrowly defined, basically as wild animals, they must be seen within the context of their natural habitat and the wilderness concept. Therefore the appropriate conservation approach should be ecosystem rather than species approach. However, the basic conservation strategy of protected areas are rarely self-sustaining. Artificial boundaries are often set around protected areas that do not recognize the natural habitat requirements of the majority of wildlife, especially the African migratory species (Lusigi 1978; Myers 1972). Consequently, in this study, the contemporary protected area concept is assumed to be narrow and the artificial boundaries are ecologically unacceptable. Fencing these areas is

inappropriate and will not solve the conflict; if anything, the protected areas might still be overrun by human developments even if they were to be fenced. In addition, fences interfere with migratory patterns of wildlife. Moreover, some species such as elephants and baboons cannot effectively be stopped by fencing.

The protected area management must go beyond the boundaries; wildlife must migrate freely to meet their natural requirements - food and breeding, but human interests must also be considered. Wildlife and its protected habitat, therefore, must "pay for their survival" (McNeely and Miller 1984; Myers 1981). Sustainable use of wildlife and its habitat is here seen as the effective means to conservation. Public participation in conservation matters and appropriate conservation education are essential and so is the sharing of the wildlife generated revenue. Effective wildlife-damage-control is a prerequisite if the compromise strategies of economic incentives and conservation education have to succeed. Limited population and development controls should inevitably be undertaken, but with local support.

Second, humans as used in the study refer to both people and their activities: cultivation, livestock husbandry, and other activities. The people here refers to the local population, those individuals, families, and communities, "traditional" or "modern", that occupy, reside in, or otherwise use, on a regular or repeated basis, a wildlife ecosystem (West and Brechin 1991). Humans and their societies are seen as part of the ecosystem, not separate from it. It is assumed that long-term human survival in the rangelands ecosystem is compatible with the survival of wildlife and the entire environment of the region. To realize the compatibility, the two must be integrated through sustainable conservation and sustainable development strategies.

Conservation is seen as the conscious planning and management of the resources for the long-term maintenance and development of the communities of the ecosystem, it has to be human-centred. Sustainable development, although a precise definition remains

elusive (see Tisdell 1988) generally means improving the quality of human life while living within the carrying capacity of supporting ecosystems (IUCN 1991). It means development activities that are sensitive to and integrated with environment and natural processes (Brechin and West 1990). It assumes that development cannot be sustained unless local people, communities, and organizations are actively involved and committed to the development activity. Ecodevelopment purports to integrate economic development with resource conservation. Its rationale is that development cannot be sustained without the proper management of natural resources and the environment for future as well as present generations. As Brechin and West (1990) note, few people would dispute the wisdom of this, but it is also true that without the promise and realization of the immediate economic development of local people, they cannot identify with the needs to conserve resources. Herein lies the difficulty that has to be compromised without illusion (Adams and McShane 1992). It is often easier to suggest proper courses of action than to implement them, and this appears quite common with conservation-based proposals.

Conservation therefore must be sustainable, being less restrictive to local interests. A troubling but fundamental question is: whose wildlife is it? Does wildlife belong to the person on whose land it is found, or to the state? Or does it belong to humankind as common property requiring global and state control (Hardin 1968)? Of whose interests is conservation? In Kenya for instance, a few wealthy individuals own rhino and elephants in their own game parks. In Zimbabwe, the much popularized CAMPFIRE program provides for private ownership (Bonner 1993; Hill 1991). But this approach makes wildlife vulnerable to the whims of individuals. While in general the state clearly has jurisdiction over wildlife resources, the interpretation adopted in this study is that wildlife belongs to the world, to humankind, but must be conserved and managed to benefit the local people on whose land it is found. The principle is that the local people must be involved and their support acquired for long-term wildlife conservation. Conservation activities need to be in the hands

of local peoples and organizations and should provide sufficient direct benefit to them. Although the current situations create serious challenges for conservationists, it offers the best opportunities for long-term successful conservation strategies. A number of local organizations, international bodies, bilateral agencies, and national governments are now aware of the need to properly manage natural resources. These organizations should co-ordinate for the welfare of both humans and conservation. Table 2.9 shows the relationships between conflict and conflict resolutions approaches and its application in this study.

Studies involving humans and nature seem to fall into three categories (Brookfield 1983). First, those where humans are perceived as biological organisms and natural components of the system. This is a natural scientist's model which ignores the social and psychological dimensions of human existence and is what has been applied in looking at the human-wildlife relationship in most previous studies. Second are those studies where emphasis is placed on the impact of humans on natural systems. Such studies are unidirectional and ignore the fact that the ecosystem also impinges on humans. The third approach taken incorporates human perceptions and behaviour from the outset into a conceptual framework along with physical and biological parameters. This study adopts the third approach and assumes that the perceptions and support of local people who have a long history of use of the ecosystems are crucial to facilitate conservation and avoid conflict. Support is strengthened when wildlife conservation generates a flow of benefits to local people. Legislation, management policy and practices for wildlife conservation must also provide appropriate support for local needs (Boshe 1981; McNeely 1992; Okoth-Ogendo 1980).

Table 2.9 Relationship Between Conflict Theories and the Study Approaches

STEPS USUALLY FOLLOWED IN CONFLICT STUDIES	APPROACHES FOLLOWED IN THIS STUDY
•Know the characteristics of the parties in the conflict (their values, their aspirations and objectives).	•Requirements of both wildlife and local people are identified. Requirements of wildlife are also outlined in terms of conservationist interests rather than wild animals (see Chapter 2)
•Examine the history of the relationship of the parties in conflict	•The historical relationship between wildlife and human is outlined. Local people coexisted with wildlife. The relationship changed with increasing human population, technology and the establishment of protected area concept (see Chapter 3)
•Identify the issues around which interaction occurs, including both conflict and cooperation; nature of the resources competed for.	•Resources upon which wildlife and human compete, eg. pasture, water, and space. There is also the direct conflict (see Figure 1.2). Cooperation is possible with wildlife conservation authorities. There could also be cooperation between herbivores and pastoralism
•Determine the behaviours and interests of various parties that form around these issues.	•Interest of local people determined •Interest of wildlife animals and of conservationist are identified (see Table 3.6)
•Determine the effects and implications of the conflict for the parties.	•Effects of conflict on wildlife and on human assessed. The implications of the situation to wildlife, protected area and tourism explained, and so is to human interests.
•Determine the institutions, policy restraints including the nature of social norms and forms for regulating conflict.	•Wildlife conservation policies outlined •Local development strategies, traditional and modern outlined
•Establish conflict survival techniques employed by the parties	•Traditional local people strategies for preventing wildlife damages identified. •Attempts made to analyze how wildlife adapt to changing situations, how they adjust to the changing environmental conditions.
•Propose solutions to reduce conflict.	•Strategies for reducing conflict in the region are proposed

This study uses a multidisciplinary approach which promotes the inclusion of both social and physical perspectives in the analysis of environmental and developmental issues. In this vein resource management is seen as social phenomena which need to be explained in terms of political and socio-economic factors as well as physical ecological factors operating within the local area. Humans are treated as part of the environment. Next, a strong historical analysis is made of the study problem. The basis for this is that many problems of resource management are not simply contemporary phenomena but have origins in earlier stages of societal development characterized by different forms of

perception and modification of nature. Such a perspective can only be understood by extending the analysis backwards in time to include the antecedents of modern conditions.

Most importantly, the approach emphasises the inclusion of the perceptions of local people (through surveys). To answer the questions from the perspectives of the resource users, researchers gather information from the local people. Conservation approaches are for most part, exclusively top-down. Conservation strategies such as park creation are often imposed on the national governments of the developing countries (especially since 1960s), who in turn impose them on local people (Abel and Blaikie 1986; Blaikie and Brookfield 1987; Brechin and West 1990). Local people have not traditionally been consulted to help in the implementation of these strategies. They have been ignored or feared as the principal sources of anti-conservation behaviour. The position of this study is that a top-down approach to conservation remains a necessary but not sufficient condition for success. The earth and its natural resources are at risk and its destruction will affect everybody. Individual aspirations and economic greed will be difficult to control if the top is not strong. However, no action should be pursued or sustained without the consent and support of the local people.

Finally, the wildlife managers must use a flexible and interlinked set of biological, economic, social, political, and cultural models to fashion management rationales and techniques appropriate for given situations. The ultimate goal becomes the encouragement of local-level initiatives in conservation programs. The aim is to foster local participation in wildlife conservation. Conservation programs built upon local ecological conditions and sustained by local socio-economic processes are likely to become the most effective methods in the long run.

2.3:4 Geography and Wildlife: Placing the Work in Context

Human-nature questions are not the unique prerogative of any single discipline. As

Macgill says:

> No one discipline provides a uniquely appropriate epistemology for the study of the interface between man and nature, nor can any single discipline be said to have devoted itself specifically to that end [but each discipline draws upon its own lines of enquiry, with obvious additional scope for cross- and interdisciplinary study] (Macgill 1986:357).

This study falls within the field of natural resource management which inherently requires an interdisciplinary approach. Many geographers and anthropologists (amongst the social scientists) have addressed issues of wildlife-human interaction within the context of the human-environment tradition (Barrows 1923; Bennet 1976; 1984; 1990; Blaikie and Brookfield 1987; Butzer 1990; Grossman 1977; Mitchell 1989: 1991; Ouma 1972; Saarinen 1974; Sauer 1963); Simmons 1989; White 1961). Perhaps the first "great" work was produced in 1864 when Marsh published The Earth as Modified by Human Action (Marsh 1864). Although some geographers have specifically looked at the land-wildlife-competition (Capone 1972; Matzke 1975), few studies have focused on analyzing processes involved (nature and causes) in the conflict to facilitate specific programs for the integration of wildlife conservation with human needs. More recently, many geographers have stressed the need to integrate conservation and development for long-term conservation and for the well-being of local people (Burton and Kates 1965; Kolars and Nystuen 1974; Turner et al 1990). Environmental integrity has increased emphasising that human activity be assessed as part of an ecosystem (Brookfield 1983; Meredith 1991), and that perception of local communities about conservation be included in analyzing natural resource management issues (Hills 1974; Manners and Mikesell 1974; Saarinen 1974; Mitchell 1989). This study contributes to some of these geographical requirements focusing on the processes involved in conflict over resources in the context of conservation and development. Based on a local area, it documents the geographical patterns of conflict, and how conflict impacts on resource management and human interests. Finally, it then develops policies and management guidelines for wildlife conservation and development.

CHAPTER THREE

Chapter Three

CONSERVATION IN KENYA: HISTORY AND CONTEXT

3.1 Introduction

This chapter has two main objectives. The first is to introduce the study area within the context of Kenya, focusing on the rangeland ecosystems and Narok District. Physical characteristics and wildlife resources, as well as the demographic and socio-economic profiles of the region are outlined. The second is to trace the history of wildlife conservation and management in Kenya with particular attention to the impact on human needs. Issues relating to relationships between wildlife and local people are outlined as are government wildlife programs in Kenya. The Maasai community, their history, territory and relationships with wildlife are described. Previous wildlife-related research in Kenya and in the Masai Mara-Serengeti ecosystem of Kenya and Tanzania is summarized. This information provides the basis for the empirical study of wildlife-human conflict in the Masai Mara region.

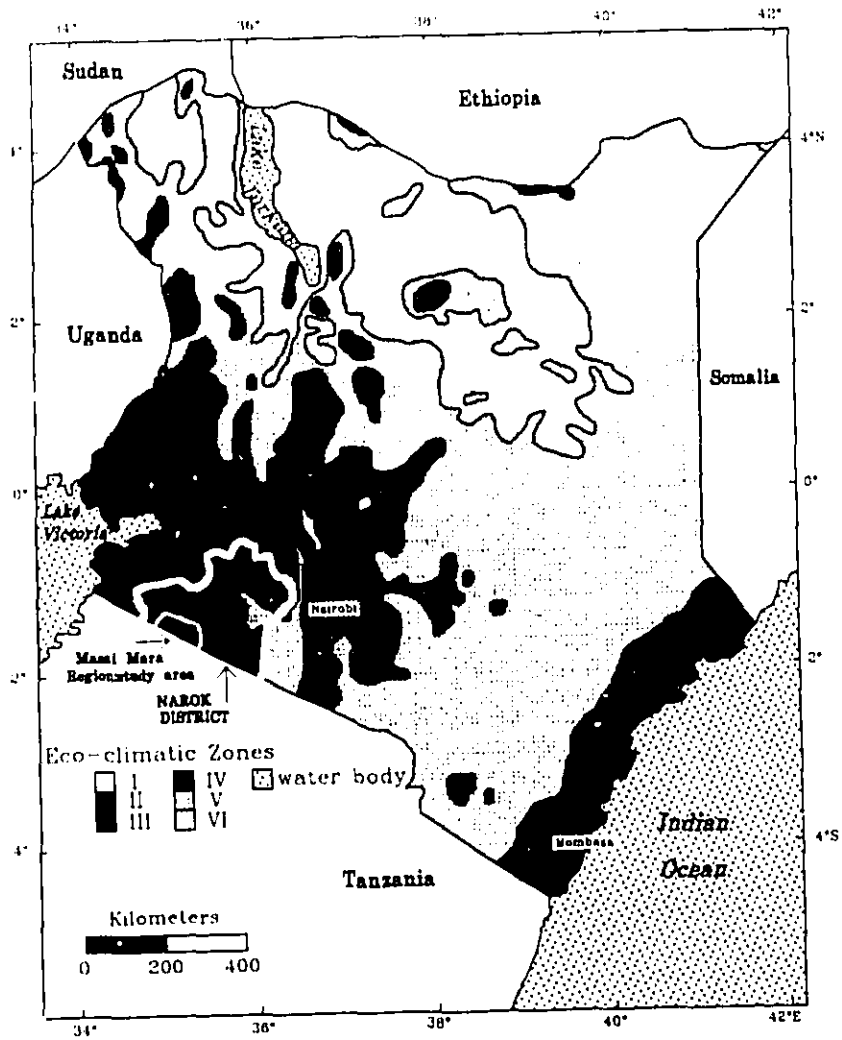
3.2 The Study Area

3.2:1 The National and Regional Context

The Masai Mara region, which covers 5,668 sq. km., is located in the arid and semi-arid areas (rangelands) of the Narok District in south-western Kenya. Ecologically, Kenya can be divided into six zones based on a moisture index (Pratt and Gwyne 1977). Map 3.1 shows the geographical configuration of the zones while Table 3.1 shows their relative proportions in terms of the country's total area. Rangelands fall in the Eco-climatic zones IV, V and VI and are principally inhabited by pastoralists[1], although semi-pastoral and

[1] The pastoralists in Kenya include the: (1) Pokomo, (2) Orma, (3) Somali, (4) Samburu, (5) Gabbra, (6) Boran, (7) Rendille, (8) Turkana, (9) Pokot and (10) Maasai. The Kitui Kamba could also be included in the group. The Nandi and other livestock-keeping peoples who do not live in the arid and semi-arid lands are excluded from this classification (Odegi-Awuondo 1982).

Map 3.1 Kenya's Eco-climatic Zones: Rangelands fall within zones IV, V and VI.



Source: Adapted from Pratt and Gywnne 1977

Table 3.1 Kenya's Eco Climatic (Land Potential) Proportions

ZONE CATEGORY	ZONE NAME	PROPORTION OF KENYA'S AREA (Million hectares)	PROPORTION OF KENYA'S AREA (%)
I	Afro-Alpine	.08	1
II	High Potential	5.3	9
III	Medium Potential	5.3	9
IV	Semiarid/marginal potential	5.3	9
V	Arid	30.0	52
VI	Very Arid	11.1	20

Source: Adapted from Pratt and Gywnne 1977

farming communities do exist. An important distinguishing feature of the rangeland is the low and variable rainfall, rarely exceeding 800 mm, with most areas receiving as little as 200-350 mm annually. Rangelands are considered to be of low agricultural potential (assuming irrigation is not feasible). Despite low and erratic rainfall, rangelands have increasingly come under cultivation due to population pressures, and the consequent misuse of land has resulted in widespread environmental degradation (Lamprey 1979).

3.2:2 The Masai Mara Region

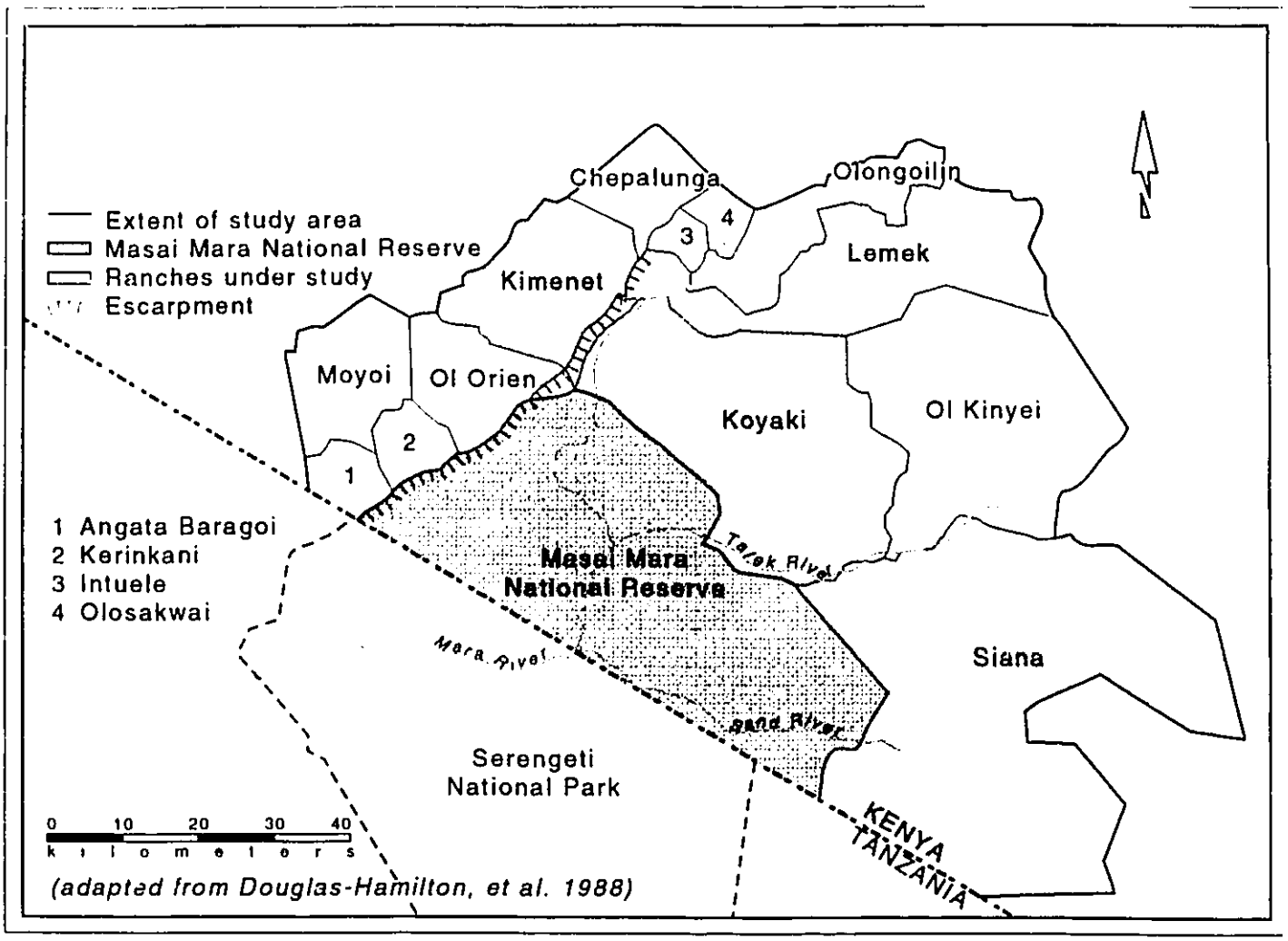
The Masai Mara region is composed of a gazetted wildlife protection area and the adjacent group ranches which also act as wildlife dispersal areas (Map 3.2). Jurisdiction over the Masai Mara Game Reserve (the protected area) has been a topic of conflict. The reserve has changed in size at least four times since its formation in 1948. The Masai Mara Game Reserve was re-gazetted in 1974 (legal Notice 271) as 1,530[2] sq. km. The area was originally established as a wildlife sanctuary when it was declared a National Reserve in 1948 (WPU 1983), but at the time, enclosed a smaller area of 250 square miles (647 sq. km.) with an undefined boundary (Sessional Paper No. 7 of 1957/58) (quoted in Douglas-Hamilton et al. 1988). In 1984, three portions totalling 162 sq. km. were de-gazetted, following an agreement in 1976 between the Kenya Government and the Narok County Council to carry out the excision. Today, the gazetted protected area is approximately 1,368 sq. km., that is, the 1,530 sq. km. minus the excision of 162 sq. km.

The Masai Mara region forms the northern portion of the Kenya-Tanzania Mara-Serengeti ecosystem (a proposed world heritage site). The Mara-Serengeti ecosystem (an area of about 30,000 sq. km.) supports one of the richest assembledges of wildlife in the world including over 1 million wildebeest, 200 thousand zebra, many species of grazers (i.e

[2] Data on the total area of the Reserve is conflicting. The Central Bureau of Statistics (1974) documents the original date of gazettement as 1961 and the area as 1,968 sq. km. Migot-Adholla et al. (1979) quote the area as 1,673 sq. Km.

eland, gazelles), browsers (including elephants, giraffes, rhinoceros) and predators (lions,

Map 3.2 Masai Mara Region: The Protected Area and the Group Ranches



leopards, wild dogs, cheetah). The limit of the Mara-Serengeti ecosystem is defined as an area covering the wet and dry season wildlife dispersal areas, and this is determined mainly by the migratory limits of its major wildlife species (Dublin 1986; Lamprey 1984; Sinclair and Norton-Griffiths 1979). In Kenya, the migration limits fall within 1,368 sq. km. of the Masai

Mara National Reserve and up to about 4,000 sq. km. of adjacent group ranch land.

The Masai Mara region has been described as critical to the entire Mara-Serengeti ecosystem. Its high rainfall, permanent water sources and high grassland productivity make it a vitally important dry season refuge for the majority of the Serengeti migrants for up to four months every year (Adams and McShane 1992; Dublin 1986; Douglas-Hamilton et al., 1988). The Reserve is administered by the Narok County Council, with technical advice from the Kenya Wildlife Services (KWS).

The outer limit of the wildlife dispersal areas was used to spatially define and confine study area. The area is thus bounded to the east by the rift valley and to the south-west by the Kenya-Tanzania border. The southern border of the study area is marked by the Nguruman escarpment which attains an altitude of up to 1400 metres. The area has been defined as a wildlife ecosystem in a number of studies (Dublin 1986; Douglas-Hamilton et al. 1988) and is so used in the present study.

3.3 The Physical Environment

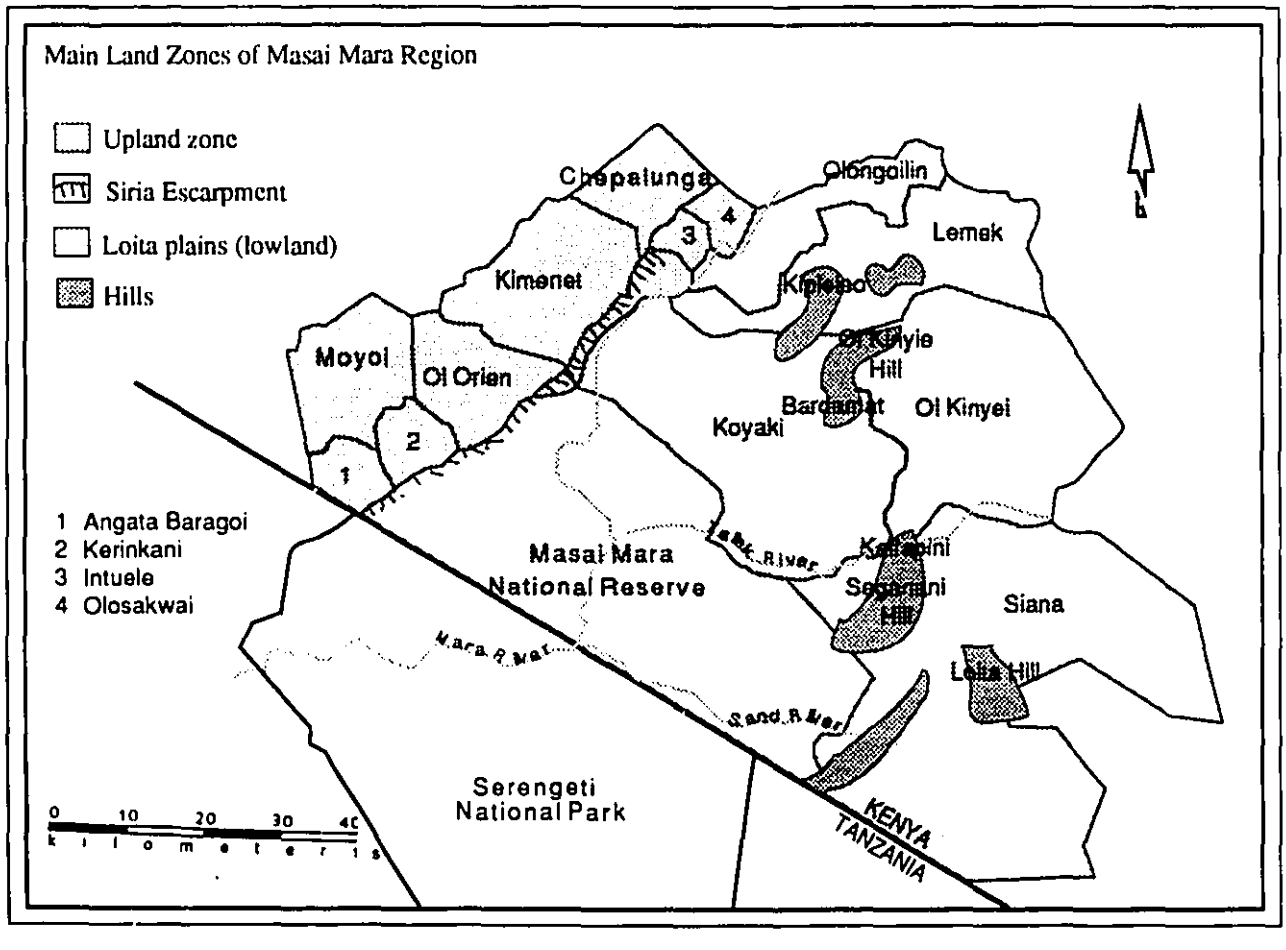
This section describes the physical environment of the study area in terms of topography, geology, soil types and fertility, climate, vegetation and water resources. These environmental attributes have significant relationships to the patterns of both resource distribution and land use, and hence influence wildlife and human behaviour. In addition, the physical characteristics create a spectacular landscape which in itself forms the base for tourism and international conservation interests in Masai Mara region.

3.3.1 Topography, Geology and Soils

The general physical characteristics of the Masai Mara region have been widely documented (Dublin 1986; Lamprey 1984; Sinclair and Norton-Griffiths 1979). The region consists primarily of plains and open woodland interspersed with riverine forests and hilly

bush or woodland areas. The dominant topographical feature of the study area is the Siria escarpment to the west, rising to 200-300 metres above the Mara plains, which is the result of a fault in the basement system. The north-west part of the study area has the appearance of a high plateaux. In the north-east part, around Lemek area, the topography is dominated by hills which are of Archaean Age and sedimentary origin, and offer additional tourist attraction (Map 3.3). The central part of the area is predominantly plains such as

Map 3.3 **Major Land Units of Masai Mara Region**



Koyaki, lower Lemek and the western part of Siana and is home to the majority of the ecosystem's wildlife. Finally, in south-east corner of the study area lies the northern tip of the Siana hill range. This topography influences the distribution of wildlife creating boundaries and corridors of movement. Plains game, for example, such as wildebeests and zebra do not frequent the hilly escarpment areas, although many pass over the upland through Tanzania.

The geology of the area has been described in detail by Williams (1964) and an exploratory map has been prepared by Glover (1966). Soils are shallow, sandy and rocky. Soil classification of the area is based on the Kenyan soil survey map of the Narok district. Various soil types, within different localities of the study area, are identified. Generally, most of the region is of poor soil quality (shallow, sandy and rocky) that cannot support agriculture. The Loita plains are dominated by volcanic deposits. River-beds and water courses have deposits of sand, gravel and silt. The upland on the escarpment can sustain some cultivation. In the lowlands, although marginal, farming is possible and small plots have already started spreading in these areas. Expanding agriculture in this area would directly compete with wildlife and livestock and be a potential source of escalating conflict.

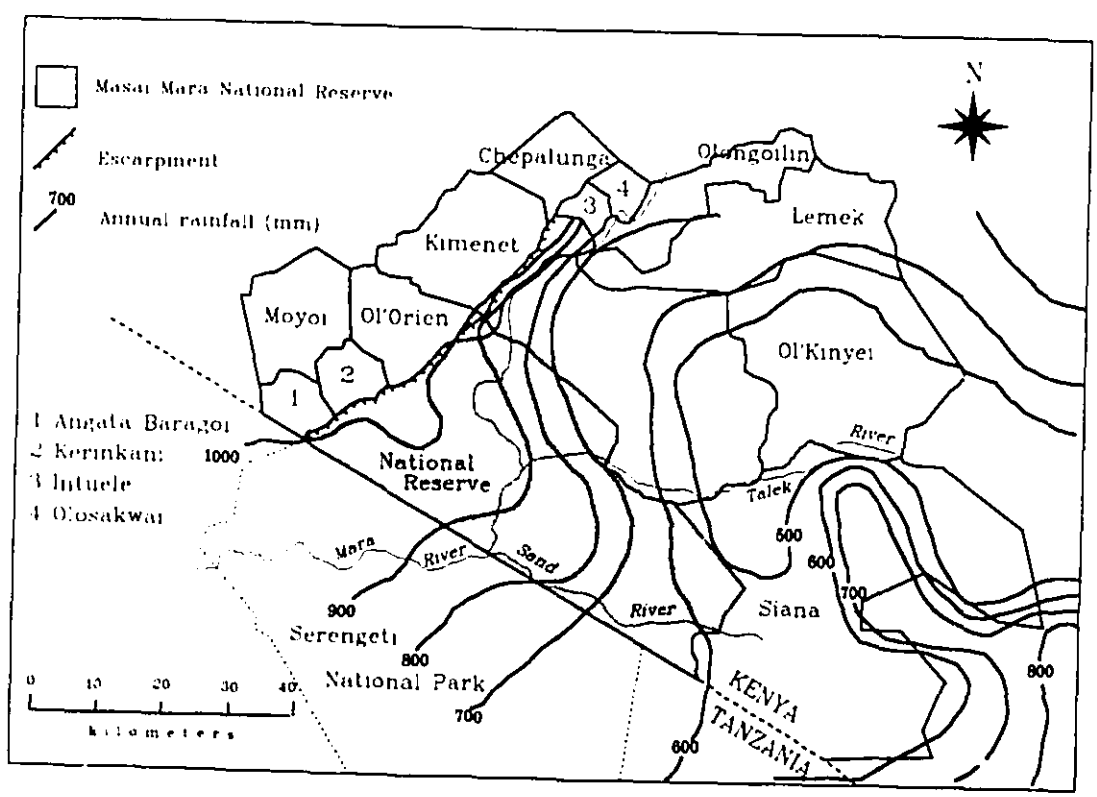
3.3:2 Climate

Existing resource practices in the region are dependent on seasonal climatic changes, which also influence the migration of both wildlife and pastoralists. Major climatic factors considered include rainfall, temperature and climatic zones. The most important climatic aspect in this region, as in all other arid and semi-arid areas, is rainfall. Rainfall governs vegetation production and the availability of water. Since access to pasture and water are critical survival factors for both wildlife and domestic stock, climate dictates their ability to use the region. In Masai Mara region, long rains begin in March and may continue until May. The rainfall distribution is bimodal. There is a marked dry season from June till

October, lesser dry season in January and February. This differential rainfall within the study area, and the entire Serengeti ecosystem, influences the northward movement of the migratory herbivores in the dry season as they seek fresh herbaceous growth and general resource use in the region.

Rainfall differs substantially within the study area. The Loita Plains to the east receive approximately 700-800 mm per annum. The western areas, more strongly influenced by the Lake Victoria weather system and the orographic effect of the Siria Escarpment, receive about 1000 mm per annum. Isohyet maps for the area have been produced by Epp and Agatsiva (1980), Glover (1966), and Norton-Griffiths et al (1975), although the position of the isohyets varies from one map to the other (Map 3.4). Rainfall in the area, as

Map 3.4 The Climate of Masai Mara Region



is common in tropical savanna regions, is erratic both in its amount and timing. The group ranches Angata Baragoi and Kimentet are within the high potential areas that support agriculture. This is the higher precipitation zone of up to 1,500 millimetres.

Like other arid and semi-arid areas, there are cycles of drier and wetter periods stretching over a number of years. Dry seasons longer than six months represent droughts and are often accompanied by famine, as occurred in 1960-61, 1973-74 and 1983-84. These periods appear on a cycle of approximately ten years. Intermittent dry years were 1968-69 and 1976. Survival under these erratic and heterogeneous climatic conditions requires adaptation by all who live in the region, allowing for temporal and spatial flexibility and mobility over long distances. There is a need for behavioral strategies that minimize risk, as well as resilience to periodic disasters.

Reliable temperature data is not available for the region. The nearest weather station for which figures are published is Narok, which is at a rather higher elevation (1890 m) than most of the study area. Mean monthly temperatures at Narok vary between 14.7 C (July and 17.7 C (April), with January to April being the warmest period with daily temperatures reaching 30° C. Temperatures in the colder months fall to just above freezing and cold winds occur during July and September. The average temperature is 18 degrees centigrade.

3.3:3 Water Resources in Mara Region

The drainage follows the topographical condition of the study area. From the Lemek Hills, the study area slopes gently downwards to the south-west. As a result, most of the study area is drained in a south-easterly direction. All the water-courses of the Mara plains eventually join the Mara River. This river rises in the Mau Hills and flows south-west along the foot of the Siria Escarpment, then south through Masai Mara National Reserve before turning west to discharge eventually into Lake Victoria. The largest tributary of the Mara River is the Talek, which drains the northern Siana Hills and western Loita plains through

two tributaries, the Kaimurunya and Ol Sabukiai.

Availability of water has been a major factor in determining the distribution of Maasai in the region. All the water courses described above hold water throughout most years, but in the Ololorok, Jagartiek, Kaimurunya and Ol Sabukiai rivers, water is confined to stagnant pools in the dry season. These tributaries dry up completely in drought years. Besides the Mara and Talek Rivers, other important source of permanent water in the study area has been a series of springs, flowing out the base of the Lemek Hills. Surface water is present in a few permanent and many seasonal rivers and streams. Mara, the major permanent river supplying the area, has most part of it, situated within the reserve. It is important to wildlife as well as to the Maasai and their livestock, particularly in the dry season. Seasonal water sources are significant in influencing the distribution of wildlife, people and their livestock. During the rains, water collects in natural depressions and forms seasonal rivers, forming major water sources for many species and reducing migration. Dams and boreholes have also been constructed to provide some water in the region.

Water distribution influences that of wildlife. During dry seasons zebra and wildebeest concentrate around ravines and other permanent water, whereas during the wet season they disperse to use the forage and temporary water on the outlying plains (Douglas-Hamilton et al. 1988). In the past and to a limited extent today, the Maasai pastoralists and their livestock mirrored this movement pattern. The behaviour of wildlife underlines the importance of movement and flexibility as pertains to resource use in this particular ecosystem. The adaptive resource use strategies practised by the pastoral Maasai - before parts of their range were excised for agriculture and wildlife conservation - followed the same patterns as migratory wildlife.

3.3:4 Vegetation

This section presents a brief description of the main vegetation and habitat types

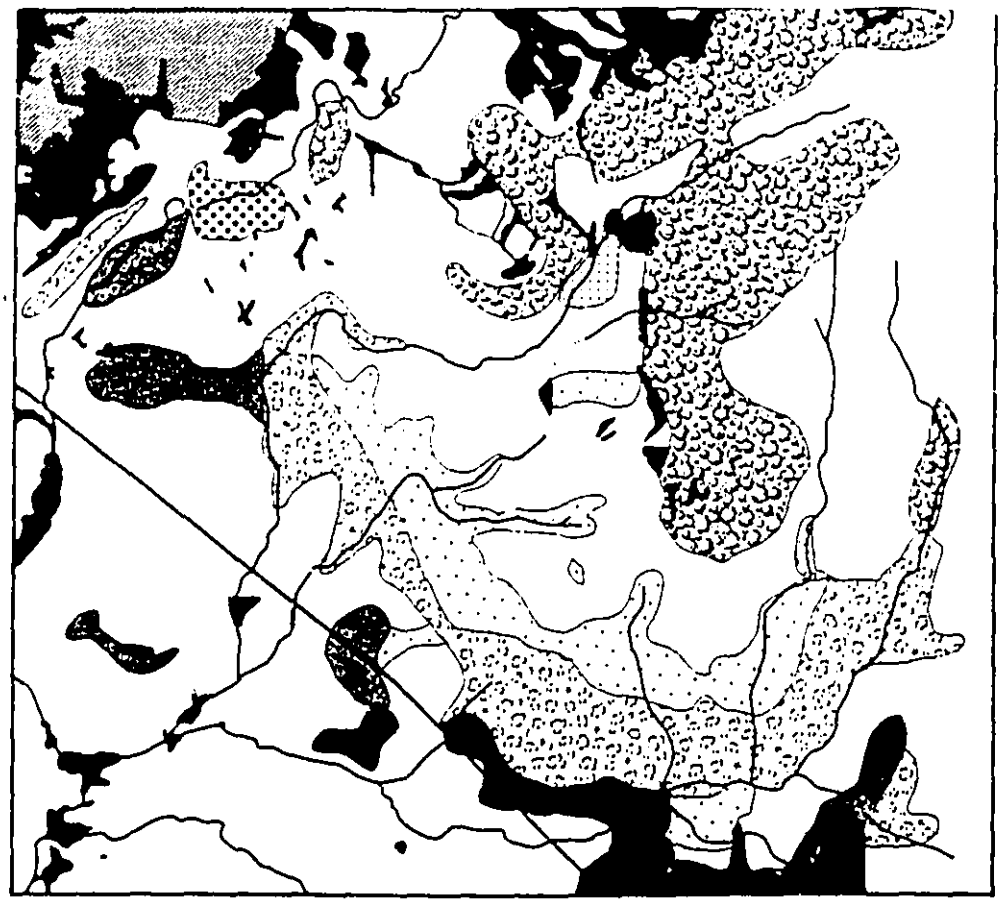
in Masai Mara region, their appearance, composition and distribution. The importance of vegetation to wildlife and pastoralists, as well as their aesthetic value, is outlined. Specific habitat types and their dynamics are described. The vegetation of the Masai Mara region and other parts of the Mara-Serengeti ecosystem has been described in detail (Dublin 1986; Lamprey 1984). The Masai Mara region consists of plains and open woodland interspersed with riverine forests and hilly bush or woodland areas. Generally, the study area lies within Eco-climatic Zone IV, the semi-arid to sub-humid zone of Pratt and Gwynne's (1977) rangelands classification, and the vegetation closely matches their description for this zone. A vegetation map for Narok District based on this rangelands classification system was prepared by Trump (1972) and a revised version as compiled by Lamprey (1984) is shown in Map 3.5.

According to this classification, grassland comprises over 40 percent of the area. The Loita Plains support a dwarf shrub grassland community with Pennisetum mezianum and Eragrostis spp. representing the most important perennial and annual grass species, respectively. Achyropsis greenwayi and Justicia elliotii are dwarf shrubs frequently associated with old termitaria scattered over the plains (Glover et al. 1964), while Sida tenuifolia and Becium obovatum are more regularly scattered over the grassland.

Moving westwards, Themeda triandra ("red oat grass") becomes the dominant grass species of the Mara grasslands. The species, usually thought to be promoted by fire (Msafiri 1984; Mwichabe 1986), is considered one of the most desirable components of grassland in southern Africa because of its high productivity and palatability. In areas of localized high grazing pressure Themeda is replaced by Pennisetum mezianum, a species that forms 'tussocks' of coarse and almost woody growth which is palatable only when sprouting (Heady 1966).

Glover and Trump (1970) state that all the plains in this region are fire-induced. However, much of the area consists of 'edaphic' grasslands where the growth of trees is

Map 3.5 Vegetation of Masai Mara Region (After Lamprey 1984).



Bushed and Wooded Grassland

- Acacia-Commiphora
- Acacia gerrardii
- Acacia drepanolobium
- Balanites-Acacia seyal
- Cassine buchananii

Bushland

- Croton dichogamus
- Tarchonanthus camphoratus

Forest

- Euclea-Diospyros and Teclea Croton

Grassland

- Edaphic and fire-inducing grassland
- Small-holding agriculture

inhibited by poor drainage, low infiltration rates and the presence of a "hard pan" beneath the soil surface. With the impeded drainage of the Mara Plains, Acacia drepanolobium (whistling thorn) is the only bush species that can take hold often forming impenetrable thickets.

There are four distinct bushland or wooded-grassland communities in the Lemek-Mara region (Table 3.2). The first is Tarchonanihus camphoratus ("leleshwa') community which covers the Aitong and Bardamat hills and large areas of the Lemek Valley floor. This species, unpalatable to goats, is derived from Euclea forest cleared by fire over the past hundred years. Glover and Trump (1970) assert that much of the country colonized by Tarchonanthus is of little agricultural or pastoral potential, not because of the presence of this plant but because of the shallowness of the soil and the maltreatment these areas have received from humankind and their stock. The most common woody species associated with Tarchonanthus are Rhus natalensis and Combretum molle, both of which are very palatable to livestock, as well as Euclea divinorum. The second bushland type is the croton-dichogamus community, in the past referred to as 'lion-bush' (Darling 1960). This bush species forms dense and distinctive clumps on shallow hill rises and tops. Fire and elephants have recently reduced these clumps in many areas (Dublin 1986; Lamprey 1984).

The Acacia-commiphora community, once extensive in the Mara and providing an excellent habitat for tsetse flies, has been almost eradicated, with the exception of a few small relic patches. With an increase in the frequency of fires in the late 1950s and early 1960s, and with the immigration of elephants into the Mara area, most of this vegetation type was destroyed by the early 1960s. However, in some areas, there has been a recolonisation of former bushland by the fourth bushland community, dominated by Acacia gerrardii (Dublin 1986; Lamprey 1984).

The only true forest occurring in the Loita-Mara area lies along the Mara River in the Masai Mara National Reserve and along the banks of the Amala River north of Lemek. The

Table 3.2 Habitat type summaries in Masai Mara Area

HABITAT TYPE	AREA IN SQ. KM	LOCATION	MAIN CHARACTERISTICS
Dwarf-shrub grassland (DSG)	1769	Loita Plains	Woody cover 1m tall, canopy 20% and herbaceous cover 20%
Shrubland (SL)	155	Siana area to Keekorok & west of Keekorok	Mostly shrubs and trees 1-6m tall, canopy 20%
Shrubby grassland (SG)	1487	Siana area, Keekorok & west of Keekorok; also in south Bardamat Hills, east of Mara bridge, west of Mara Serena Lodge, in association with GI, WG, & DSG	Shrubs & trees 1-6m tall, canopy 20%, woody vegetation 710m tall, herbaceous cover 20%, dwarf shrubs 1m tall form main ground cover
Pure grassland	650	Found between Talek river and Bardament Hills; small units scattered throughout the area	Woody cover 20%, herbaceous cover 20%, main, herbaceous vegetation
Thicket shrubland (TS)	231	Siana area, on tops and sides of hills	Shrubland with 80% canopy cover; shrubs & trees 1-6m tall
Shrubby riverine (SR)	187	Habitat within 50m of stream in form of thin bands along drainage lines	Woody vegetation 1-6m tall predominates
Wooded riverine (WR) out the area	126	Along Mara river: a few small units scattered throughout the area	Acacia and other trees within 50m of river
Wooded grassland (WG)	397	Found only in Mara Triangle & west of Mara Serena Lodge	Scattered or grouped trees (20% cover) with trees less than 200m apart
Bushy grassland (BG), Grassy shrubland (GS), Dwarf shrubland (DS), Woodland	1098	Scattered in small units throughout the area, DS found in semi-desert areas with basement soils and places like Loita Plains	BG (wooded vegetation 6-10m tall, canopy 20%), GS (wooded vegetation 1 6m tall, canopy cover 20%), WL (trees 10m tall, canopy cover 20%)

Source: KREMU Reports (1983) and Ecodynamics (1982)

dominant upper story trees are Euclea divinorum and Diospyros abyssinica, while the shrub understorey is composed chiefly of Teclea trichocarpa, T. nobilis, Croton dichogamus and Grewia trichocarpa. Where the upper storey has been eliminated by elephants, the understorey remains to form a distinctive riparian community along the Talek and Mara rivers.

3.3:4.1 Vegetation Dynamics in Masai Mara Region

Lamprey (1984) and Dublin (1986) have studied changes in vegetation covering the study area and found that the vegetation of the region is adjusting to four major and relatively recent ecological perturbations. The first was the eradication of rinderpest, an endemic disease in the wildebeest population since the 1890s. Since the eradication of the disease in 1963, wildebeest numbers in the Serengeti have increased six-fold, from 250,000 to the present 1.4 million. In 1969, this increase in population resulted in an expansion of the wildebeest's northern dry-season range into the Mara of Kenya (Pennychick 1975). The Mara area has a separate population of wildebeest, which also increased five-fold during the 1960s and 1970s to approximately 100,000 in 1979 (Darling, 1960; Stewart & Talbot 1962; Stelfox et al. 1980). Second, there was an increase in frequency and intensity of fires over the period 1959-1963. Until 1959, the Mara region was covered by a dense Acacia-commiphora bushland, harbouring tsetse. The Maasai inhabiting the Lemek area were unable to take their stock into the Mara because of a high prelavance of the disease trypanosomiasis (carried by tsetse fly). However, over the period 1959-1963, rainfall was high over the whole of Narok District, allowing biennial or triennial burning by the Maasai. The bush, and with it the tsetse, were eliminated over a four-year period (Langridge et al. 1970; Lamprey 1984; Dublin 1986).

The third change is the immigration of Maasai pastoralists into the Mara plains. Following the elimination of tsetse from the Mara region, the Maasai of the Purko section from the Mau and Loita regions migrated into the Mara area to make use of newly available

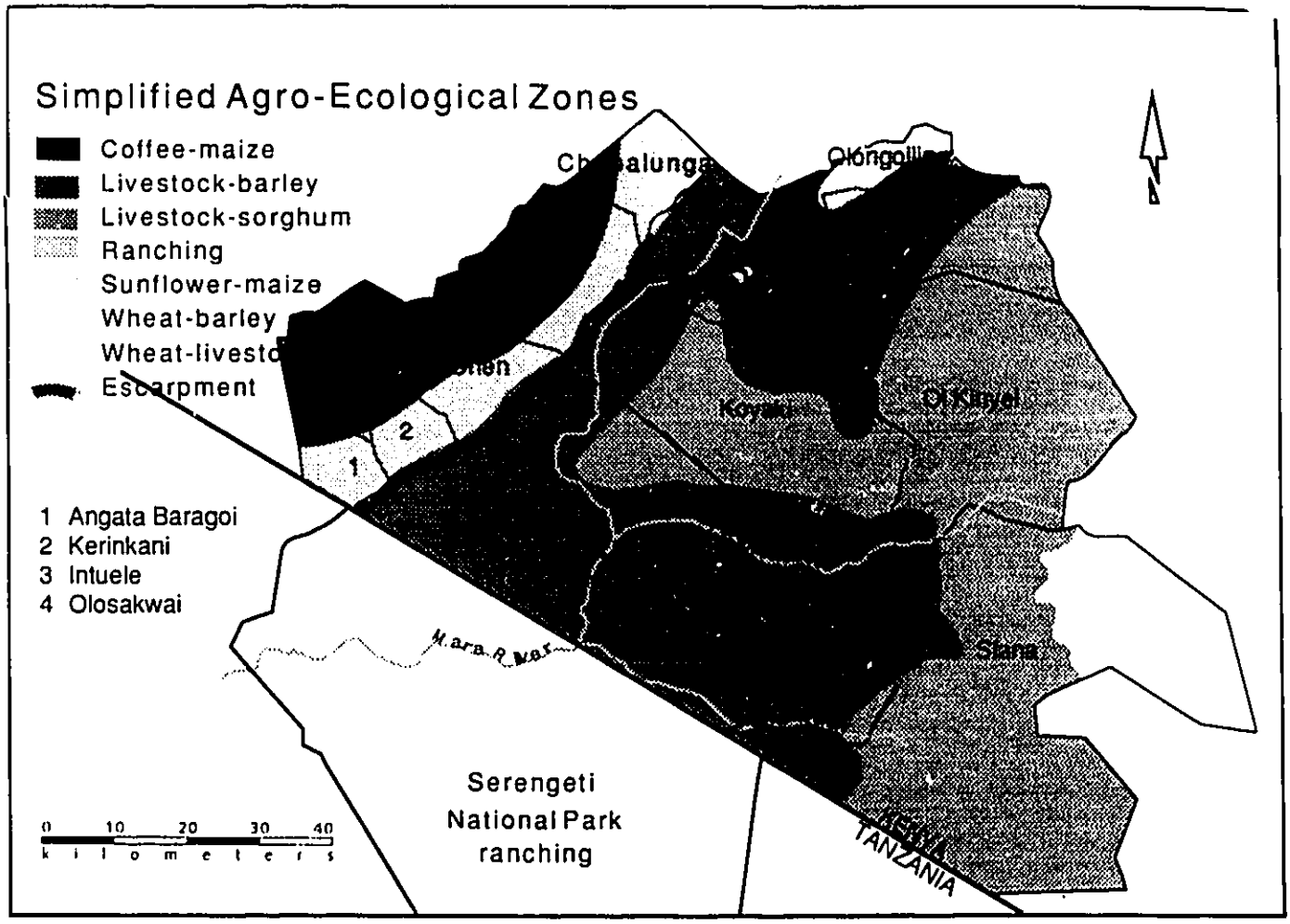
grazing. This led to high-grazing pressure and the reduction of fire frequency which in turn has resulted in bush encroachment and, in some cases, a return of tsetse (Lamprey 1984). Another factor contributing to Maasai immigration has been the loss of grazing on the Loita plains, as an increasing proportion of this seasonal grazing reserve has since the 1970s been turned over to commercial wheat farming. In the Lemek Valley continued Maasai immigration has resulted in a scarcity of grazing, to the extent that the ratio of numbers of livestock to people has begun to decline (Lamprey 1984). Many people in this area have started to grow maize to supplement their diet, a practice not recorded for the Lemek Valley before 1974 (Lamprey 1984). Most of those cultivating are, however, non-Maasai, mostly those working in the neighbouring wheat farms. Finally, further ecological change was brought about by the immigration of elephants into the ecosystem in the early 1960s. Widespread agricultural expansion in the areas to the north and west of the Serengeti and Mara, forced large numbers of elephants into the ecosystem (Norton-Griffiths 1979; Glover & Trump 1970), resulting in severe woodland destruction in the northern areas (Lamprey 1984).

As a result of these ecological changes and recent increases in pastoral grazing pressure, conflicts in land-use in the Loita-Mara area have escalated. Agricultural development, pastoral livestock production and wildlife conservation in the same area are incompatible without careful planning.

3.3:5 Agro-Climatic Zones

The agro-climatic zones of the area are shown in Map 3.6 and Table 3.3. The region can be divided into two broad ecological zones: upland high potential and lowland marginal potential. Topographically, the upland zone is flat plateau in the west and hilly in the north, with altitude ranging from 1463m to 1829m; lowland ranches are generally flat plains with scattered hills, rising to about 700m. The upland area is the main water catchment zone of

Map 3.6 Agro-Ecological Zones of Masai Mara Region



Source: Narok District Development Plan 1989

Table 3.3 Differences Between Upland and Lowland Ranches

CHARACTERISTICS	UPLAND	LOWLAND
Physical Factors Physiography	Hilly/plateau: elevation 1,463-1,829m. Vegetation: forested land and bushland.	Flatland/undulating plains: elevation 1,000-1,200m. Vegetation: grassland and moderately woodland Flat plains interposed with riverine forests
History of settlement	Group ranch adjudication began 1970; Sedentary settlements around 1954; Maasai semi-nomadic 1800s	
Ecological Factors	Soils: grey-brown, or red-brown, clay or loams, Rainfall: 1200mm. per annum. High agricultural potential	Soils: brown to grey-brown; Rainfall: 750-1000mm.; Low agricultural potential
Land uses	Subsistence dryland farming; some commercial farming, decreasing pastoralism; land tenure: most land owned privately	Subsistence pastoralism, wildlife conservation; limited subsistence dryland or irrigated farming.

the region. Most of the streams within and beyond the region drain from the upland. Vegetation in the upland is forest and bush, but is rapidly decreasing due to the expanding human activities. Lowland area is primarily open grassland with riverine bush.

The land in the upland is cooler and wetter and more productive than the lowland areas, and consequently more amenable to settlement (see Table 3.3). Most of immigrants into the region (many of with an agrarian background) settled in the upland zone. Traditionally, the upland zone acted as drought grazing reserve (*"osupuko"*) for the Maasai within the region. This has been increasingly curtailed by expanding agriculture and open range livestock, causing wildlife grazing to be restricted to the lowland. The development of the region lies mainly in the raising livestock, tourism and some limited farming.

3.4 Wildlife Resources

This section describes wildlife resources in Masai Mara region within the context of Kenya, rangelands ecosystem and Narok District. The types, density and migratory patterns of the various species are explained. Kenya's varied environments support an incredible variety of wild animals. Although wildlife populations have been substantially reduced in modern times, game can still be seen in spectacular abundance in some areas, especially in the rangelands ecosystems. According to Capone (1972), there are 57 prominent mammal species in Kenya. He categorized the species into: (1) horned animals; including buffalo, kudu, gazelles, and other antelopes; (2) large carnivores including lion, leopard, cheetah, hyena, wilddog and aardwolf; (3) other important large mammals such as rhinoceros, elephant, and giraffe. In addition to these large mammals, there are (4) small mammals, and (5) bird life (Petrides 1955).

A second level of classification is by food preference. Herbivores, the most numerous of Kenya's wild animals, depend on vegetation. Some species such as the buffalo, zebra, wildebeest, and Thomson's gazelle are entirely or almost entirely grazers.

Other species such as giraffe, kudu, bushback, and black rhinoceros are entirely or almost entirely browsers. Some species are mixed feeders, consuming grass and shrubs. Among these are the impala, reedbuck, and sable and roan antelopes (see Table 3.4). Within these very broad groupings each species differs in precise food requirements and preference of plant species or growth stage of the same plant. Specific habitat requirements of the different species tend to limit most species to particular vegetation types that provide the food and other resources necessary for survival. Three distinct wildlife vegetation types can be distinguished in Kenya: (1) bushland, (2) savanna and grassland, and (3) forest. The savanna and grassland vegetation type is the most productive of Kenya's wildlife habitats, supporting large herds of zebra, wildebeest, Kongoni, topi, and gazelle and this is found almost entirely in the rangelands. The forest areas, especially the montane forests, provide habitats for some of the less common species like the rare bongo, forest hog, mountain reedbuck, duicker, and monkey, to name a few. As mentioned earlier, rangelands over much

Table 3:4 Dietary habits of wild ungulates in the study area

Grazers	Browsers	Mixed feeders
Waterbuck Wildebeest Zebra Buffalo Kongoni Topi T. gazelle Warthog	Giraffe Elephant Rhino Bushback Kudu	G. gazelle Impala Eland Reedbuck Sable and roan Antelope

of Africa have been important wildlife zones. In Kenya over 90% of wildlife, protected areas, and associated tourism are concentrated in the rangelands. Many wildlife however is still roaming outside the protected areas (Njoka 1990; Rajottee 1983; Western 1989) (Table 3.5). Narok district is part of the large number of home range for wildlife mainly found in the bush and grasslands. Animals include elephant, buffalo, giraffe, lion, zebra, cheetah, wildebeest and many others. Scientific findings in Masai Mara region indicate that the study area supports a varied and abundant population of wild animals (both ungulates and predators) (Darling 1960; Sinclair and Norton-Griffifths 1979; Taiti 1974; Talbot

Table 3.5 Distribution of Wildlife in and Outside Parks and Reserves Within Kenya's Rangelands

SPECIES	RANGELANDS (Total Wildlife)	INSIDE PARKS	% OUTSIDE PARKS
Browsers			
Gerenuk Ostrich	55,600	1,909	3
Giraffe Lesser	39,700	3,037	8
Kudu	77,600	8,499	11
Rhino	19,200	3,637	19
	350	189	54
Mixed Feeders			
Grant's Gazelle	331,100	40,394	12
Eland	51,300	7,847	15
Impala	253,700	72,131	28
Thomson's	244,200	88,109	36
Gazelle	30,000	17,500	58
Elephant			
Grazers			
Grevy's Zebra	7,900	111	1
Water Buck	18,200	1,958	11
Hunter's	7,500	1,500	20
Hartebeest	138,600	31,897	23
Topi	74,800	20,357	27
Oryx	85,600	25,953	29
Buffalo	59,300	19,834	34
Kongoni	182,500	73,216	40
Burchell's Zebra	207,400	112,605	54
Wildebeest			
Total	1,8884,558	529,788	

Source: Western 1989 (quoted from Andere et el. 1980). Grevy's zebra numbers are low in parks because the population ranges widely in arid northern Kenya, where there are few protected areas. Heavy poaching has increased the relative number of elephants and rhinos within parks.

and Stewart 1962) and recently KREMU aerial surveys (1970-1988) and Dublin (1986). Some of the common wildlife found in the region are listed in Appendix A. The principal wild ungulates are wildebeest, zebra, topi, buffalo, kongoni, impala, eland, elephant, waterbuck, Thomson's and Grant's gazelles, as well as isolated populations of hippo, crocodile, rhino, dik-dik and klipspringer. Hippo and crocodile are found in the Mara river. The carnivores found in the region include lion, leopard, hyena, cheetah, hunting dog and bat-eared fox.

Table 3.6 summarizes the individual species counts. Over the last three decades, there has been a general increase in the number of most species of plains game. The increases have been observed in zebra, topi, kongoni, buffalo, wildebeest and eland

populations, since 1961 (Stelfox et al. 1980). Lions are also believed to have increased. The rhino population in the region has declined drastically, mainly due to poaching[3]. Stelfox et al. (1980) give some of the reasons for increases in wild ungulate populations. The elephant population, for example has increased within the region due to excessive poaching and other human activities in other parts of the ecosystem (Douglas-Hamilton et al. 1988). These increases, if allowed to continue at the present rate, will have major consequences for the already diminishing wildlife habitat and breeding grounds.

Table 3.6 Population Estimates of Wild Herbivores for the Mara and Loita Plains, 1958, 1961, 1974, 1977 and 1979

SPECIES	1958+ (Oct.-Nov.)	1961* (May)	1974 (May)	1977** (May)	1979** (May)	1979** (July)	AV.INSTANTANEOUS3 RATE OF INCREASE
Wildebeest	15,000	17,817	84,710	84,700	101,700	819,500	.099
Zebra	12,000	20,867	20,412	34,600	65,200	107,800	.047
Topi	4,000	4,111	5,082	17,900	31,500	25,500	.098
Buffalo	4,000	5,934	10,832	34,200	30,000	31,500	.093
Kongoni	1,000	721	850	5,300	8,900	5,00	.123
T.Gazelle	12,000	-	11,936	63,300	106,500	90,500	(.447)
G.Gazelle	-	-	5,204	8,800	19,900	18,500	(.260)
Impala	-	-	8,692	53,900	59,200	51,800	(.401)
Eland	500	750	1,168	4,700	8,500	4,600	.119
Elephant	500	455	1,012	1,200	700	300	-
Rhinoceros	100	54	84	100	0	0	-
Totals1	37,100	50,709	124,200	182,700	246,500	1,277,700	
Total2	-	-	150,032	308,700	432,100	1,438,500	

+ Darling (1960)
* Stewart, D.R.M. & Talbot, L.M. (1962)
** KREMU Aerial Surveys and Taiti, S. (1974)
1 does not include gazelle and impala
2 includes gazelle and impala
3. Av. instantaneous rate of increase (r) calculated by fitting an exponential equation (Nt=Noe) for the years 1961 to 1979.

3.4.2 Distribution and Movement Patterns

The principal wild ungulate species found in the Masai Mara region outlined above,

[3] Rhino and elephants have suffered from heavy poaching in the past few years. Masai Mara and a few other parks in the country have been identified for special rhino protection. Such a move, that is restricting conservation to only one species, has been criticized by a number of conservationists as being dangerous move as it ignores other species and the overall ecosystem.

can be grouped into migratory[4] and resident species. Data are also available on the distribution and density of predominant species from scientific sources (Ecodynamics 1982; Taiti 1974). These have been shown in Table 3.7. Animal movements and distribution are of particular significance with regard to the Maasai Mara-Serengeti-Loita and Siana Plains ecosystems. The distribution and movement of wild ungulates must be viewed in the context of habitat utilization and resource exploitation within the Masai Mara region, and the entire Mara-Serengeti ecosystem.

Table 3.7 Density of wildlife species for each of the Masai Mara Region and Neighbouring Areas

Species	Mara	Loita	Siana	Nguruman
Wildebeest	70.2	22.3	11.9	0.84
Zebra	16.2	8.6	6.2	1.33
Buffalo	8.3	0.2	2.8	0.89
Kongoni	1.2	0.3	1.2	-
Topi	13.2	0.2	0.6	-
Thomson's g.	19.3	13.3	5.6	-
Warthog	1.4	0.1	0.6	-
Giraffe	0.8	0.6	0.8	0.08
Elephant	0.3	0.0	0.2	0.16
Rhino	0.005	0.0	0.0	0.02
Grant's g.	1.2	5.6	1.3	0.46
Impala	11.4	3.9	12.2	-
Eland	0.8	0.9	0.3	-

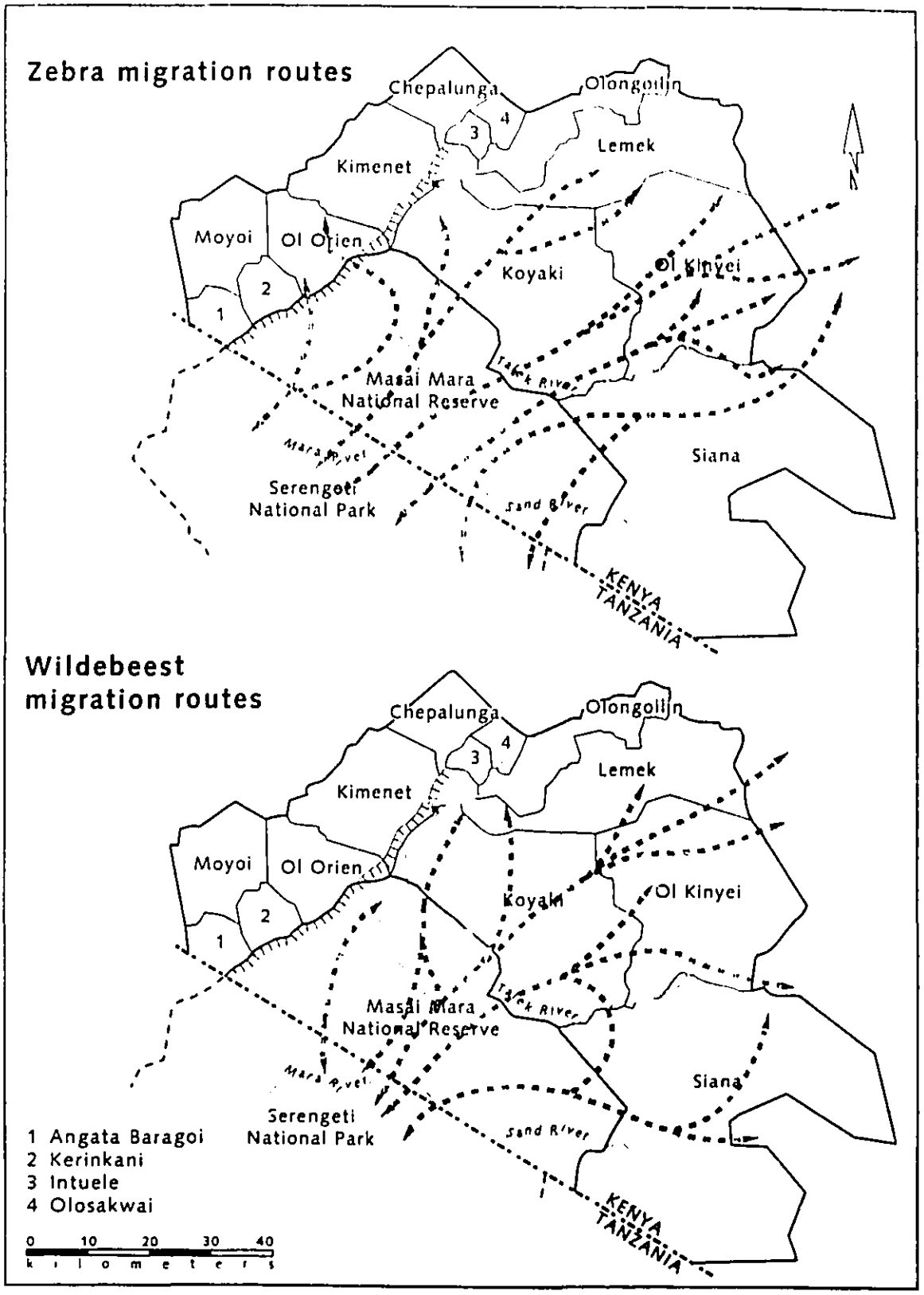
Source: Ecodynamics 1982

3.4:2.1 Migratory Herbivore Species

Included in this group are such wild herbivores as the wildebeest, zebra and Thomson's gazelle. These herbivores follow two migration patterns which are best studied in terms of occupancy, grazing patterns and movement in and out of the Masai Mara National Game Reserve, Loita Plains and northern Serengeti ecosystems. Apart from the

[4] Migration of wildlife is a natural process and must be met by all mobile species. The movement is necessary for forage and breeding purposes. The animals rely on mobility to overcome their vulnerability (Pratt and Gwynee, 1977). Mobility has several implications and is an essential feature of animal ecology.

Map 3.7 Wildebeests and Zebras Migratory Routes in Masai Mara Region



Source: Ecodynamics 1982

spectacular annual migrations, migratory patterns are localized within each part of the study area (Sinclair and Norton-Griffith 1979). The movement patterns are dependent upon diet or available forage, and the climatic conditions in the Masai Mara region, Loita Plains and Serengeti ecosystems. Map 3.7 shows the migration routes of the wildebeest and zebra within the region.

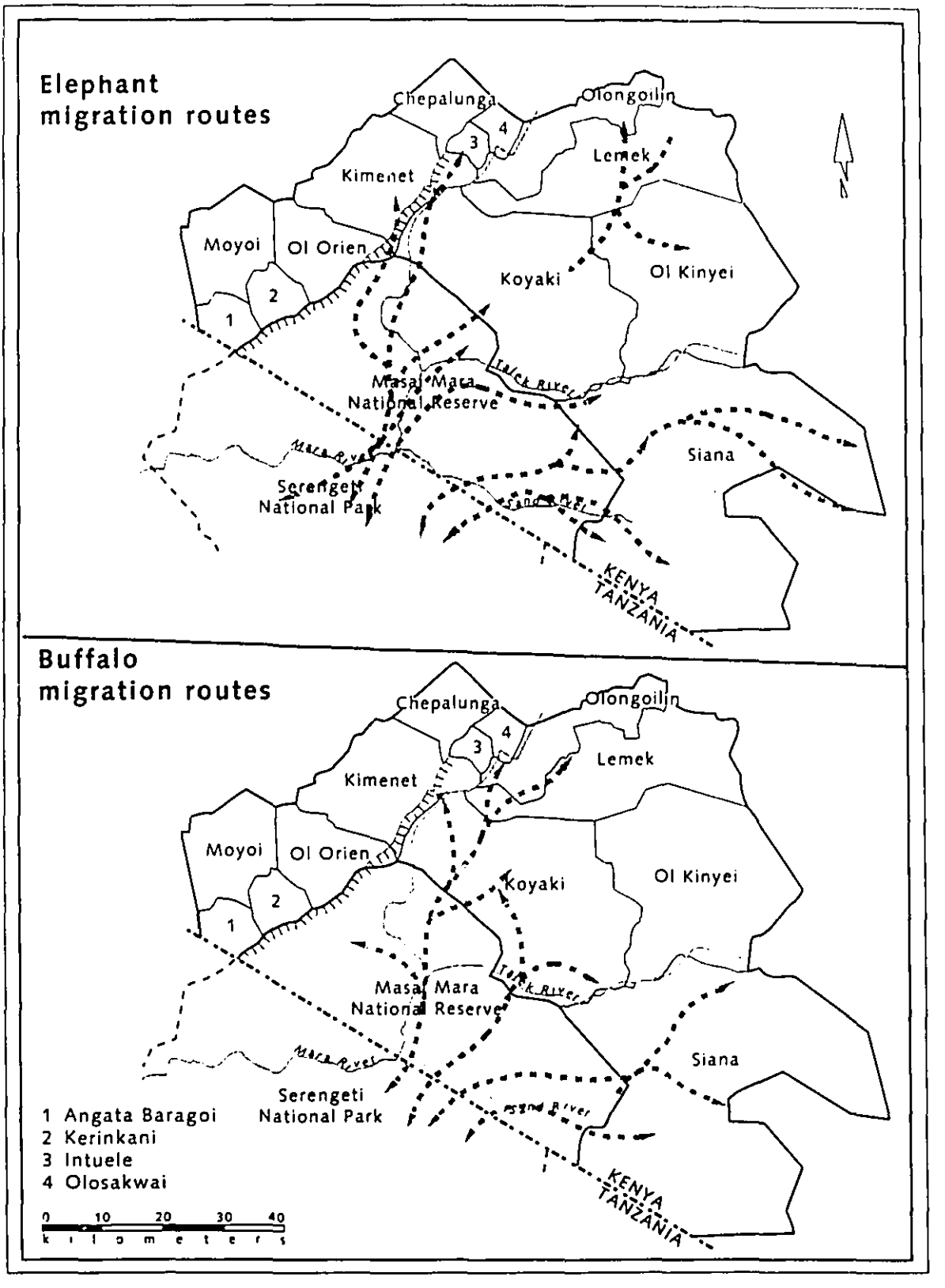
The wildebeest is numerically the most important of all the migratory species. Virtually all wildebeest move out of the Masai Mara National Reserve during the rains, moving northwards to Loita Plains as well as southwards to the Serengeti. The area south of Aitong and Loita Plains is the main breeding ground. Large numbers concentrate in the reserve during the dry season (June, July, August). During late August, September and early October the large herds of the migratory species start to filter back across the Kenya-Tanzania border into the Serengeti ecosystems. The animals follow various routes or corridors as demonstrated in Map 3.7.

3.4:2.2 Resident Species of Wild Herbivores

Among the less migratory species are buffaloe, topi, kongoni and elephant. Map 3.8 shows the migratory patterns of elephant and buffaloe. Their migrations are not as spectacular as those described above for the migratory species. They are however similarly dictated by, among other things, forage availability and climatic conditions. They also follow the pattern of the Mara-Serengeti ecosystem. Unlike the wildebeest, the topi population is resident in the Mara game park all the year round. Like the kongoni, small groups of topi move northwards to Ngorkorri. Their calving grounds are around the Olorukoti-Olkiloriti Plains outside the Reserve, as well as in the Mara Triangle within the Reserve.

In summary, Masai Mara region has long been recognized for its abundant wildlife (Simon 1962). There is regular wildlife movement out of the protected area onto the group ranches (Lamprey 1984; Dublin 1986; Douglas-Hamilton et al. 1988). Wildlife makes up 30%

Map 3.8 Elephants and Buffalos Migratory Routes in Masai Mara Region



Source: Ecodynamics 1982

of the herbivore biomass in the District (Croze 1978). At least 50 herbivorous species are recorded for Narok District. Twenty-two large mammals are found in Mara region (Sinclair & Norton-Griffiths 1979). Masai Mara region also contains attractive scenery and marvellous bird life (roughly 300 species). These diverse characteristics indicate that the Masai Mara region should be conserved.

3.5 The Human Environment

This section examines the human factor of Masai Mara region. It begins by looking at the history of the area, the events that have influenced the human as well as wildlife populations in the region up to the point where wildlife-human conflict began to escalate. It then outlines the demographic and socio-economic profiles of the region within the context of Kenya and Narok District, and ends with a description of the existing land uses in the region.

3.5:1 History of the area

The study area has experienced dramatic changes. Table 3.8 provides a chronology of historical development that has occurred within Masai Mara region (including Serengeti area) between 1880 up to 1991 when the field work for this study was carried out. This historical analysis shows us how the populations of wildlife and humans together with the environment, have changed to date.

In the 1880s, an epidemic of the exotic viral disease rinderpest, destroyed over 90% of Maasai cattle and also many ungulate species, especially buffalo and wildebeest. This was followed by famine since the Maasai depend on livestock. As a result of the famine, human epidemics, including small pox occurred and many Maasai lives were lost. During the same time, elephant numbers were being greatly reduced by incursions of Arab slave and ivory traders from the coast. As drought struck the area, domestic stock concentrated

at watering points, thus facilitating the spread of contiguous Bovine pleuro-pneumonia (CBPP). By 1900 the region had few people, few major herbivores and few elephants. As a result, there was less grazing and browsing pressure. Annual fires were set by the Maasai leading to bush and woodland recovery. By 1930, the woody vegetation provided habitats for tsetse flies harboured by the remaining wildlife species. Tsetse flies carry the parasitic blood disease, Trypanosomiasis, which rendered the region largely uninhabitable for cattle. During this period the Serengeti and the Mara were set aside as protected areas for the purpose of wildlife preservation and they remained largely uninhabited by pastoral Maasai for the next two decades.

In the late 1950s, the situation changed because of a combination of (1) changing climate, (2) wildlife distribution, and (3) an attempt by the colonial administration to reduce tsetse fly habitat. Bush and woodland losses began in the Masai Mara region. Rainfall increased, grazing animals were still relatively few, and grass grew to a high biomass in the dry season. The Maasai returned to their traditional pattern of grass burning to improve pasture. Hot fire helps to destroy tsetse infested bush, and kill various parasites. By early and mid-1960s, the decline in woodland was well underway and the area had become sufficiently bush-free to allow Maasai settlement on a permanent basis. Since this time, the Maasai have continuously inhabited the area surrounding the entire Maasai Mara National Reserve.

In the last 30 years human beings, wildlife, cattle, and agriculture have all increased in number. Wildebeest and elephants numbers have both increased and the pastoralists, wheat fields and tourism have expanded tremendously as a result of the expansion of agriculture, especially on the high potential areas, less land becomes available for grazing both for wildlife and livestock. The seasonal movement of livestock to other grazing areas is now limited. This situation has escalated the conflict.

Table 3.8 Chronology of Historical Events in Masai Mara Region (1880 1991

APPROXIMATE DATES	MAJOR EVENTS
1880S	The Period of Destruction "enkidaaroto" •Drought/famine •Rinderpest epidemic: and exotic viral disease decimated wild and domestic ungulates in the entire Mara-Serengeti area •Starvation of Maasai following the death of many stock due to rinderpest. Eating of game meat was possible •Human epidemics: local pastoralists succumbed to diseases and starvation. Small pox outbreak •Hunting for ivory reduces elephant population
1900 - 1930s & 40s	•Reduced herbivores including elephants following the disease •Number of people also decreased •Bush and woodland recovered as effects of heavy browsing and annual fires by the Maasai decreased •Increase in tsetse flies[5] as a result of the increase in bush and also harboured by the remaining wildlife species. •Increased hunting due to ivory trade •Attempts by the Colonial government to reduce tsetse flies •Both Serengeti and Mara National reserves created
1950s-1960s	Period of increase of trees and the invasion of the tsetse fly •Increase in rainfall •Dense woodland coverage
1961-1967	•Decline of vegetation due to fires, high grass productivity, unusually high rainfall •Elephants caused damage to vegetation
1967-1991	Return of the Maasai and an increase in the wildlife populations •Period of rapid population growth •Changes in land tenure, land use and the general environment increase of permanent settlement, immigration of non-Maasai communities of agrarian background •Expansion of cultivation both commercial (by telephone farmers) and for subsistence by the immigrants •Increase in tourism and tourist facilities (lodges etc and continued restriction in wildlife reserve •Increase in conflict (land use and antagonistic attitudes)

Source: Douglas-Hamilton et al. 1988 and Robertshaw 1990

3.5.1 Demographic Profile

Human populations and permanent settlements have expanded rapidly over the past three decades and this has had a profound influence upon the ecology of the study area. I have made use of national census data for the years 1948, 1962, 1969 and 1979 to document these changes. Table 3.9 shows population details of Kenya, the study area and

[5] Tsetse flies carry the parasitic blood disease, trypanosomiasis which rendered the area largely unhabitable for cattle.

Narok District. Narok District had a population of 125,215[6], by 1969. This rose to 210,306 persons by 1979. It is possible that today the Maasai represent less than 50% of the population in the District.

Table 3.9 Kenya, Narok District and Mara Area Population Growth 1948-1989

YEAR	KENYA (Total Population)	Estimated Average Annual Growth rate(%)	Average Density (per sq.km.)	Narok District and Masai Mara Region[7]	Estimated Average Annual Growth rate	Average Density (per sq.km.)
1948	5,405,966	1.2	9.5	37,648 (8,000)	1.9 (1.2)	2 (0.5)
1962	8,636,263	1.8	15.2	110,100 (10,000)	2.1 (1.8)	3 (2)
1969	10,942,705	2.8	19.2	125,219 (22,000)	3.5 (2.8)	6 (4)
1979	15,322,000	3.7	26.9	210,306 (35,000)	6.8 (6.0)	12 (7)
1989/1990	26,000,000	4.0	47	402,000 (72,000)	7.0 (7.5)	34 (14)

Source: Douglas-Hamilton et al. 1988 and GOK 1989

Map 3.9 and Table 3.10 show the population densities within the region by group ranches. The Masai Mara National Reserve is today surrounded by group ranches, all of which are well-settled with a combined human population of over 35,000 in 1979 (CBS 1980). In 1962, the human population of the Masai Mara area was probably 10,000. With a rate of increase of 7.5% per annum (Lamprey 1984) through births and immigration, Douglas-Hamilton et al., (1988) estimated the population of the study area to be over 65,000 by 1987.

[6] Population census results and estimates in Narok District or amongst the Maasai are subject to debate. They may not reflect the actual figures, as the local inhabitants have certain cultural beliefs regarding the counting of people and livestock. There are very strong beliefs that children and livestock are not to be counted because malevolent forces may strike them. Children are known by their birth names, affiliation and sex, while livestock are known by colours or other characteristics. Gross counts are believed to inspire malevolent forces resulting in frequent deaths and serious family troubles.

[7] Figures for Masai Mara region are shown in brackets.

Map 3.9 **Human Population Density of Masai Mara Region**

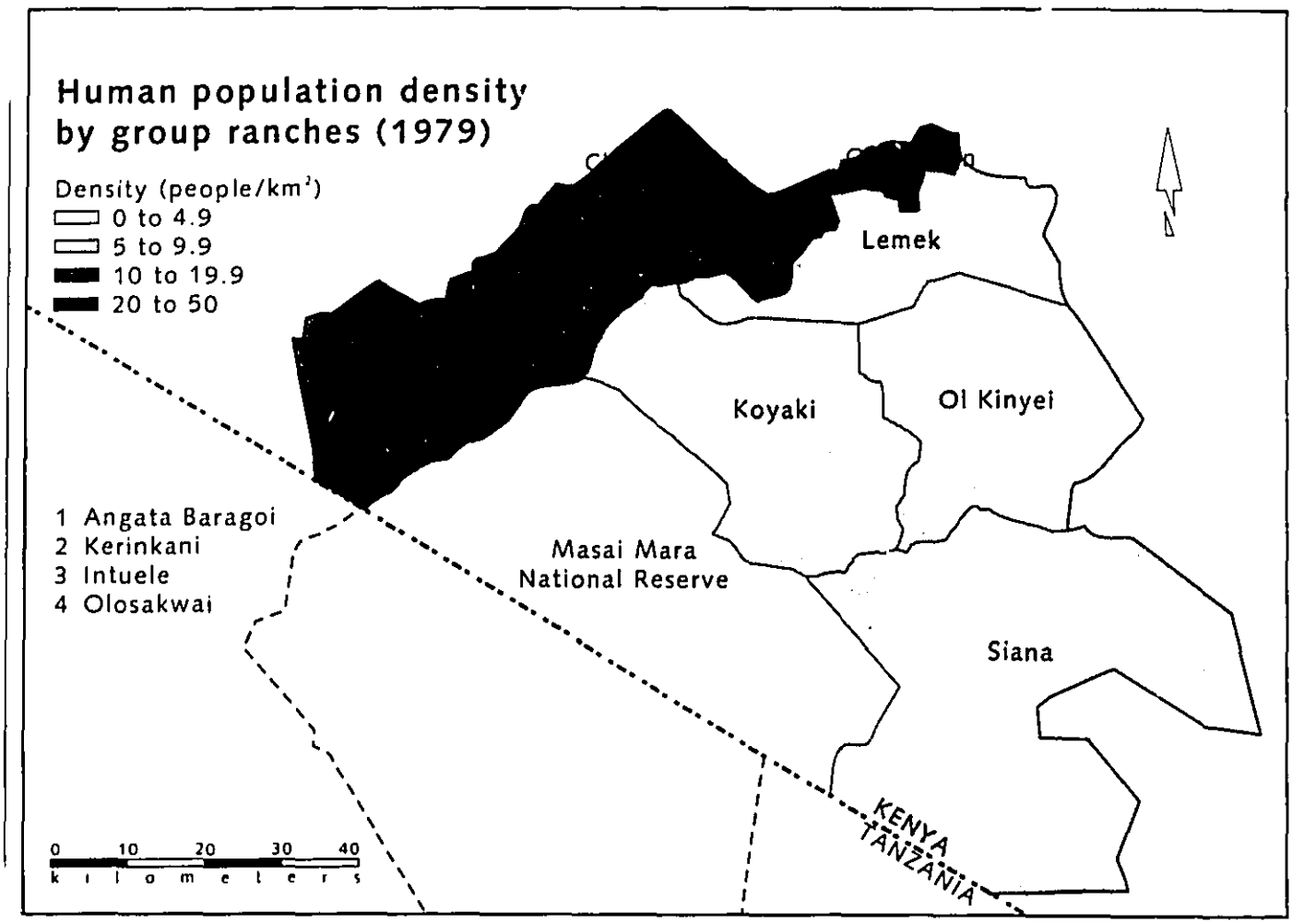


Table 3.10 Group Ranch Areas and Human Population

GROUP RANCHES	AREA SQ. KM.	POPULATION	DENSITY SQ. KM.
ANGATA BARAGOI	78.82	3,588	45.5
OLOSAKWANA,INTULELE,OLONGOILIIN,CHE	445.00	18,856	42.4
PALUNGA	264.94	4,333	16.4
MOYOI	368.00	5,082	13.8
KIMENTET	265.52	3,620	13.6
OLORIEN,KERINKANI	982.00	5,972	6.1
SIANA	2162.00	12,238	5.7
LEMEK,OLKINYEI,KOYAKI	1368.00	4,590	3.4
MASAI MARA RESERVE[a]			
TOTAL	5934.26	58,279	9.8

[a] The population in the reserve are employees in the tourist lodges and park administration. Spatial areas of the group ranches are derived from adjudication map. The area of Kimentet was estimated by Douglas-Hamilton et al. (1988).

Assuming the same growth rate, the population at the time of the field work for this study (1991) was approximately 72,000. In some high potential agricultural areas such as Kimentet and Angata Baragoi, populations have increased dramatically.

Within the region, human population has intensified and expanded in four main areas: Angata Baragoi, Kimentet and Lemek. In Angata Baragoi, the area of highest population density (45.5 sq. km), the population has expanded into areas bordering the park. Generally, population densities are higher in upland ranches than lowland ones.
Overall these data show patterns of accelerating population growth and widening distribution throughout the study area. Wildlife-human conflict has also increased with the increasing human population. The effects of this growth have been to hem in the Maasai and their livestock and to provide a barrier to wildlife migratory movements.

3.5:2 Socio-Economic Profile

The Masai Mara region has been home to the pastoral Maasai, their herds of cattle and flocks of sheep, goats and donkeys since 800 BC (Robertshow 1990). Although a predominantly Maasai pastoralist area up until 30 years ago, Mara (like other parts of the Maasai rangelands) is now increasingly occupied by people from many other ethnic groups, most of whom are agriculturalists. The ethnic groups in the study area can be listed as follows: Maasai, Kikuyu, Kipsigis, Nandi, Kisii, Luo, Abaluhya, Kuria, Ndorobo (Table 3.11). The majority of the inhabitants are pastoralists, although agro-pastoral and farming communities do exist.

These people come from as many as 15 different Kenyan ethnic groups, and possibly some from Tanzania. From the surrounding districts these include Kikuyu, Kisii, Luyha and Luo, coming from the surrounding districts. For the purposes of this study they are collectively referred to as non-Maasai.

Table 3.11 Ethnic Composition and Annual Rates of Population Increase

ETHNIC GROUP	1969	1979	INCREASE (%)
Maasai	83243	118091	4.2
Kalenjin	32078	59921	8.7
Kikuyu	4578	1738	728.0
Ndorobo	1024	1528	4.9
Luo	834	2812	23.7
Kisii	816	4525	45.5
Abaluhya	682	1831	16.9
Kuria	429	1426	23.2
Kamba	187	618	23.0

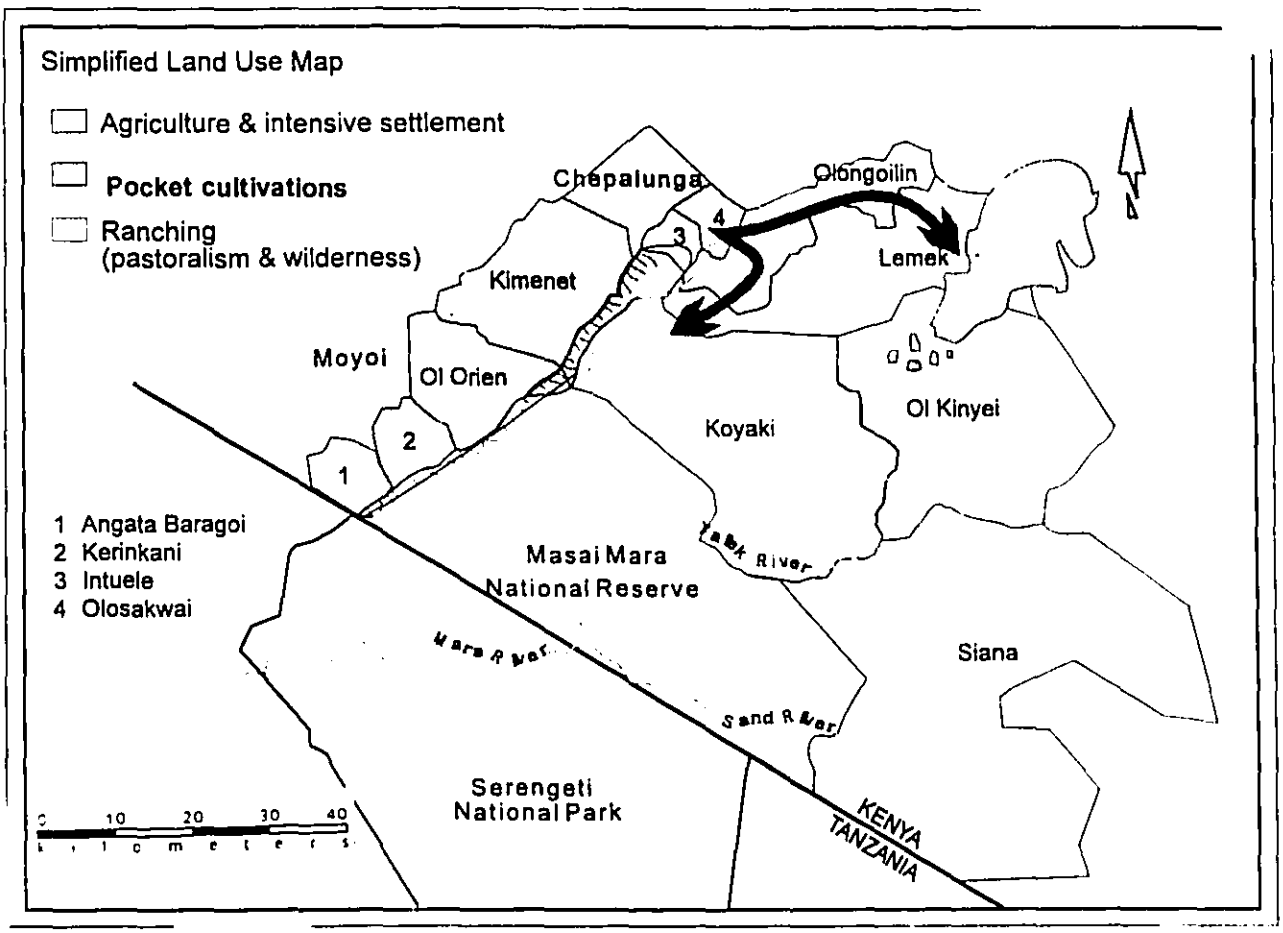
Source: Calculated from 1969 and 1979 Kenya Population Censuses

3.5.3 Land Tenure System and Land Use

During the 1970s and 1980s, the status of land ownership was changed throughout the southern rangelands (The Land (Group) Representatives Act, Chapter 287, 1968). Formerly, cattle were privately owned, but the land was "crownland" held by the crown on behalf of the Maasai. It was adjudicated by section, each of which held its land portion. As land was adjudicated, it was registered as freehold, in private or group holdings. These large tracts of land were further broken down in the high potential areas into individual properties, which could be sold or leased. In the Mau Forest, Ngong hills and the Loitokitok area at the base of Mount Kilimanjaro, much land was sold or leased to agriculturalists growing subsistence and cash crops. Some Maasai began to plant small plots of maize and millet within their compounds. Houses, fences and cropfields sprang up in areas which hitherto were rangeland. This trend towards cultivation is widely viewed as a major deviation from Maasai tradition. Map 3.10 shows a simplified land use Map of the region. Upland area is more intensively cultivated and settled. Cultivation is spreading towards the lowland and the reserve.

There are four main land use activities in the Masai Mara region: (1) livestock production; (2) agriculture; (3) tourism/wildlife conservation; and (4) human settlement. Other lesser activities include market centres, roads, boreholes, and schools. Studies

Map 3.10 A Simplified Land Use Map of Masai Mara Region



Source: Modified from Msafiri 1984

indicate that the most profitable land use returns in the region would be a combination of wildlife/tourism and livestock production (Douglas-Hamilton et al. 1988). Table 3.12 shows cattle density in the Masai Mara region. Generally, Maasai land-use is based on a flexible concept of territoriality which has been adapted to fit changing circumstances (Kituyi 1990).

Flexible patterns of movement and opportunistic management strategies are needed in order to gain access to pasture and water (Galaty and Johnson 1990).

Table 3.12 Group Ranch Areas and Cattle Population

GROUP RANCH	AREA SQ. KM	CATTLE	DENSITY
KERINKANI	81	20600	254
ANGATA BARAGOI	79	13400	170
OLORIEN	185	26000	141
SIANA	982	103200	105
KIMENTET	368	34200	93
LEMEK	497	12000	24
KOYAKI	877	18700	21
OLKINYEI	788	10700	14
MASAI MARA RESERVE	1368	0	0
TOTAL	5224	238800	91

Source: Douglas-Hamilton et al. 1988

Cattle numbers, no doubt, correlate with the increase in human population and the number of manyattas and temporary livestock bomas. Owing to improved veterinary services in the area there has been a general increase in herd sizes for cattle, sheep and goats. The Narok District has at present 800,000 cattle, 1,300,000 sheep, 970,000 goats and 160,000 donkeys (LMD Annual 1990). Douglas-Hamilton, et al. (1988) estimated livestock numbers in 1987 in the Mara Area at 250,000 cattle and 150,000 sheep and goats (with sheep probably outnumbering goats 3 to 2).

Rapid expansion has also occurred in cereal farming. According to Douglas-Hamilton et al (1988), there were only two farmers growing wheat in the region by 1980. Today, at least 35 companies are involved in growing wheat on land purchased or leased from the Maasai group ranches. Pockets of smallholder farms have also developed along the Mara River and the Siria Escarpment (Map 3.10). The principal cereal crop in the region is wheat, although maize is grown in much smaller acreage. It is unclear how much acreage

in the region is under cultivation. No relevant map exists and not much is documented in the literature. The District Development Plan 89/93 gives figures of 23,000 hectares in 1984 and 43,000 hectares in 1987 for the entire district. Douglas-Hamilton et al. (1988) estimated that the total area planted was probably less than 1,000 hectares in the Masai Mara region by 1987. Only a small area of maize had been cultivated. Wheatland is usually let on three-year lease agreements.

3.6 Wildlife Conservation and Management in Kenya

This section traces the history of wildlife conservation and management in the Masai Mara region within the context of Kenya. This shows how conservation practices in the past have ignored the local population, contributing to poor public attitudes towards wildlife and hence, increased wildlife-human conflict. This has undermined efforts to protect wildlife and maintain the sanctity of parks, reserves and wildlife outside the protected areas. Issues in wildlife-human relationships are outlined and government wildlife programs being undertaken to reduce the conflict in Masai Mara region and in the rest of the country are described.

3.6:1 History of Wildlife Conservation

The history of wildlife conservation and management in Kenya can be evaluated under three main periods: (1) pre-colonial; (2) colonial; and (3) post-colonial. Dates may overlap but some themes can be identified as specific to the different periods. Table 3.13 presents the chronology of historical events of wildlife conservation and management in Kenya.

3.6.1:1 Wildlife in Pre-colonial Kenya (Before 1880)

Before colonial rule in Kenya (1880), local people had close contact with wild

animals. They saw wildlife as natural wonders and sources of food. In some societies, like the Maasai, wild animals were almost never eaten, the eland being an exception because it resembles the cow. Maasai boys could kill a lion as a "proof" of bravery or as an initiation into manhood. By-products of wildlife were worn by elders and used as signs or symbols (Aboud 1989; Deihl 1985). Zebra skins were used by Maasai for clothing and ornamental tools.

Table 3.13 Chronology of Wildlife Conservation and Management in Kenya

PERIODS/APPROX. DATE	CONDITIONS, KEY ACTIONS, WILDLIFE-HUMAN RELATIONSHIPS
Pre-Colonial (Before 1895)	• Relative harmonious co-existence, small human population, large wildlife population, communal land ownership, less intensive land use, antagonistic attitudes, no protected areas, no game control. • Beginning of Arab slave trade into interior, rise of Kenyan ivory trade
Colonial Era (1893-1963)	•Beginning of colonial influence, no game control, indiscriminate hunting and shooting for sport, also to give way for settlers agriculture. •Pioneering Protection - colonial Government responsible: introduction of game control, game and forest reserves with sport hunting licences 1940's
(1930s)	•Preservation through parks - national parks were managed by Trustees, Game control and sport hunting outside parks under Game Department. First national park, Nairobi park established 1946.
(1945-)	• Anti-poaching against subsistence hunters
Post-Colonial Era (1960s-1977)	•Parks managed by Trustees until amalgamation with Game Department Conservation and Management Department in 1976. Utilization without management, Hunting Ban in 1977 Compensation to farmers for crop and livestock depredation Mining the parks (1977-1990) • Ministry of Wildlife and Tourism in charge of wildlife • Tourism in parks and reserves promoted • No benefit to local people • poaching and anti-poaching
(1990-91-92)	Contemporary Challenges: • Establishment of The Kenya Wildlife Services (KWS) (1990) • No compensation to farmers for crop and livestock depredation, compensation for human deaths/injuries retained. Alternative system of compensation required • Mounting pressures on parks and wildlife outside the reserves • Challenges for community participation • Need for practical measures to reduce conflict

3.6:1.2 Wildlife Resources Under Colonial Administration (1880-1963)

Wildlife resources were greatly reduced upon the arrival of explorers, adventurers and missionaries in East Africa during the 19th century and with the eventual European settlement. Large numbers of wildlife were killed by hunters (Cranworth 1919; Meinertzhagen 1957). As Capone notes:

> There were no limits on the number of animals that could be shot and it became common practice to shoot large numbers of each species in hopes of getting one good trophy head. The size of each hunter's bag was also a source of pride and many animals were shot simply to add to the tally (Capone 1972:28).

In the meantime, traditional African hunting for subsistence was denounced as barbarous and unfair (Adams and McShane 1992). By the late nineteenth century, explorers roundly condemned African hunters (Adams and McShane 1992). By 1894 concern for the disappearance of wild animals, particularly "big game", was expressed by some early colonial administrators (Johnson 1902). The Commissioner of Uganda noted the decline in wildlife and proposed measures to protect some species (Simon 1962).

The conservation idea in East Africa received its official expression in British East Africa Company's "Sporting Licenses Regulation of 5th September, 1894, "which proposed hunting restrictions and bag limits, regulating the number of kills that might be made on each license" (Capone 1972). Meanwhile, the European settler farmers introduced modern agriculture, which had a devastating effect on much of the wildlife. The incompatibility of wildlife, particularly large species, with agriculture drove wildlife out of settled areas. As farming and population increased, so did conflict with wildlife. These agricultural activities are today expanding into the rangelands.

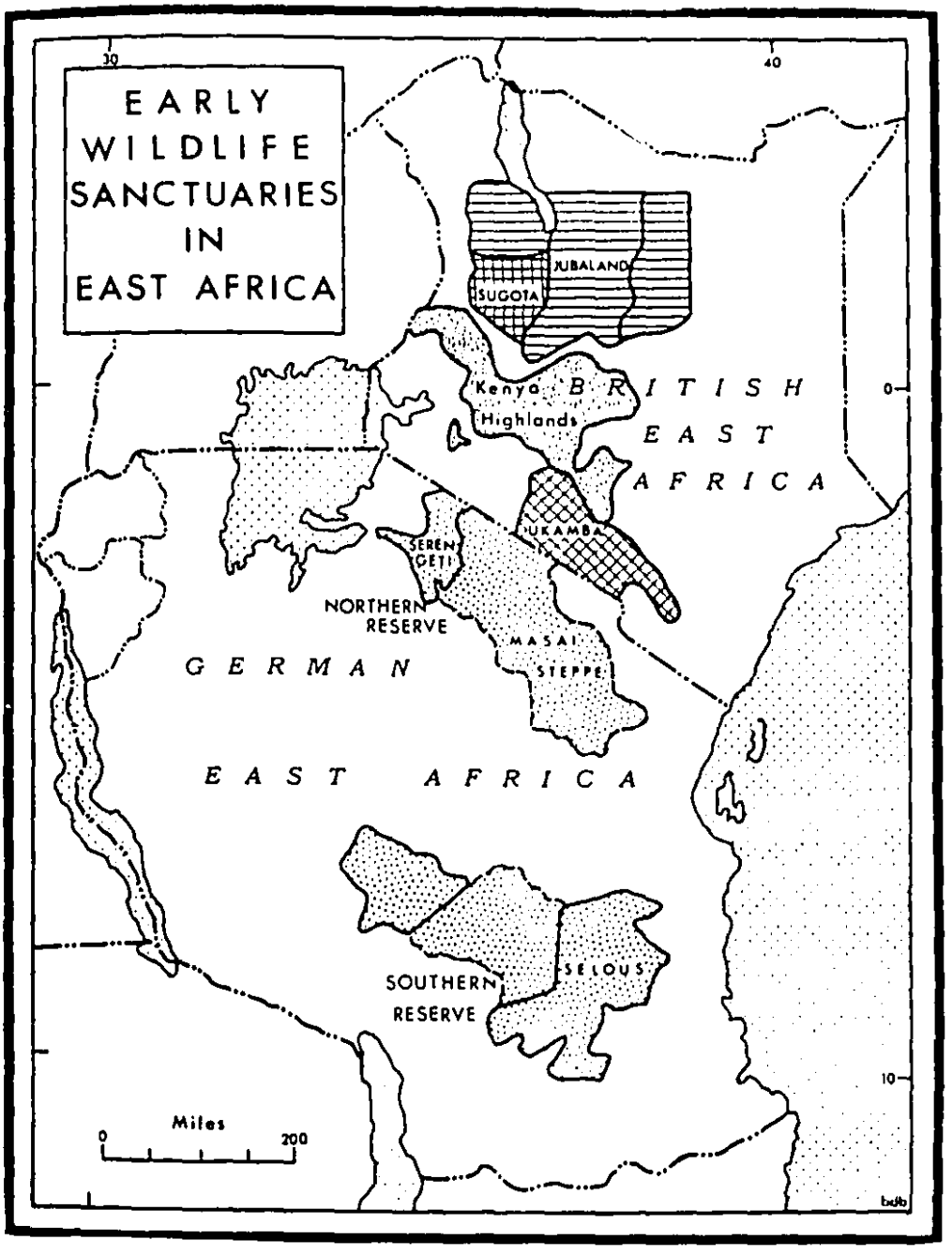
In response to the growing destruction of wildlife in Africa, an international conference was convened in London in 1900 which was attended by representatives of the colonial powers having African dependencies. All the "governments" concerned shared an interest in the large-scale implementation of the conservation idea (Capone 1972). During the same period, interest in Africa's wildlife was mounting in other parts of the world and

people began to travel to see wild animals rather than to hunt them (Berger 1989; Capone 1972). The idea for national parks, pioneered in America, was also gaining support in Europe. These conditions led directly to the consolidation of the creation of protected areas in Kenya.

The first game reserves were established in 1906 in areas that were considered to have little economic potential (Map 3.11). Only a few parks were subsequently created in the relatively economically high potential areas such as the Aberdares and Mt. Kenya areas; all of them today are partially fenced. There was increased concern to protect wildlife and demands that restrictions be placed on human settlement in wildlife conservation areas. But no consideration was given to issues such as the space requirements of truly viable ecological units. No concern was given to local peoples whose lands were being considered as desirable areas for the creation of wildlife sanctuaries. The local people were treated as a threat to wildlife, even though use of wildlife for subsistence was probably not a major factor in its decline, in comparison to the effect of sport hunting and agriculture. It was believed that wildlife could only be protected by eliminating all human interference. Interference with local hunting rights on traditional hunting grounds, the interruption of ancient nomadic migration routes, and the restriction of settlement to one side of a line demarcated on the ground, were all consequences of the establishment of game sanctuaries (Capone 1972).

It became increasingly clear that while complete protection of wildlife could be accomplished in some reserves, there were other areas in which animals had to share the land with the human population. As a result, some people expressed alternative views. For example, Von Wissmann, an early administrator in German East Africa suggested cooperation with the Africans in order to draw from their expertise and wisely use and protect wildlife (Simon 1962). It is interesting to note, as reported in chapter two, that even in North America, some conservationists suggested cooperation with the native people.

Map 3.11 Early Wildlife Conservation Areas



Source: Capone 1972

3.6:1.2:1 The Concept of Wildlife Protected Areas.(1945-1960)

The establishment of the first parks in Kenya followed the passing of the Royal National Parks Ordinance in 1945. National reserves were created to cover areas where human activity could not be excluded. A National Parks Administration was set up under the Trustees of the National Parks, a para-governmental organization. The first areas receiving special protection were in, or adjacent to, the Maasailand (rangelands): Nairobi National Park (established 1946), Amboseli National Reserve (1948), and Tsavo National Park (1948). The Masai Mara National Reserve, the area for the present study was established in 1974. We will now examine how the concept of protected areas evolved during the colonial period in Kenya.

The Kenya National Park Service took responsibility for protecting wildlife and its habitat. This task was carried out through legislation enforced by conservation and government officials. Many of Kenya's major parks were created during this era. The Game Department, as a separate organization from the parks service, was responsible for wildlife outside the parks. It controlled and licensed sport hunting and carried out game control in agricultural areas. The Game Department cooperated with farmers because of its role in the control of wild animals in order to protect African crops, especially from elephants (Berger 1989; Kinloch 1972). The Department, together with county councils, was responsible for administering game reserves, where indigenous human use continued with relatively little conflict (with the exception of subsistence hunting). Most of the people using game reserves were pastoralists who seasonally grazed their cattle in reserves. An example of collaboration between wardens and pastoralists in reserves is told in the story of Amboseli Park (Western 1982).

The "imported" concept of conservation, however, provided the public with little motivation to cherish and protect wildlife, and no opportunity to benefit from it. Insensitivity to local needs was exemplified by the anti-poaching campaign in Tsavo, which allegedly

destroyed completely the Waliangulu society and culture that was dependent on elephant hunting for their livelihood (Berger 1989). At one time, about one-third of the adult male Waliangulu were in prison for poaching (Lusigi 1978). African resistance tended to entrench the European view that the people living near parks could not be trusted or given any responsibility for protecting wildlife. Mistrust of the public has coloured official conservation thinking up until the present era. This contributed to the "island" and territorial attitude of many park wardens, who tended to work as though parks were completely separate and unrelated to life outside park boundaries. Creation of parks may also have fuelled the notion that the land outside protected areas could be modified entirely for agriculture or other human uses (with the exception of areas designated for hunting, which were generally remote, arid and not attractive for farming).

Areas outside the protected reserves were also open to modern land and resource use practices which tended to emphasize maximum exploitation, not sustainable management. Modern farming practices have tended to reduce the variables (diversity) in the ecosystem and to develop monocultural systems with artificially high production. These strategies have led to environmental depletion and to the elimination and extinction of wild animal species (Berger 1989). By the time Kenya attained independence in 1963, there were four national parks and six game reserves. There are presently 23 national parks and 29 national reserves (Map 3.12) (Kioko 1992), but it is becoming increasingly difficult to acquire new areas for protection as human activities expand. In fact, status of some of the new parks/reserve is being repealed[9].

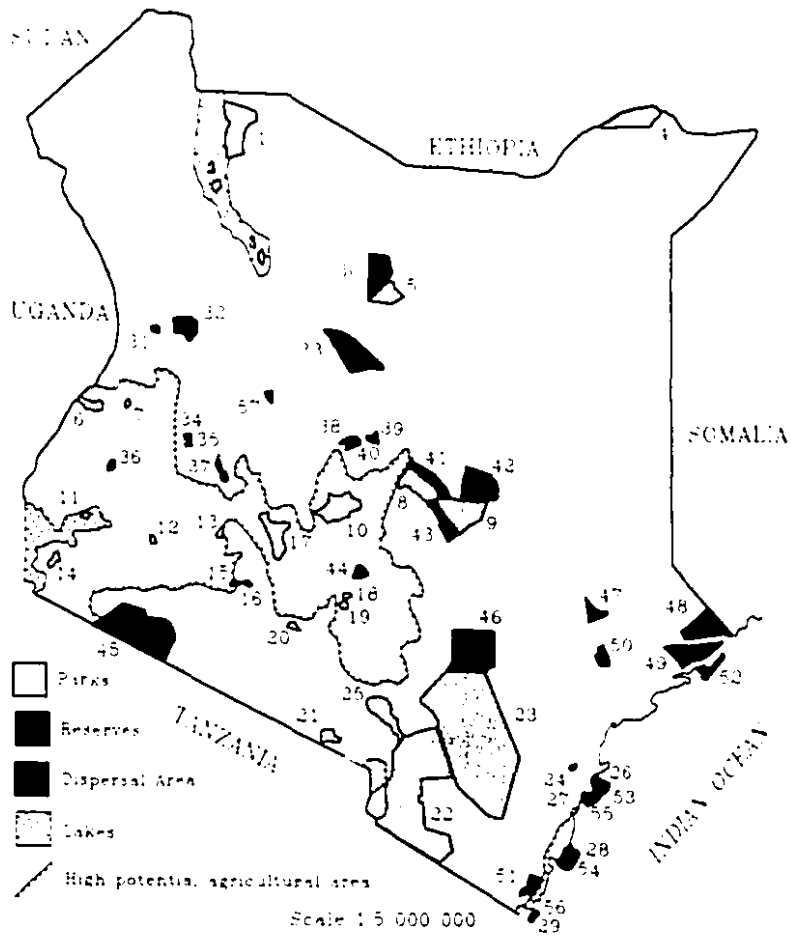
[9] Three areas that were originally declared and gazetted as protected areas including Ndere Island, Tana River and Ruma have been degazetted. A number of protected areas have had portions excised. Masai Mara Game Reserve has been reduced three times since it was gazetted. It is increasingly argued that areas that do not contain wildlife or significant natural resources should be open for human use. As inhabitants of these areas become politically vocal, such proposals are bound to increase.

3.6:1 Post-colonial period (1963-1991)

The post-independence Kenya had meant a different approach to wildlife management issues. Conservation policy and programs had to complement the new aspirations and national strategies for economic and social development. The National Parks Service (under the 1964 National Parks of Kenya Act (cap. 377 of the Laws of Kenya) and the Government Game Department (Wild Animal Protection Act) were created. In 1976, a Wildlife Conservation and Management Department under the Ministry of Tourism and Wildlife was created from the amalgamation of the two organizations. It was governed by new legislation, the Wildlife (Conservation and Management) Act. Important modifications in Wildlife conservation policy began to occur. The Wildlife Act contained policy that allowed for "utilization" as part of conservation management. The Act had been preceded by a sessional paper (No. 3, 1975) on the future of wildlife management, not only in parks and reserves, but also in the dispersal areas around parks. As a legitimate form of land use, it proposed that landowners supporting wildlife should receive sufficient enumeration to enable wildlife utilization to be sustained, and it suggested ways for sharing economic benefits from wildlife.

The need to link planning and management of parks with wildlife dispersal areas on park peripheries was beginning to be recognized. A new approach to conservation which could include human activities had to be designed. Walter Lusigi, one of the first Kenyans to conduct research on the wildlife-people management, proposed a way of coordinating park planning with development in surrounding land. He suggested a "conservation unit approach" for planning the Nairobi National Park Ecosystem (Lusigi 1978). The proposed coordinated management system, with various categories of land use: a national park, a protected area, and a multiple-use area, took the economic and cultural needs of people living on the park boundaries into account. Although this model has received enormous international recognition, there is no evidence to that it has been tested for implementation, even in the context of the Nairobi National Park ecosystem where it was developed.

Map 3.12 National Parks and Equivalent Reserves of Kenya



Source: WCMD 1986

Key

NATIONAL PARKS

1 SIBILOI
2 CENTRAL ISLAND
3 SOUTH ISLAND
4 MALKA MARI
5 MARSABIT
6 MOUNT ELGON
7 SAIWA SWAMP
8 MERU
9 KORA
10 MT. KENYA
11 NDERE ISLAND
12 MAU
13 LAKE NAKURU
14 RUMA
15 HELLS GATE
16 LONGONOT
17 ABERDARE
18 FOURTEEN FALLS
19 OL DONYO SABUK
20 NAIROBI
21 AMBOSELI
22 TSAVO WEST
23 TSAVO EAST
24
25 CHYULU

MARINE PARKS

26 MALINDI
27 WATAMU
28 MOMBASA
29 KISITE
30 MARSABIT
31 NASOLOT
32 SOUTH TURKANA
33 LOSAI
34 KERIO VALLEY
35 KAMNAROK
36 KAKAMEGA
37 LAKE BOGORIA
38 SAMBURU
39 SHABA
40 BUFFALO SPRINGS
41 BISANADI
42 RAHOLE
43 NORTH KITUI
44 MWEA
45 MASAI MARA
46 S. KITUI
47 ARAWALE
48 BONI
49 DODORI
50 TANA RIVER PRIMATE
51 SHIMBA HILLS

MARINE RESERVES

52 KIUNGA
53 MALINDI
54 MOMBASA
55 WATAMU
56 MPUNGUTI
57 MARALAL

Another approach has been to manage wildlife as an alternative source of protein. During the 1960's, there had been a growing interest in the potential for wildlife as a source of protein to feed Africa's fast-growing population (Food and Agriculture Organization [FAO] 1967; Talbot 1967; Tinley 1979). The Government's intention to legalize and develop controlled sale of game meat was reflected in the 1970-74 National Development Plan (1969). This shift from preservation to rational exploitation was also an aspect of the next plan (1975-78). Research on wildlife meat production and the characteristics that made wildlife physiologically and ecologically superior to domestic stock was encouraged (Darling 1960; Ledger 1967; Quartrup 1974; Talbot et al. 1965).

The growth rate in the establishment of the protected areas in Kenya increased immediately after independence but has slowed down in the 1980s and 1990s. It is becoming increasingly difficult to acquire and declare new lands as parks and reserves, basically because of demands for land and human population growth. The major objectives of wildlife conservation in Kenya (through the protected areas concept) and the economic justification for wildlife conservation are as listed below.

Wildlife is utilized in two main ways in Kenya: (1) consumptive, and (2) non-consumptive. Non-consumptive is mainly through game viewing in parks and reserves, scientific advancement (research), cultural naming in folklore and songs. Consumptive uses include (1) sport hunting, (2) capture for export, (3) game cropping for meat and trophies, and (4) game ranching alone or in combination with livestock. Processing and marketing of wildlife products is also encouraged as a means of achieving higher net contribution to the economy. For consumptive utilization to benefit the local people it is necessary to direct it outside the reserves. Such consumptive utilization should also be managed to reduce the number of species causing damage. Wildlife should remain in these community areas only as long as they provide direct benefits to local people.

3.6:2 Wildlife/Local People Issues in Kenya

This section outlines the main issues involved in the wildlife-protection area and the way that the local people of Kenya are affected. These include (1) wildlife policy, (2) wildlife damage control, (3) compensation for loss due to wildlife, (4) disease transmission from wildlife to livestock, (5) distribution of tourism revenue that neglects local people, and (6) wildlife conservation education and extension services. These issues underlie the wildlife-human conflict in the Masai Mara region and other parts of Kenya and are presented here to provide the background for analysis of the views of the local people towards the programs in the next chapter.

3.6:2.1 Wildlife Policy

The Kenya government's commitment to wildlife protection is demonstrated by its land reservation and strict wildlife conservation legislation and policies. The main objective of the protected areas is "to preserve in a reasonably natural state examples of the main types of habitat which are found in Kenya for aesthetic, scientific and cultural purposes" (WCMD 1986). The Government's present policy towards wildlife was first described in Sessional Paper No. 3 of 1975, Statement on Future Wildlife Management Policy. The Sessional paper was an attempt to move away from policing and towards conservation and management of wildlife resources. It suggested that returns to wildlife should be optimized through (1) conserving it when that is the best form of land use (or can be productive in combination with other uses); (2) ensuring implementation of those uses, and (3) ensuring an equitable distribution of benefits of those uses. The paper states that:

> ...(t)he main future emphasis of wildlife policy will be upon finding means to secure optimum returns from the wildlife resource, and upon implementation of those means for the benefit of landowners and the nation generally ... If wildlife is to continue to use some of this carrying capacity, which is now being brought under direct, explicit, and conscious management for the first time, it must yield returns to the ranchers, which are the least equal to the returns from the livestock, which could replace it.

This policy gives room for integrating wildlife conservation with local communities but its operation is unclear. The Sessional Paper established framework for the subsequent Wildlife (Conservation and Management) Act, Cap 376 of the Laws of Kenya. The Act is the principal legislation dealing with wildlife. It was amended in 1989 and is now the Wildlife (Conservation and Management) (Amendment) Act. The amended Acts established the Kenya Wildlife Services (KWS), a parastotal organization and was put in charge of wildlife conservation and management. The major functions of KWS range from the formulation of policies regarding wildlife conservation, management and utilization to conduct and co-ordinate research activities in the field of wildlife conservation and management and the administration and co-ordination of the international protocols, conventions and treaties regarding wildlife matters. Mention and pledge are made with regard to wildlife damage control and integrating wildlife conservation with local communities through extension services, creation of awareness and provision of tangible economic benefits to local people, but these are, to say the least, "paper programs". We will now outline the specific programs being undertaken in wildlife areas, outlining their strength and shortcomings.

3.6:2:2 Wildlife Damage Control

Wildlife damage control is one of the major programs that the government undertakes in its attempts to reduce wildlife-human conflict; traditionally called "game control", it has been an important responsibility of the Kenya wildlife authority since the beginning of wildlife protection. Ritchie (1968) defines "Game control" in Kenya as:

> the sum total of measures that must be taken to prevent any animals, desired to preserve from coming into serious conflict with man and his legitimate activities. While game preservation means in effect the shielding of game from man and his instinct to kill, game control means the shielding of man from the depredations of game.. (Ritchie quoted in Brown 1968:209).

Wildlife damage control in Kenya today, is carried out primarily by the KWS. Before the amalgamation it was the responsibility of the Game Department. The former national

parks and Forest Department had also been engaged in control activities. The government's position on the control of wild animals was stated in a sessional paper, published in 1959.

> The government does recognize a responsibility, arising from its declared game preservation policy, to assist in the control of schedule game animals as far as it is practicable to do so. Control is an important function of the game Department and the Government intends that, within the limits of finance available, such control shall be as effective as is practicable (GOK - Sessional Paper no. 1 of 1959/60:5).

This position was once more consolidated in a new sessional paper, published in 1975:

> The government accepts a general responsibility to assist with control of behaviour of wildlife, which is adverse to other activities or to human life, within the limits of available finance, manpower, and techniques and subject to co-operation by the relevant landowners and other members of the public.

The paper continues with:

> The techniques used by the Service or recommended to landowners for particular game control problems depend upon the circumstances of the case, and specifically upon the likely benefits to be secured, relative to the costs of achieving them. The range of available techniques includes deterrence (through use of thunderflashes, night fires, dogs, shooting of one or two numbers of a herd), erection of game proof barriers (which is very expensive and can only be countenanced where game damage is likely to be large and where it is in the interest of sound land use management, that wildlife be excluded from the area), translocation or extermination (via poisoning, shooting, or destruction of habitat) (GOK - Sessional Paper No. 3 of 1975, sections 77, 78 and 79: 16-17).

These statements reflect the intensions of the government but mean more on paper than in reality. Wildlife control indicates the steps that the government as the owner of wildlife takes to reduce or resolve the conflict. Wildlife control in the Masai Mara region means, in essence, the controlling of wildlife where they conflict with livestock and crops.

3.6:2.3 Compensation for Loss

As early as the late 1950s a kind of wildlife damage compensation existed through Kenya. Hunting was partially regulated through a Controlled Area system[10], which covered

[10] The Controlled Area System was a management regulation of the Game department, attempting to spread hunting pressure and preventing overcrowding of areas by limiting the number of hunters in any hunting block at the same time. A hunting block is a controlled area that is open to hunting.

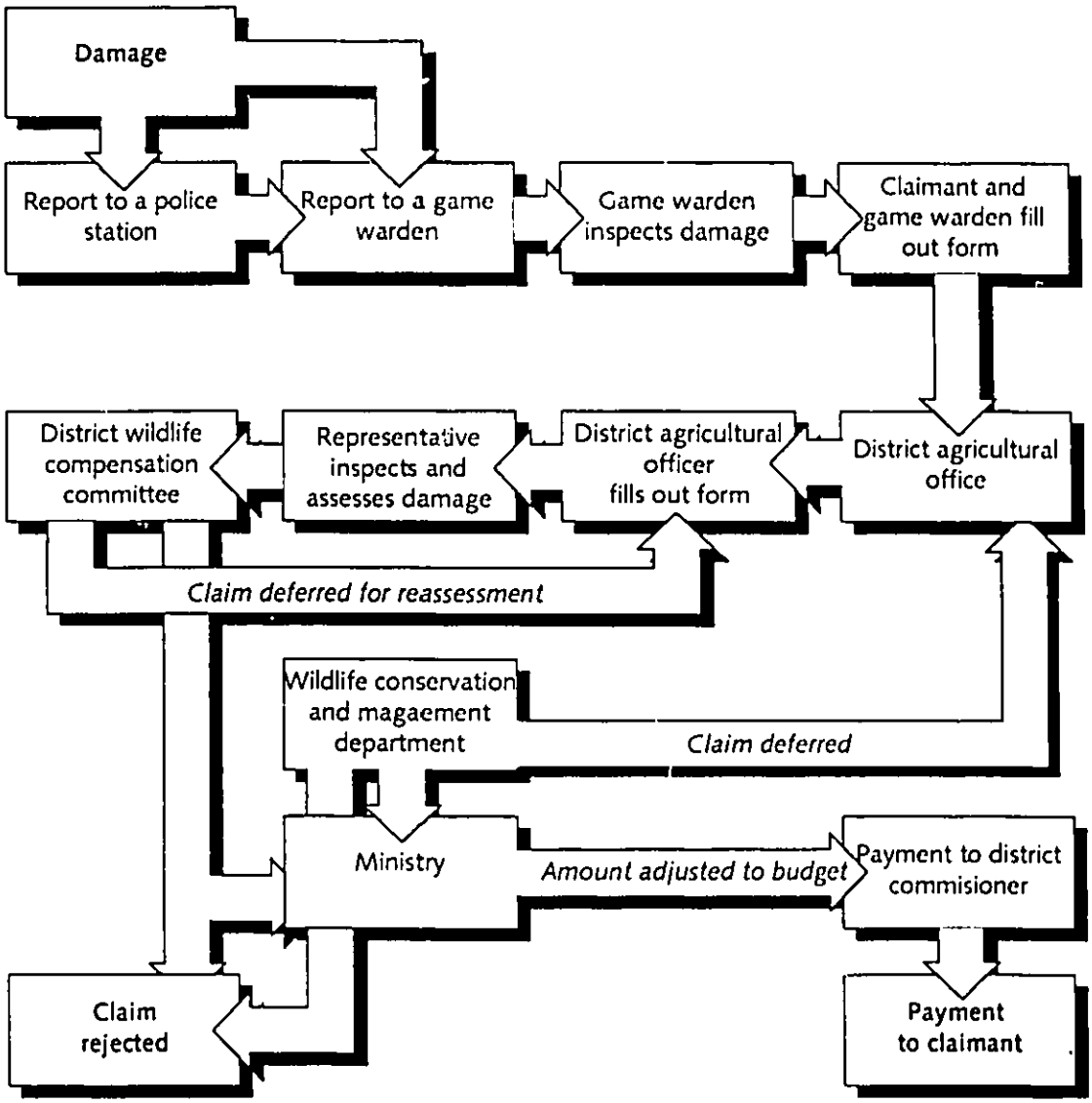
game areas outside the national parks and game reserves (except for private land). This Controlled Area system also served to bring some of the economic benefits of wildlife exploitation directly to the people. Hunters had to pay fees to the District Councils for the use of a controlled area. District Councils were encouraged to use at least part of the money received from controlled area fees to compensate people for damage or personal injuries caused by wild animals (Capone 1972). This system ended with the banning of hunting in 1977.

The current compensation scheme was established in late 1975. In this scheme, those who suffered property damage, human death or injury because of wildlife would receive monetary compensation from the government. However, no compensation would be paid in cases where the loss of life or injury occurred in the course of illegal activities, as in the case of poaching wild animals. Indirect damage such as the loss of livestock due to disease transmitted by wildlife or competition for resources was not been included in the scheme because it is difficult to quantify or confirm such losses.

The procedure of the compensation is shown in Figure 3.1. Damage must be immediately reported to the Game Department or a local police station. The Game warden determines whether the claim is legitimate and assists the claimant in filling out a compensation form. Officers from the District Agricultural Office visit the scene and they determine the extent of damage in monetary terms on the level of local values and productivity levels. Claims for personal injury/death must be accompanied by a medical or post mortem certificate. Next, the claim goes to the District Wildlife Compensation Committee (gazetted in 1978), consisting of a number of interested parties and two members of the public. This committee discusses the claim and either defers it for re-assessment at the local level or approves it with a recommended amount of compensation before sending the claim to the KWS in Nairobi. KWS once again makes a recommendation on the required compensation and this recommendation is forwarded to the Ministry of Tourism and Wildlife

for payment.

Figure 3.1 **Stages in Wildlife Compensation Procedures**



Source: Mwenge 1980

The Ministry reduces the recommended amount to fit within the overall available budget.

Finally, payment is made to the District Commissioner, who eventually pays the compensation to the claimant. If the claimant is not satisfied with amount received, he has the right to appeal within 60 days.

Over the years claims for compensation have increased in response to increasing wildlife damage. During 1986, for instance, compensation claims for the Narok District totalled Kshs. 47 million (Table 3.14). The accuracy of the claims is difficult to police. From the local people's perspective the scheme has failed to meet the costs of sustaining wildlife on their land (Douglas-Hamilton et al. 1988). The administration of the scheme is burdensome as the claims procedure is too long.

Table 3.14 Narok District Wildlife Damage and Compensation Claims and Payments 1979-86

YEAR	AMOUNT CLAIMED (K.SHS)	AMOUNT PAID (K.SHS)	TYPES OF CLAIMS (% of Total Claim Value)		
			Crop	Livestock	Personal
1979	721,955	721,955	100	0	0
1980	852,198	852,198	N/A	N/A	N/A
1981	no data	no data	N/A	N/A	N/A
1982	3,336,729	1,548,579	86	6	7
1983	9,939,436	2,071,925	93	6	1
1984	13,167,291	2,120,014	92	5	3
1985	14,785,737	1,199,145	96	3	<1
1986	46,996,8660	533,740	97	2	1

Source: Douglas-Hamilton et al. 1988

3.6:3.4 Wildlife Disease Transmission to Livestock

Table 3.15 shows the general diseases believed to originate from wildlife to domestic cattle. The common wildlife cited as disease carriers were buffalo, elephants and wildebeests. Apart from the diseases listed, wildlife also carry all the four common types of ticks known in East Africa: brown, blue, bont and red (Odegi-Awuondo 1982). The ticks

transmit various stock diseases including East Coast Fever, anaplasmosis, redwater (babesiosis), and headwater. Wildlife have developed immunity to most of the diseases, thus acting as healthy carriers. One of the factors in wildlife damage in the Masai Mara region is the transmission of disease from wildlife (wildebeests and buffalo) to livestock. There is a need to investigate the disease cycle between wildlife and domestic livestock. The result of such research should then be used to assist planning of off-take quotas for individual species with the aim of reducing the level of disease transmission.

Table 3.15 Livestock and Wildlife Diseases

DISEASE	WILDLIFE AFFECTED	DOMESTIC STOCK AFFECTED
East Coast Fever	Buffalo	Cattle
Anthrax		Cattle
Rinderpest	Buffalo (all warm-blooded animals)	Cattle, camels, sheep, goats, pigs
Foot and mouth	Ruminants (nearly all others	Cattle, pigs, sheep
Malignant Catarrh	Wildebeests	Cattle, sheep
Trypanosomiasis	(nearly all)	Cattle, sheep, goats, camels

Source: Pratt and Gwynne 1977.

3.6:2.5 Distribution of Tourism Revenue

One of the main justifications for protecting wildlife in Masai Mara and Kenya at large, is tourism. This section examines the role of wildlife (through the protected area) in tourism in the Masai Mara region within the Kenyan context. It shows that the local people do not benefit, and that this is one reason why they might hold negative attitudes towards wildlife conservation.

The Masai Mara region, through tourism, is one of Kenya's chief foreign exchange earning areas. In 1987, for example, the Reserve absorbed 18% of all visits to national parks or reserves in the country and generated 8% of gross tourist revenues for Kenya (Douglas-Hamilton et al. 1988). Tourism is Kenya's primary foreign exchange earner. In the last two decades, visitor numbers to Kenya have escalated three-fold (Table 3.16). There have been

Table 3.16 Kenya Tourism Arrivals and Earnings (1967-1990)

YEAR	ARRIVALS* (1000'S	CHANGE (%)	CURRENT EARNINGS K	CONSTANT EARNINGS	VALUE OF DOMESTIC EXPORTS	TOURISM AS PROPORTION (EXPORTS + TOURISM EARNINGS %)
1967	225	-	NA	-	53.5	-
1968	262	16.4	17.3(2)	46.6	57.6	23.0
1969	293	11.9	16.7	43.7	63.3	20.1
1970	343	17.1	18.5	47.2	71.6	20.5
1971	411	19.7	23.9	58.3	73.2	24.6
1972	345	-16.1	27.3	68.8	90.6	23.2
1973	338	-2.0	24.3(3)	55.9	122.6	16.5
1974	316	-6.5	26.5	51.3	162.9	14.0
1975	324	2.5	33.4	55.6	168.9	16.5
1976	446	37.7	42.9(2)	60.8	268.8	13.8
1977	346	-22.4	48.3	58.5	480.3	9.2
1978	361	4.3	60.0	70.4	369.9	14.0
1979	383	6.1	62.0	68.4	385.5	13.9
1980	389	1.6	82.5	82.5	487.6	14.5
1981	366	-5.9	90.0	81.4	513.9	14.9
1982	392	7.1	116.0	96.2	545.7	17.8
1983	272	-5.1	122.0	92.1	633.1	16.2
1984	462	24.2	152.0	103.6	754.8	16.8
1985	541	17.1	197.0	125.1	776.0	20.2
1986	614	13.5	247.0	147.0	NA	-
1987	665	8.3	275.0(4)	154.0	NA	-

NOTES:

* Over 75% of arrivals are holiday visitors (others are business and transit); average length of stay is 16 days (18 for holiday and 12 for business visitors).

** Includes tourism, business and transit (Source: (CBS)

*** CBS calculations

Sources:

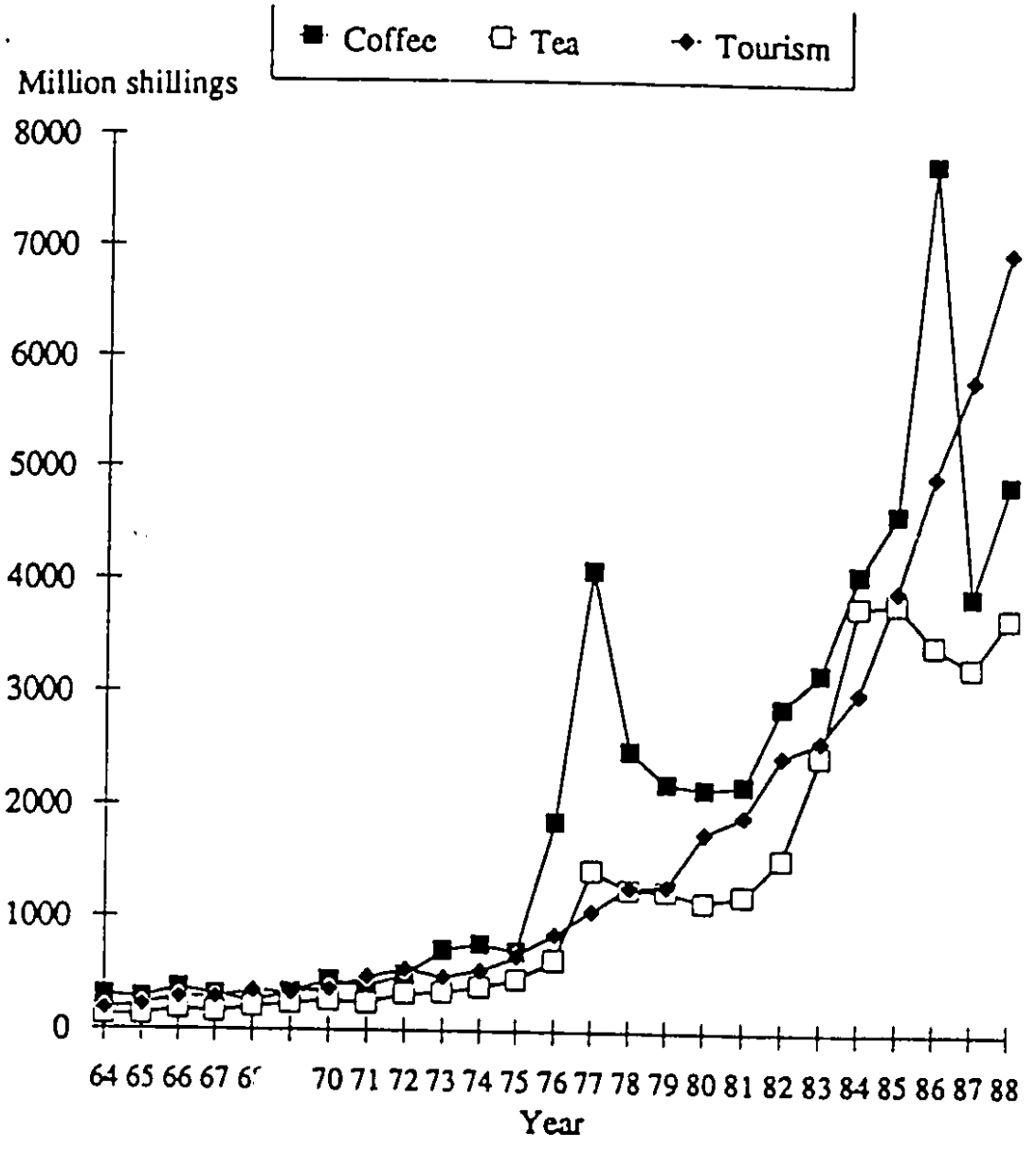
1) 1963 earnings were K#7.9m (Development Plan 1964-1968)
2) Development Plan: 1979-1983
3) Sessional Paper No. 3 of 1975
4) "Financial Times," March 15, 1988, quoting the Ministry of Tourism and Wildlife
5) Deflator obtained from World Bank "International Financial Statistics" Supplement of Price Statistics 1986. Deflator for 1986 and 1987 estimated.

All other data from "Economic Survey" for various years (CBS).

three distinct periods of tourism growth in Kenya: the late 1960's, 1975 to the mid- 1980's. Tourist growth has been 5.7% per annum, while earning has increased 15% per annum. Wildlife plays a remarkable role in the industry with the visitors numbers to parks steadily

increasing[11]. Currently, Kenya receives about 700,000 tourists per year. Tourism is now the leading foreign currency earner after the traditional export crops of coffee, tea and horticultural produce (see Figure 3.2). Foreign exchange earnings were US $18 million

Figure 3.2 Role of Tourism in Kenyan Economy (1964-1988)



Source: Sinclair 1991

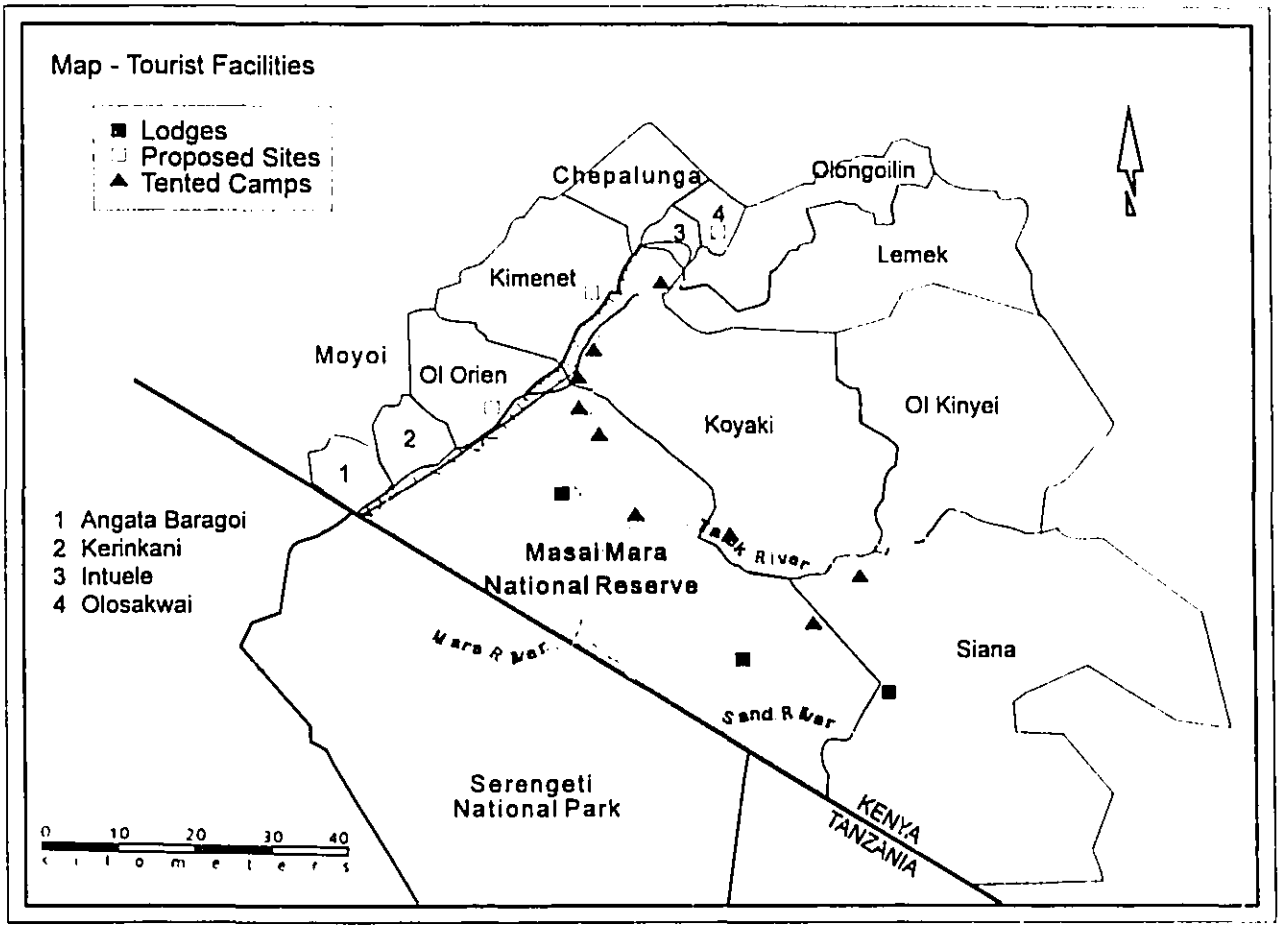
[11] Experts, however, warn that many tourist will turn to coast as wildlife population dwindle. With Tanzanian tourism gaining popularity, more of wildlife viewing tourists will probably prefer Tanzania.

in 1990, a growth of 23.4 per cent from about US $15 million recorded in 1989. Approximately 110,000 people, or 8.3% of the wage earning population of 1.3 million people are employed directly or indirectly in tourism. Kenya's highest tourism growth rates occurred during the 1960s with the advent of charter tours. The number of tourists increased by 227% between 1960 and 1967, and by 131% between 1968 and 1972 (Rajotte 1987). World economic and political conditions led to a general downward trend in tourism numbers in the 1970s and early 1980s. The government projects that about 1 million will be visiting the country in coming years and the KWS believes that with better management techniques, better infrastructure, and a wider range of reserves made available, Kenya can absorb as many as 10 million tourists per year (KWS 1990).

The Masai Mara region has always been an important attraction for tourists. Downey of Ker and Downey, began escorting tourist clients to the Mara in 1929 simply because it was one place in Kenya where the clients were guaranteed to see large quantities of a wide variety of wildlife. Before the 1960's, the Mara Area was not a tourist destination as there were no facilities and very poor roads. Keekorok Lodge opened in 1965 with 48 beds. In 1975, there were 264 beds in the Mara and by 1980 there were 548 available. By 1991 there were over one thousand beds and at least 180,000 visitors going to the Reserve and the surrounding wildlife dispersal areas each year. Map 3.13 shows the distribution of tourism facilities in the Masai Mara region.

The Mara area has attracted tourists more rapidly than any other park or reserve in the country with visitor entries rising by 9%, and bed nights by 12% annually. There have been significant benefits from tourism for the people of the district. Over the last decade, the Narok County Council (NCC) has earned over Kshs 75 million (CAD $3) in revenues from visitor tariffs from lodges set up in the reserve (Douglas-Hamilton et al 1988). Much of this has gone to health, education, and animal husbandry projects throughout the district. The critical issue is that the adjacent group ranches in the wildlife dispersal area received, in

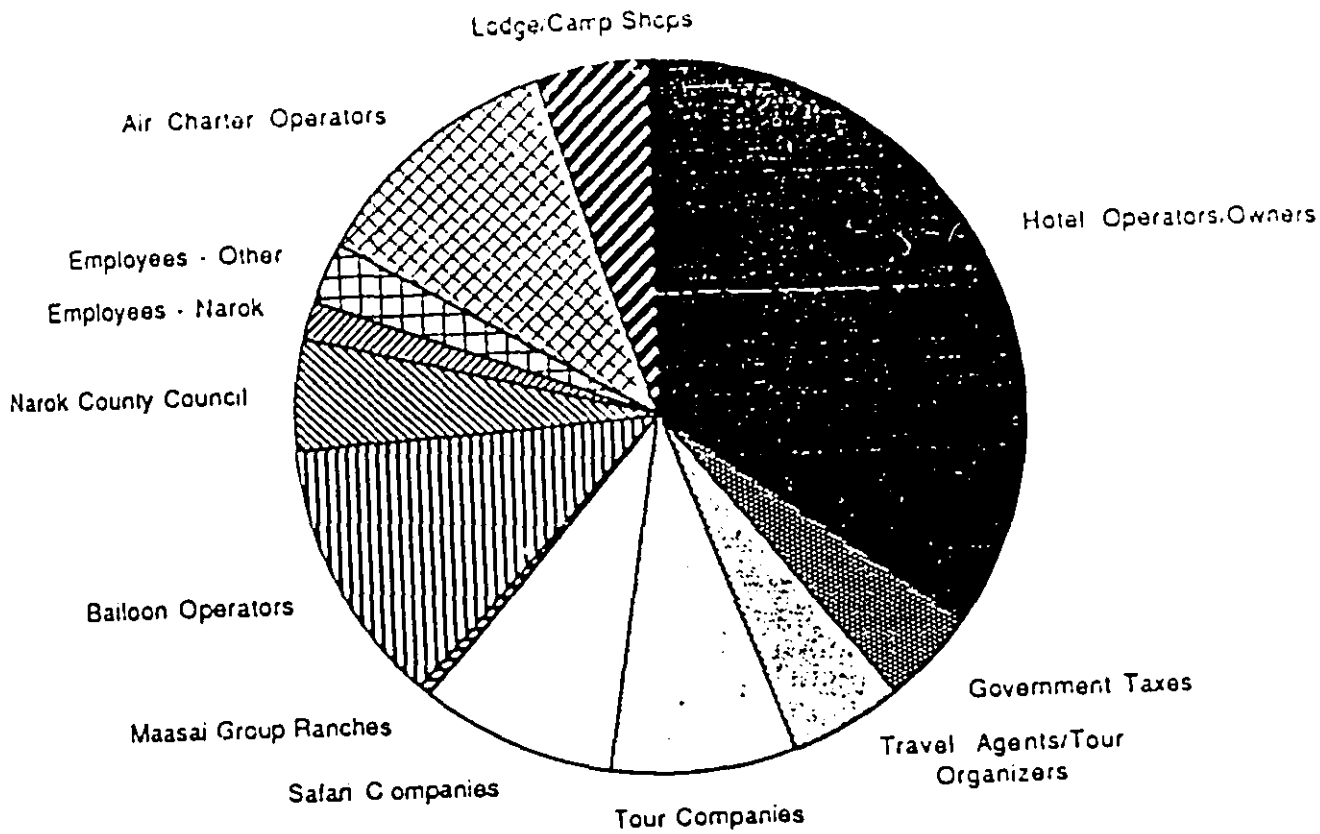
Map 3.13 Tourist Facilities in Masai Mara Region



Source: Douglas-Hamilton et al. 1988

1987, for example, only about Kshs. 2.78 million (Douglas-Hamilton et al. 1988). Less than 1% of these earnings find their way to the Maasai people of the group ranches where the wildlife spends much of its time (Douglas-Hamilton et al. 1988). Table 3.17 and Figure 3.3 show the probable distribution of the gross earnings of the Masai Mara region.

Figure 3.3 Distributions of tourism Earnings in Masai Mara Region (1987)



Source: Douglas-Hamilton et al. 1988

Table 3.18 Direct Distribution of Earnings (1987)

BENEFITS	AMOUNT (Kshs. m)	PROPORTION (%)
Hotel Operators/Owners	155.69	35.00
Government Taxes	20.10	4.50
Travel Agents/Tour Organizers	22.41	5.00
Tour Companies	37.53	8.40
Safari Companies (Tented)	37.51	8.40
Maasai Group Ranches	2.78	0.60
Balloon Operators	53.60	12.10
Narok County Council	23.07	5.20
Employees - Nerok	7.84	1.80
Employees - Other	12.26	2.80
Air Charter Operators	49.94	11.20
Lodge/Camp Shops	21.92	4.90
Total:	444.65	99.90

Source: Douglas-Hamilton et al. 1988.

About 7% of the gross revenue remain in Narok District in the form of Council revenues (K.shs. 23.1 million) and salaries and wages of lodge and camp employees (Kshs. 7.8 million). Probably another 2% accrues within the District in the form of payments for transport services, expenditure by tour drivers, purchase of fuel, supply of beer (most is supplied from Nairobi) and other minor services. About Kshs. 20 million (5%) was paid directly to the government in the form of taxes and levies (hotel accommodation tax and catering levy) in 1987. These estimates confirm that little benefits accruing from protected area-based tourism goes to the local people of the Masai Mara region.

Potentially, the pastoralism/wildlife tourism combination in the Masai Mara is so lucrative that there should be ample revenues to allow for full local benefits for the Maasai who share the land with the wildlife. It is these people who deserve the credit for its very existence. For tourism to continue to flourish, the industry must make a greater economic contribution to the improvement of living conditions in the wildlife dispersal areas. Protected areas play a significant role in attracting tourists. More than a half of the tourists that come to Kenya visit the protected areas. Kenya currently has 23 national parks and 29 game reserves, occupying about 8% of the country's land surface. Most of the protected areas are located in the arid and semi arid lands. Hotel bed-night occupancy by foreign residents in Game reserves and national parks rose by 15.2 per cent in 1990 compared to 8.3 per cent growth in 1989. The most commonly visited protected areas with over one thousand visitors in 1990 include Amboseli, Nairobi, Lake Nakuru, Tsavo East National parks and the Masai Mara National Reserve (Table 3.18). Generally, protected area-based tourism has become an important source of revenue for the country and is one of the main forces behind the government's interests in wildlife conservation.

Table 3.18. Annual Visitors to National Parks and Game Reserves, 1986-1990 (100,000)

PROTECTED AREAS	1986	1987	1988	1989	1990
Amboseli National Park	157.0	148.5	137.7	140.4	237.2
Animal Orphanage	73.0	82.1	84.8	43.3	213.8
Masai Mara National Reserve	94.8	95.9	118.8	196.2	180.5
Lake Nakuru national Park	127.9	127.9	138.6	167.4	174.2
Nairobi National Park	91.6	99.8	125.5	155.2	152.8
Tsavo (East)	75.3	89.6	87.3	101.1	127.7
Total visits to all Park	925.5	996.0	1,095.8	1,255.0	1,532.2

Source: EIU 1991

The question, however, is who benefits from the tourism revenue generated from the protected areas. Although tourism's benefit to developing countries is in itself debatable (for example, de Kadt 1979; Britton 1983; Marsh 1987; Rajotte 1987), the concern here is to establish how it is distributed within the country. Quite often almost all the revenue earned goes directly to the national treasury, while very little is ploughed back into local regions that sustain the protected area tourism. Often the local people are treated as threats to the protected areas and this has created antagonistic attitudes towards wildlife and the protected area by the local people.

3.6:2.6 Wildlife Conservation Education and Extension Services

Wildlife conservation education of Kenyan people is becoming increasingly important as human population increases, land pressure mounts and people's familiarity with wildlife through daily experience decreases. There are two main purposes to wildlife conservation education: (1) to increase the Kenyan peoples' understanding of their country's wildlife and ecosystems and the value they place upon them, and thus create an atmosphere of concern and support for wildlife conservation, and (2) to offer all visitors to

Kenya's wildlife areas information about wildlife while enhancing their commitment to its conservation.

By 1991, there were educational facilities at Nairobi, Nakuru, Voi and Meru run by KWS. There were also NGO-run facilities at Nakuru, Hell's Gate, Langata and Nanyuki. In addition, awareness of the value of wildlife is achieved through participation in popular Provincial Agricultural shows. The education staff were few and were trained primarily in wildlife management, rather than in communication or other skills. The main questions to be addressed with regard to wildlife education are: (1) who are the target groups and what are their aims (interests) regarding resource use in relation to wildlife conservation in Masai Mara, (2) what are the "messages" to get across to them, and (3) what are the available educational channels and techniques? Often the local people are treated as uninformed. There is need first to establish exactly what the local people know and want, then to fill in the gaps regarding wildlife conservation. It is also important to establish the role of wildlife conservation education in relation to other education and extension services, such as in agriculture, NGOs, and other interest groups in environmental conservation education. Table 3.19 outlines various interest groups in wildlife conservation in Masai Mara region and in Kenya in general. The main target group, however, should be communities living in park adjuncts.

3.6:2.7 Other Government Activities

There are other government wildlife programs that affect local people directly or indirectly. Primary amongst these are the anti-poaching activities. The anti-poaching unit of KWS has the dual purpose of fighting poachers and controlling problem wildlife, especially dangerous animals including vermin. The game stations were basically concerned with abatement of depredation and control of predation on domestic animals. The Wildlife Conservation and management Act, Cap. 376, Sec. 31, states the circumstances under

Table 3.19 Major Interest Groups in Wildlife Conservation Issues

INTEREST GROUPS	ABILITY OF EACH GROUP	AIMS (Interests)
Rural Dwellers (semi-nomadic pastoralists and settled cultivators)	Limited power to enforce their interests. Use local councils and NGOs	•To defend their farming and grazing areas and to protect themselves, their crops and their livestock from wildlife damage. •To increase access to land and wildlife resources (eg. game meat) and gain employment within parks authorities and tourist companies
Wildlife Tour Operators	•Commercial influence (often foreign-owned, small exclusive companies) giving funds and clout for lobbying. •Also some links to conservation groups	To maintain accessible and attractive conservation areas with impressive wildlife for tourism
Wildlife Tourists	•Spending power (well off international visitors)	To recreate and enjoy
State Wildlife/Tourism Departments. Government officials, policy-makers, politicians, administrators, technocrats Conservationists (Kenya Wildlife services	Political, administrative and through control of wildlife products (directly and indirectly)	To earn foreign exchange Enhance national status in international opinion Sometimes to benefit individual from an agreement conserve wildlife preserve for natural heritage, tourism
Wildlife Lobby Groups. Scientists (biologists, educators, wildliferes, planners)	•International status and backing, often have connections to national agencies, most members are expatriate and influential	To preserve wildlife for scientific, aesthetic purposes
Wild Animals	•Ecological ability •Advocated for by wildlife lobby groups, international and national conservation community	To meet ecological requirements eg. "birth-right" to migrate seasonally in and out of reserve area for food and breeding

Sources: Information adapted from Yeager and Miller 1986; Matowanyika 1989; Bonner 1993; Abel and Blaikie 1986; Rickinson 1993.

which game may be destroyed. Poaching is one of the major problems facing Kenya wildlife Service.

3.6:3 The Maasai of Kenya: A historical Overview

The Maasai of Kenya and Tanzania, their history, traditional utilization of the environment and their relationships with wildlife have been widely described (Berger 1989; Galaty 1992; Homewood and Rodgers 1991; Jacobs 1975; Western 1982). They are an "Eastern Nilotic" people, living in the Great Rift Valley region of Southern Kenya and Northern Tanzania[12] (Berger 1989). Today they number about 350,000 people (1989 estimates). In 1975, Jacobs estimated that there were about 64,000 pastoral Maasai in Kenya occupying 16,000 sq. miles. Although there are other Maa-speaking peoples, only those who are semi-nomadic[13] pastoralists are referred to as the Maasai proper. They and other pastoralist groups, such as the Samburu, Rendille, Turkana, Borana, Orma and Somali constituted about one million people in Kenya by 1989 (Berger 1989). They inhabit the arid and semi-arid rangelands which cover three-quarters of Kenya's land area, and where most of Kenya's wildlife is found.

Uptill the coming of the Europeans to East Africa, the Maasai people were made up of diverse, autonomous, and geographically separate groups or "sections" (*oloshon*), sharing a common language and culture (Berger 1989; Galaty 1981; 1992; 1993). Berger (1989), Fosbrooke (1948) and Jacobs (1975) have described the structures of the sections.

First, each section had its own territory and autonomous political structure, based on a division of society into age-sets. The sections were divided into localities (*enkutoto*),

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[12] Maasailand refers to that land which is primarily occupied by the Maasai people of Kenya and Tanzania. But here, we concentrate only on the Kenya's Maasailand. Today, this includes Narok and Kajiado Districts.

[13] Nomadic Pastoralism refers to a way of life based on herding. It is dependent on mobility in areas where the condition of the environment is characterized by marked seasonality. This means that there are insufficient resources for the people and their livestock to stay in one place throughout the year.

with their own permanent water supplies for dry season grazing and clearly defined boundaries for wet season pasture, within which families moved. Each locality was a self-contained ecological and social unit, which largely managed its own local affairs. People were prohibited from using one anothers' territories without permission, although during drought there was institutional sharing of resources (Bekure and Pasha 1990; Galaty and Johnson 1990). Senior elders of a section formed the governing body within a section, and consulted and made decisions as a group.

Secondly, within each section, the principle unit of livestock management was a "kraal camp" (*enkang*), consisting of several independent polygamous families with common interests and friendship. The traditional herding system involved herd and family movements from high-potential, dry-season pasture based at permanent water sources, to temporary low-potential wet-season grazing near temporary water supplies. Their resource management techniques tended to conserve pastures and promote ecological sustainability (Berger 1989; Galaty 1992). As Berger (1989) explains; the Maasai traditionally made systematic reconnaissance of, and movement to, wet season grazing flushes, which allowed conservation of standing hay in dry-season pastures; they used donkeys to carry water to expand grazing areas and to permit camps to stay away as long as possible; they made moderate burns of grasslands to get rid of ticks and other diseases and to promote the growth of nutritious grasses; they directed the movement of cattle and sheep to avoid damage to grass at critical periods and to control bush encroachment. Members who failed to adhere to these practises were subjected to social rebuke. This system of management, controlled livestock population over a long period of time, thus ensured protection of the environment (Berger 1989).

However, during times of hardship, the Maasai would also depend on their relationships with nearby agricultural communities (Kjaerby 1980; Parkipuny 1989; 1991). The Maasai have been known to disdain those who till their soil, "*Ilmeek*" (who are

considered poor). However, historical studies of Maasai relationships with neighbours suggest that there must have always been Maasai-speaking agricultural settlements in the better watered parts of their land. These places provided refuge during famines and droughts. Those who became destitute in times of disaster could find a source of livelihood by turning to agriculture (Galaty 1981; Parkipuny and Berger 1993). These Ilkurrman communities occurred at the intersection of pastoralists, foreign agriculturalists, and trade caravans (Galaty 1981). Recent studies have highlighted the dynamic aspects of the Maasai communities and how the Maasai established various innovations for survival (Kituyi 1990).

3.6:3.1 Post-Colonial History of the Maasai

At the time of Europeans arrival in East Africa in the middle of the last century, the Maasai occupied the largest amount of territory of any ethnic group. By the middle of the last century, they occupied land from northern Kenya to Southern Tanzania. They are said to have been at the height of their territoriality just before their devastation by drought, famine and disease in the 1880s (Fosbrooke 1948; Jacobs 1975, Tignor 1976). However, with the establishment of a British colonial government and its program of White settlement at the beginning of this century, the Maasai lost some of their best dry-season grazing land (Tignor 1976).

Various treaties were signed between a few Maasai leaders and the colonial settlers (Sindiga 1984). The first treaty in 1904, removed the Maasai from the Nakuru-Naivasha area of the Rift Valley. A second treaty in 1911 moved them from the Laikipia highlands. In exchange, their southern land was extended to include what is now the northwest part of Narok District to form a Southern Reserve (Cranworth 1919). The colonial image of the Maasai as unproductive and warsome was the justification for taking their land for European settlement (Berger 1989; Collett 1987). The Maasai probably lost more land to the British than any other ethnic group (Tignor 1976; Sarone 1988). They were never able to reclaim the

land taken by the British, which since independence, has been largely taken by their old competitors, the Kikuyu.

Today, the Maasai occupy Kajiado and Narok Districts. During colonial times and to some extent today, the Maasai continued to practise pastoralism, in spite of efforts by the colonial (and the independent Kenyan) governments to get them to reduce stock and to use modern livestock management (Berger 1989). Various Government activities such as veterinary services were introduced in the 1920s to encourage the production of beef and to increase the participation by the Maasai in the national economy. The African Livestock Development (Aldev) (1962) program increased watering points by constructing boreholes and dams in the 1940s and 1950s. This reduced some of the ecological restrictions on livestock (Western 1973), and the Maasai were perceived by the Government to be overstocking. Herd size increase and overgrazing were considered to be the major cause of rangeland degradation and desertification (Brown 1963; Lamprey 1983).

3.6:3.2 Maasai Relationship to Wildlife Conservation

This section looks at how the aforementioned transformations affect the traditionally harmonious relationship between the Maasai, the wildlife, and the entire environment. The Maasai's success in conserving their environment without threatening the existence of the region's wildlife can be attributed to pastoralism itself. There seems to have always been a close and relatively harmonious association between the Maasai and wildlife. As Western (1976) states:

> Seasonal migration patterns and foraging strategies of Maasai livestock and wildlife species are so similar that their niches are intermingled and inseparable (Quoted in Berger 1989:55).

Jacobs (1975) quoting Bell (1969) comments:

> Heavy pastoral grazing of medium to tall grassland is both a necessary and beneficial condition for the development and maintenance of the vast herds of wild ungulates that are found in these areas today (Quoted in Berger 1989:55).

Before the establishment of parks and the proliferation of agriculture, wildlife and livestock shared the rangeland ecosystem. Both grazed lowland grassland during rainy season and migrated to wetter highlands during dry periods when lowlands cease to provide adequate pasture (Deihl 1985). It is believed that a combination of wildlife and livestock at certain population levels can help increase carrying capacity (Berger 1989; Croze 1978). Historical records suggest there were people raising cattle for milk in Maasailand about 3,000 years ago (Collett 1987; Waller 1976; Bower 1973; Odner 1972). At the same time, wildlife were occurring in Maasailand at the time of European contact, after more than 2,500 years of pastoralism. Research show that wildlife/pastoralist systems are ecologically more productive than either modern cattle ranching or wildlife alone (Western 1982; Western and Gichohi 1993). The Maasai and other pastoralists can be seen as "ecosystem people" (Dasmann 1984), in the sense that they have evolved a way of life integral to the surrounding ecosystem and became adapted to and influenced their environment without destroying its sustainability (Berger 1989; Galaty 1992). Their survival depended on its continuing productivity. As Dasmann (1984) says, their culture contrasts with modern "biosphere cultures", which take resources from many ecosystems but do not depend on any one.

Traditionally, the Maasai are trained through the experience of living in their surroundings to become good observers of natural processes such as seasonal change, weather and wildlife habitants. Survival strategies require an initial and intimate knowledge of their environment. As Berger (1989) and Western & Dunne (1979), say, the Maasai are natural "ecologists". Many aspects of their culture are connected with the natural world around them. This experience is reflected in their ideology and legitimized by participation in their ceremonies, rituals and social institutions (Mol 1978). The recognition of an interdependence between humans and other forms of life is expressed through cultural practices and beliefs. Many animal species have special significance. The lion hunt,

"*alamayoi*", is associated with honour and bravery; the hedgehog, antbear and mole are considered good luck; the duiker, jackal and cape are bringers of bad fortune. Ostrich feathers are worn at the Eunoto ceremony (Berger 1989; Sarone & Hazel 1985). Maasai do not seem to regard "God" as having given them dominion over nature. Their view of some other forms of life is shown in their names for smaller plains game: "*inkineji e nkai*" (the goats of God), and "*inkishu in nkai*" (the cattle of God) (Mol 1978). Learning about wildlife and the natural world was part of traditional education. This is well described by a Maasai warrior.

Many writers have noted that the Maasai do not normally kill wildlife, although there are reports of hunts, and of taming wildebeests for milk for human consumption and calf rearing to survive famine (Aboud 1989; Beger 1989; Deihl 1985). Berger notes that although the Maasai use many of the products of wildlife, they acquire them by collection or purchase from neighbours. She suggests that the Maasai coexisted peacefully with wildlife because most species were not a threat to their livelihood. In times of plenty the Maasai would celebrate the abundance and variety of life in their surroundings, and, because of their close connection to the natural world, would appreciate and value many species of wild animals. However, with the formation of parks in Maasailand, prohibiting Maasai use of important forage and water sources, it is not surprising that they increasingly view wildlife as competing for grazing and water. The changing relationship between the Maasai and wildlife is illustrated by the situation in the rangelands of Maasai Mara region, where this study was carried out. This will be discussed further in the chapters that follow.

3.6:3.3 Changes in Maasailand

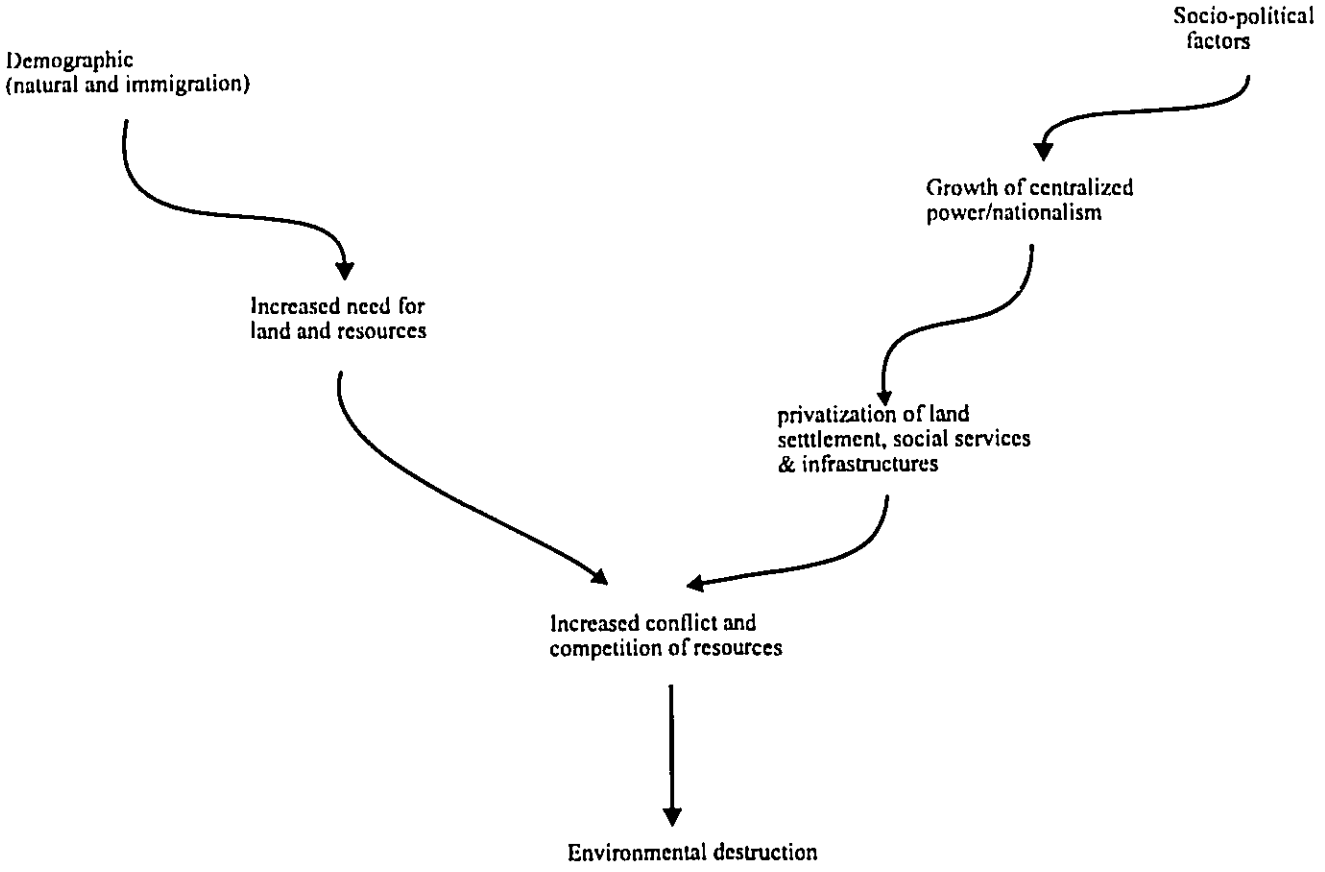
Many of the Maasai now have their livelihood in settled agriculture and semi-pastoralism. A section of the Maasai community is increasingly involved in the national money-based economy rather than in subsistence economy. This is changing cultural

values, reducing community cohesiveness, and undermining conventions and social patterns governing economy, traditional practices and social life. Besides modern range and livestock programs, the growth of centralized power and nationalism, the privatization of land, the spread of agriculture, permanent settlement, and provision of social services are now altering the Maasai way of life (Figure 3.4). Maasailand, like other less developed economic "peripheries", has become dependent on and is increasingly manipulated by national rather than local interests (Berger 1989; Hedlund 1979; Kituyi 1990).

The growth of national influence in Masai Mara region is evident through both the work of the civil service and through the activities of the local politicians. One of the most important policies associated with rural development in Kenya is the District Focus for Rural Development (GOK. 1984). The objectives of the District Focus (DF) are laudable: decentralization of development planning, a system of local representation and participation in identifying needs and priorities, and coordination and teamwork within Government and between government and NGOs. In practice, however, the policy is increasingly becoming an instrument of control. The limited allocation of development resources at the district level suggests that the Government is committed to overall national control in deciding priorities and allocating resources. This limits the extent to which the central bureaucracy can be expected to bring the interests of local areas and minorities, such as the Maasai into consideration.

The Central Government exercises control and authority through its representatives. The District Commissioner is the key administrator of Government policy at the local level. As chairman of the District Development Committee, he can dominate other Ministries and agencies. Through his office he and his officers (District Officers and Chiefs, known collectively as "the Administration") have access to and control the hierarchy of the development committee, which reach sub-locational levels. As such, the DC has considerable political as well as administrative power. The involvement of the

Figure 3.4 Changes in Maasailand Leading to Conflict and Environmental Destruction



administration in trying to "sell" subdivision of group ranches, and in trying to abolish the Maasai tradition of the warrior age-set living and traditional group education in "Emanyatta", are two examples of how national ideologies and political interests are penetrating into local development and conservation issues. Related to the above consolidation of power is the increasing presence of political practices at the local level. Parties can influence divisions, especially as they cooperate with administrations - chiefs. The Maasai have been limited in their participation in the modern political and development process by their relative lack of

formal education. There has been little understanding practice of modern methods of democratic forms. There is little understanding of modern law, civil rights and cooperative rights and the official ways to appeal injustice.

In the past few Maasai have had access to higher education (King 1970; Sarone 1986), compared to other Kenyan communities, so they are not well represented in the civil service and at the national policy-making level. Maasai who have taken on political leadership have adopted the ideologies and approach to development espoused by national leadership, which is dominated by people from settled agricultural groups and influenced by foreign value systems. This group constitutes a group of wealthy Maasai whose interests tend to be served by the top-down approaches of Government programs (Hedlund 1970). These interests have more in common with other social groups in Kenya than with the majority of Maasai and are tied in with the priorities of the state rather than with local conditions and needs (Berger 1989; Hedlund 1970).

Today, many Maasai are educated and are gaining influence over the community (Holland 1992). Some elders have used their status to consolidate power and resources through the modern politics, but many, perhaps hampered by illiteracy, are ill equipped to deal with modern circumstances. There are differences in wealth among the Maasai, mostly in terms of cattle ownership (Grandin 1986). Modernization is destroying past forms of social support. Women, who have even less formal education than men (Sarone 1986) and still marry in their early teens, play no partial role.

The Maasai Mara region and other parts of Maasailand are seen as relatively unproductive areas of the nation that must be modernized to contribute to the national economy. This attitude inadvertently encourages the immigration of agriculturalists seeking land into the region and has further reduced land and resources available (Campbell 1979). There has been an expansion of Government and Non-Government technical agencies into the region.

The predominance of settled agriculturalists in Kenya's national leadership tends toward programs to settle nomads. The Government has encouraged human settlement through the provision of social amenities such as schools, health services and roads and by the support of the growth of small trading centres (e.g. county councils issue permits for plots). The opportunities for earning income in trading centres have been taken up by entrepreneurs of both Maasai and other origins. Population centres, often associated with irrigation schemes, are creating an ever-growing zone of denuded land around the settlements. With increased population, the demand for firewood and trees will also increase thus leading to devegetation. Settlement and shop-keeping have introduced a new system of values based on commercialism and individual ownership, which conflict with Maasai pastoralist culture. Social problems such as excessive and illegal liquor brewing are reported to be on the increase. Changing roles and responsibilities of different age groups and sex are a striking feature of these centres. Women engage in independent economic activities, children are going to school rather than herding.

Since colonial times, school education has been seen as a means to modernize the Maasai (Sarone 1986). Maasai cultural forms of education and communication have not been recognized or understood by governments and have been ignored, underrated or actively opposed by official policy and programs. Maasai culture has been viewed as a threat to modernization, and, as a result, the aspects that might contribute to modern education have been overlooked so that there is little likelihood for schools to draw from Maasai culture. Modern education is centred on a standard, centrally determined school curriculum, usually taught by people of a different culture (King 1970; Sarone 1986).

A form of education relevant to conservation is that acquired during junior warriorhood. Young men of the warriors age-set living together in special encampments (emanyatta) train and pass through specific ceremonies over a number of years. This practice has been opposed by Government because it keeps young men out of school. It

is not recognized as a training in social moves and in strategies to survive in a particularly harsh environment: the practical application of the Maasai understanding of ecology, range and livestock management. The abolition of warriors will destroy an opportunity for young Maasai men to develop a respect for and wisdom about the land they live in (Berger 1989). It is also likely that if warriorhood is not replaced with an alternative that will meet its diverse functions, social problems will arise. A generation of young people will be uneducated in both traditional and modern forms. The nation will be losing an important cultural resource.

Modern education tends to encourage values and aspirations that alienate and remove a Maasai from the home setting (Nkinyangi 1980, Sarone 1986). Educated Maasai seeking employment usually have to leave home. Modern administration and education are also changing modes of communication and hence effect the quality of interaction between people and leaders. The chief's "baraza", a community meeting to execute official policy and orders, is replacing the elders gathering. Decision making, communication and expression of authority are changing. Authority is now dependent on seniority, an official hierarchy dependent on not only seniority, but formal education. Modern education is replacing the oral tradition with a written mode of communication: the ear with the eye. It is concluded that there has been a reduction in harmonious relationships, hence an increase in conflict. Maasai livelihood is increasingly becoming dependant on the national rather than the local economy. These changes are contributing to conflict and to an increase in environmental destruction which threatens the survival of wildlife and the future of the protected areas in the Maasailand (see Figure 3.4).

3.6:4 Wildlife-Related Research and Planning Activities

Research and planning activities are widely undertaken on wildlife-related issues, although past research activities on wildlife issues in Kenya have not significantly

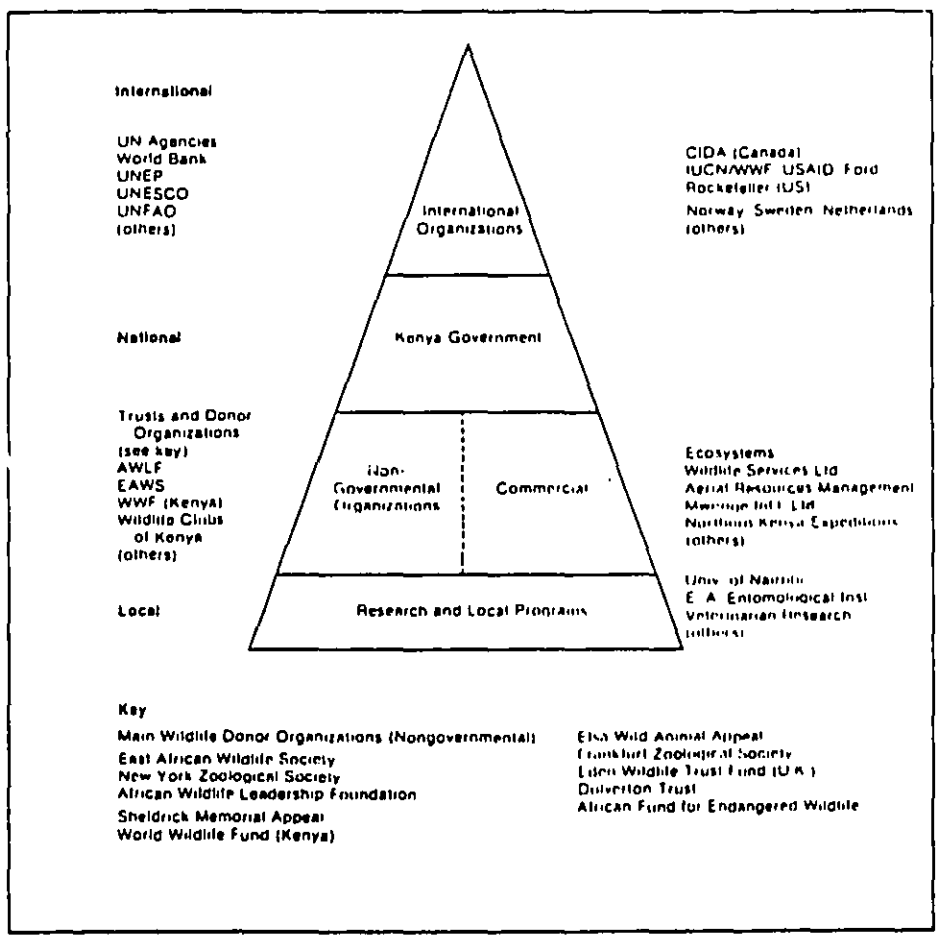
contributed to proper wildlife management. Most of the research has been oriented towards single species of plants and animals in isolation, with little consideration given to the totality of the wildlife environment. In a survey of 210 wildlife-related research projects initiated in east Africa between 1968 and 1981, Miller (1982) reveals that there is little integration of research efforts. The vast majority of wildlife researchers are zoological, either species-oriented or focused on a specific ecosystem. They cover seven main areas: herbivores; predators; bird ecology; land use and range ecosystems; management and planning issues; aerial survey and range monitoring results; and wildlife disease and veterinary research. According to Miller, out of the first 137 research projects in East Africa until 1972 only one: The Utilization of Wildlife in East Africa, has dealt with human ecological concerns. Overall, only 4 out of 210 were so oriented. Very little research touches on the broad-ranging political, economic and educational issues that form the most needed data. As Lusigi (1980) observes

> The first and most important (wildlife research priority) is the realisation and appreciation of the role man will have played and will continue to play in wildlife conservation. The long standing tie between man and wildlife in Africa and how they co-existed in the past must be thoroughly understood. It is this which will form the basis of our understanding of the present (Lusigi 1980:106).

Institutions that undertake wildlife research and form the wildlife establishment in Kenya apart from KWS, include: (1) the National Museums of Kenya (NMK), (2) the Institute of Primate Research (IPR), (3) the Department of Resources Surveys and Remote Sensing (DRSRS, previously KREMU), (4) the local universities, and (5) various non-governmental, private and international organizations such as UNEP, UNESCO, WWF, IUCN, UNDP and many others (Figure 3.5). In addition to research, these organizations also support conservation projects including parks/tourism development, equipment for anti-poaching units and a wildlife training program. Most of the organizations appear to operate independently, and although they cooperate on specific projects, they often conflict (Miller 1982). In order to realize effective sustainable wildlife conservation, it is necessary that

these organizations work together.

Figure 3.5 Institutions Involved in Wildlife Issues in Kenya



Source: After Miller 1982

3.6:4:1 Wildlife Related Research at Masai Mara Region

In the Masai Mara region, a review of research and management plans drawn up for the region since 1960 reveals that the reserve boundaries were made without input from applied research (Douglas-Hamilton et al 1988). Much research has been conducted, yet no

specific success has been registered in the way of integrating wildlife conservation and human development needs. The first research began in 1960, but its focus was upon the quantification of animal ranges and populations rather than upon suggestions for management and conservation.

The most significant plans were made in 1988 by EEC on behalf of WCMD and in 1983 on behalf of NCC by the Wildlife Planning Unit of WCMD. No original plan justifying the creation of the Masai Mara National Reserve was found. Consequently, no clear basis for choosing the boundaries exist. It is therefore not surprising that the reserve boundary has been changed three times. Placing the reserve on the Kenya-Tanzania border is justified on the basis of its relationship with the Serengeti ecosystem. The exclusion of the Maasai from the park has caused much grievance and is the main reason for suspicion of any further attempts to define "conservation zones". There has been limited consultation of the local people and this is one of the main reasons why previous attempts to integrate wildlife conservation with human needs in the area have failed (Douglas-Hamilton et al. 1988, Ecodynamics 1982). This study aims to fill the gap on the human dimensions of wildlife conservation.

CHAPTER FOUR

Chapter Four

WILDLIFE-HUMAN CONFLICT IN MASAI MARA REGION: RESULTS AND DATA ANALYSIS

4.1 Introduction

The previous chapters introduced the study area and presented a broad background to the issues involved in the wildlife-human interfaces. This chapter presents the results and data analysis based on the five sampled group ranches. The ranches have been grouped into two strata - upland and lowland zones, for a more consolidated comparative analysis. The chapter is divided into six sections: (1) the setting for conflict, (2) perception of conflict, (3) quantification of conflict, (4) factors influencing conflict, (5) conservation attitudes and experiences of government wildlife programs, and (6) respondents recommendations on how the conflict can be resolved. Tests for significance, regarding differences in responses amongst the group ranches, are presented and discussed. These findings form the basis for the development of a program for integrating wildlife conservation with human needs, as presented in the succeeding chapter.

4.2 The Setting for Conflict

Humans, livestock and wildlife have historically shared the Masai Mara-Serengeti ecosystem with limited conflict. In the last thirty years, however, their population growth has caused increased wildlife-human conflict in the region (Chapter 3). This section reports on the socio-economic characteristics of the local people, their livestock, length of residency, history of migration, resource use patterns and problems, and wildlife sighting in the region. These findings together with the material presented in Chapter 3 provide the setting for conflict. The following sections will assess the local people's perception of the conflict and offer a quantification of wildlife damage.

4.2:1 The People: Socio-Economic Factors

A myriad of socio-economic and demographic factors concerning local people, directly or indirectly influence the perception of and attitudes towards wildlife-human conflict. These factors include ethnicity, age, level of education, occupation and land ownership systems (Table 4.1).

Within the sample, the majority (62.4%) of the household heads were Maasai, and 37.6% were non-Maasai. The non-Maasai percentage was higher than the census reports, indicating a possible increase in immigrants population in recent years in the region. The majority of these immigrants have an agrarian background: landless and relatively poor, they have been displaced from the agriculturally potential parts of the country where the land distribution favours the rich. When these new settlers arrive in the rangelands, they often prefer areas with high agricultural potential. Narok and Kajiado districts are among the most preferred areas since they have some marginal areas available for cultivation. Over the last thirty years or so, people from different parts of the country have migrated into the Masai Mara region.

There are considerable variations between group ranches as regards the distribution of Maasai and non-Maasai within the region. Most of the non-Maasai were settled mostly in the agriculturally rich upland zone of Angata Baragoi and Kimentet group ranches, while Maasai were predominantly in the lowland zone group ranches of Lemek, Koyaki and Siana. Variations in ethnic background (as well as age, level of education and occupation) may influence perceptions of and response to wildlife-human relationships.

The ages of the interviewed heads of household ranged from 19 to 87 years (a mean of 49 years and a median of 48 years). In Angata Baragoi, they ranged from 23 to 83, while in Koyaki, the youngest was 19 and oldest was 80 years. There was no significant difference in the ages of respondents between group ranches. Residents of upland ranches were as old as residents in the lowland ranches. The majority (89.8%) of those interviewed were

men, because men often are the heads of a household. There was insignificant variation of female respondents between group ranches. Average household size for the region was 7, and varied little between the ranches.

The level of education, or lack of education, may influence an individual's knowledge and perception of resources. Among the 500 respondents, 360 (72%) had no formal education at all; 87 (17.4%) had some primary education, 44 (8.8%) had secondary level, 6 (1.2%) college, mostly teacher training; and just 3 (0.6%) were university graduates. The more educated may perceive wildlife-human interactions as less of a nuisance to the community, but may demand more action to protect the local people or provide direct benefits from wildlife conservation. In the past, few Maasai have had access to schooling as compared to residents of other Kenyan communities (Sarone 1986), but recent trends indicate an increasing number of educated members of the society and general support to schooling (Holland 1992).

Similarly, the main occupation of the heads of the household may determine the land use practices and resource perceptions, and by extension the presence of wildlife. The majority (64%) cited pastoralism as a main occupation, 35.8% stated farming, while only 0.4% stated other activities. It is clear why many local residents indicated pastoralism: the Maasai see themselves as herdsmen by tradition and sacred mandate, and thus the majority are still pastoralists (Arhem 1985). They are "people of cattle" (*iltung'ana loo ngishu)* (Galaty 1981). Farming is conceived of as desecration of the land upon which cattle feed. Since the majority of region's residents are Maasai, the region is still basically a pastoral area. Other categories of employment include cattle trading, the selling of ornaments (mainly to tourists), and those work in either the Masai Mara Game Reserve or the tourist lodges. The majority of those stating cultivation as their main occupation were residents of the Angata Baragoi and Kimentet areas, the agriculturally viable areas, while most pastoralists lived in the lowland zone of the Lemek, Koyaki and Siana group ranches. It should be noted that

Table 4.1 Socio-economic Factors by Group Ranch and Zone in Masai Mara Region (1991)

SOCIO-ECONOMIC FACTORS	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Ethnicity of Respondents***						
Maasai	4 (4.4%)	10 (10.2%)	104 (93.7%)	98 (98.0%)	96 (96.0%)	312 (62.4%)
	14 (7.6%)		298 (95.8%)			
Non-Maasai	87 (95.6%)	88 (89.8%)	7 (6.3%)	2 (2.0%)	4 (4.0%)	188 (37.6%)
	175 (92.4%)		13 (4.2%)			
Total	91 (100%)	98 (100%)	111 (100.0%)	100 (100.0%)	100 (100.0%)	500 (100%)
Chi-squared 459.063	189 (100%)		311 (100%)			
Sex of the Respondents*						
Male	84 (92.3%)	84 (85.7%)	105 (94.5%)	89 (89.0%)	87 (87.0%)	449 (89.8%)
	168 (88.9%)		287 (90.3%)			
Female	7 (7.7%)	14 (14.3%)	6 (5.5%)	11 (11.0%)	13 (13.0%)	51 (10.2%)
	21 (11.1%)		30 (9.8%)			
Total	91 (100%)	98 (100%)	111 (100.0%)	100 (100.0%)	100 (100.0%)	500 (100%)
Chi-squared: 7.072	189 (100%)		311 (100%)			
Mean Household Size*						
0-6	26 (28.6%)	19 (19.4%)	17 (15.3%)	16 (16.0%)	13 (13.0%)	91 (18.7%)
	45 (22.5%)		46 (14.8%)			
7-12	48 (52.7%)	56 (57.1%)	53 (47.7%)	56 (56.0%)	51 (51%)	264 (53.2%)
	104 (54.4%)		160 (51.9%)			
13-++	17 (18.7%)	23 (23.5%)	41 (36.9%)	28 (28.0%)	36 (36.0%)	145 (37.4%)
	40 (41.1%)		105 (33.7%)			
Total	91 (100%)	98 (100%)	111 (100.0%)	100 (100.0%)	100 (100.0%)	500 (100%)
ANOVA "F" 2.732	189 (100%)		311 (100%)			

Age of Respondent						
18-25	13 (14.3%)	16 (17.6%)	29 (16%)	11 (9.9%)	10 (10.0%)	13 (13.0%)	34 (10.9%)	63 (13.5%)
26-45	43 (47.3%)	27 (29.7%)	70 (38%)	37 (33.3%)	30 (30.0%)	26 (26.0%)	93 (29.8%)	163 (22.9%)
46-60	25 (27.5%)	41 (45.1%)	66 (33%)	48 (43.2%)	43 (43.0%)	49 (49.0%)	140 (46.6%)	206 (39.8%)
61-++	10 (10.9%)	14 (14.3%)	24 (12%)	15 (13.5%)	17 (17.0%)	12 (12.0%)	44 (14.2%)	68 (13.1%)
Total	91 (100%)	98 (100%)	189 (100%)	111 (100.0%)	100 (100.0%)	100 (100.0%)	311 (100%)	500 (100%)
ANOVA "F" 0.838								
Level of Education of Respondents* **								
None	61 (67%)	58 (59.2%)	119 (63%)	78 (70.0%)	87 (87.0%)	76 (76.0%)	241 (77.6%)	360 (72.0%)
Primary	21 (23.1%)	23 (23.5%)	44 (22%)	20 (18.0%)	7 (7.0%)	16 (16.0%)	43 (13.6%)	87 (17.4%)
Secondary	9 (9.3%)	17 (17.3%)	26 (13%)	8 (7.2%)	3 (3.0%)	7 (7.0%)	18 (5.8%)	44 (8.8%)
College	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (2.7%)	3 (3.0%)	1 (1.0%)	7 (2.3%)	6 (1.2%)
University	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.8%)	0 (0.0%)	0 (0.0%)	2 (0.6%)	3 (0.6%)
Total	91 (100%)	98 (100%)	189 (100%)	111 (100.0%)	100 (100.0%)	100 (100.0%)	311 (100.0%)	500 (100%)
Chi-squared: 45.090								

Length of Residency***				
0-15	16 (16%)	24 (25%)	3 (3.0%)	45 (9.0%)
	40 (21.2%)		6 (1.3%)	
16-30	45 (50%)	56 (58%)	17 (16%)	131 (26.2%)
	101 (53.4%)		25 (8.0%)	
31 ++	30 (34%)	18 (18.0%)	91 (81%)	324 (64.8%)
	48 (25.4%)		276 (88.7%)	
Total	91 (100%)	98 (100%)	111 (100%)	500 (100%)
	189 (100%)		311 (100%)	
ANOVA "F" 122.76				
Main Occupation of Respondents***				
Pastoralists	7 (7.7%)	12 (12.2%)	104 (94%)	320 (64.0%)
	19 (9.5%)		301 (97.0%)	
Farmer	84 (92.3%)	86 (88.8%)	3 (2.7%)	176 (35.8%)
	170 (85%)		6 (2.9%)	
Cattle traders	0 (0.0%)	0 (0.0%)	4 (3.6%)	4 (0.8%)
	0 (0.0%)		4 (1.2%)	
Others				
Total	91 (100%)	98 (100%)	111 (100%)	500 (100%)
	189 (100%)		311 (100%)	
Chi-squared: 618.759				

those reporting farming as their main subsistence also kept livestock. In addition, although only a few people indicated that they were employees in Masai Mara National Reserve, a substantial number of residents have been able to earn a living from the reserve. Cattle trekking or trade which involves moving cattle to Nairobi in exchange for money has been a popular business amongst the Maasai.

4.2:2 Livestock Population

Traditionally, the pastoral Maasai have viewed cattle as a valuable commodity. Small stock are largely seen as a substitute for cattle (Arhem 1985; Galaty 1981; Ndagala 1992)[1]. An overwhelming majority (87.4%) of respondents own livestock (Table 4.2), including: native cattle, grade cattle, shoats (goats and sheep), donkeys and dogs. Cattle are not commonly killed except for ritual or life-cycle related ceremonies. Meat is obtained on a more regular basis from goats and sheep. Cattle are primarily producers of milk. Donkeys are used for transporting water, goods to and from market, and personal effects during family movements from one residential area to a new one. Although less considered, dogs are common and very important in pastoral resource management and protection. They prevent livestock from straying and are helpful in tracking down missing animals during the day. At night they raise alarm when there are strangers or wild animals in the vicinity. Their basic role entails ensuring the security of the people and herds.

The family livestock holdings varied remarkably and often determined the status of the family or individual in society. As regards native cattle, ownership ranged from 0 to 950 with a mean of 112 per family. Most of the respondents indicated a reduction in the number of livestock they owned. This means that the Maasai have recently become less wealthy

[1] Maasai and their livestock structure has been widely studied (Evangelou 1985; Grandin 1986 Homewood 1992). Past studies have indicated how difficult it is to establish the exact number of livestock owned, especially per household. Different methods have been applied including undertaking gate counts of the animals per manyatta (Homewood 1992).

Table 4.2 Family Livestock Holdings by Group Ranch and Zone

LIVESTOCK HOLDINGS & WEALTH	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Keep Livestock**						
Yes	75 (98.0%)	84 (96.0%) 159 (97%)	98 (88%)	89 (89%) 275 (88.3%)	88 (88%)	434 (87.0%)
No	16 (2.2%)	14 (4.1%) 30 (3.1%)	13 (11.7%)	11 (11%) 36 (11.6%)	12 (12%)	66 (13.0%)
Total	91 (100%)	98 (100%) 189 (100%)	111 (100%)	100 (100%) 311 (100%)	100 (100%)	500 (100%)
Chi-squared 12.396						
Native cattle owned[2]*						
Poor						
None 0	16 (18.0%)	14 (16.0%) 30 (11.3%)	13 (13%)	11 (11%) 36 (12.0%)	12 (12%)	66 13.2%
Poor 1-10	20 (22.0%)	24 (23.0%) 44 (15.0%)	16 (25%)	14 (24%) 64 (21.0%)	12 (14%)	86 (17.2%)
11-20	10 (11.0%)	12 (11.0%) 22 (7.3%)	15 (44%)	24 (18%) 95 (31.3%)	32 (32%)	93 (18.6%)
Medium 21-50	13 (14%)	8 (9.0%) 21 (7.6%)	37 (36%)	26 (27%) 76 (24.7%)	11 (11%)	95 (19.0%)
51-100	11 (12%)	15 (16%) 26 (9.3%)	11 (11%)	12 (11%) 36 (12.0%)	13 (13%)	62 (12.6%)
Rich 101-351	14 (15%)	10 (10%) 24 (12.5%)	9 (9%)	7 (14%) 29 (9.7%)	15 (5%)	55 (11.%)
Very Rich 351-++	7 (8%)	15 (16%) 23 (12.0%)	10 (10%)	6 (10%) 22 (7.3%)	5 (3.0%)	41 (8.4%)
Total	91 (100%)	98 (100%) 189 (100%)	111 (100%)	100 100% 311(100)	100 (100%)	500 (100%)
ANOVA "F" 1.405						

[2] The designation of the local people into poor, well-off or rich was based on livestock owned and was made in the field by the help of Ole Nasuako (a Maasai) and is comparable to previous studies amongst the Maasai.

Goats owned*						
Poor						
None 0	11 (12%)	15 (15.3%)	16 (14.4%)	11 (11%)	12 (12%)	65 (13.0%)
	26 (13.8%)		39 (12.5%)			
1-10	25 (27.5%)	32 (32.6%)	30 (27.9%)	23 (23%)	30 (10%)	120 (24.0%)
	57 (30.2%)		63 (20.3%)			
11-20	21 (23.1%)	16 (16.3%)	19 (17.1%)	21 (21%)	15 (15%)	92 (18.4%)
	37 (19.6%)		55 (17.7%)			
Medium 21-50	9 (9.9%)	16 (16.3%)	18 (16.2%)	9 (9%)	10 (10.0%)	62 (12.4%)
	25 (13.2%)		37 (11.9%)			
51-100	10 (11%)	9 (9.2%)	10 (9%)	11 (11%)	10 (10.0%)	50 (10.0%)
	19 (10.0%)		31 (30.0%)			
Rich 101-351	8 (8.8%)	6 (6.1%)	8 (7.2%)	11 (11%)	10 (10.0%)	43 (8.6%)
	14 (7.4%)		29 (9.3%)			
Very Rich 351-++	7 (7.7%)	4 (4.1%)	10 (9%)	14 (14%)	13 (13%)	51 (10.2%)
	11 (5.8%)		37 (11.9%)			
Total						
	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)
	189 (100%)		311 (100%)			
ANOVA "F" 2.746						
Sheep owned*						
Poor						
None 0	11 (12.0%)	2 (2.0%)	4 (3.6%)	6 (6.0%)	5 (5.0%)	26 (5.2%)
	13 (6.9%)		15 (4.8%)			
Poor 1-10	21 (22%)	50 (51%)	50 (45.0%)	45 (45%)	44 (44%)	210 (42.0%)
	71 (37.6%)		139 (44.7%)			
11-20	29 (31.9%)	24 (14.5%)	34 (30.6%)	25 (15.0%)	34 (34%)	146 (29.2%)
	53 (28.0%)		93 (29.9%)			
Medium 21-50	13 (14.1%)	8 (8.2%)	10 (9.0%)	9 (9.0%)	7 (7.0%)	47 (9.4%)
	21 (11.5%)		26 (8.4%)			35 (7.0%)
51-100	11 (12.0%)	6 (6.1%)	7 (6.3%)	5 (5%)	6 (6%)	22 (4.4%)
	17 (9.0%)		18 (5.8%)			12 (2.4%)
Rich 101-351	6 (6.6%)	7 (7.1%)	3 (2.7%)	4 (4%)	2 (2%)	
	13 (6.9%)		9 (2.9%)			
Very Rich 351-++	0 (0.0%)	1 (1.0%)	3 (2.7%)	6 (6%)	2 (2%)	
	1 (0.5%)		11 (3.5%)			
Total	91 (100%)	98 (100%)				
	189 (100%)		111 (100%)	100 (100%)	100 (100%)	500 (100%)
ANOVA "F" 1.041			311(100%)			

than in the past, a trend supported by recent studies among the community (Homewood 1992). Only a few people owned grade cattle 20 in Kimentet, 6 in Angata Baragoi, and 3 in Lemek, although many expressed a desire to increase their holdings. Grade cattle as opposed to open range pastoralism, requires paddock fencing which reduces the land available for both wildlife and livestock grazing (see Plates 4.2 and 4.3). Whereas about 46% planned to increase their livestock holdings, 22% planned to reduce their holdings, citing the anticipated decline in grazing space as the reason. Despite efforts by the Government to introduce other cattle breeds, the short-horn humped zebu are still the mainstay of Maasai cattle, as they have a high resistance to stock disease(s) and can trek long distances. Although majority of livestock holders live in the lowland ranches, none of the lowland residents owned grade cattle.

4.2:3 Major Problems in the Region

This section examines the perceived problems as regards resource use in the region. People's responses to certain activities may be dictated by the general difficulties they face. When asked to state what they thought were the major problems they faced, 32% cited water shortage, while only 18% cited wildlife menace[3] (Table 4.3). Another 18% cited other problems including poor roads, the lack of transportation facilities, livestock diseases, poor veterinary services, poor livestock marketing and school services, and even stock theft (or stock raiding). Water is the number one problem in both the upland and lowland areas. This may relate to land use requirements for cultivators and pastoralists. Surprisingly, health and food shortages were seen as a major problem more in the upland areas than in the plains. The reason for this could be the difference in expectations between the immigrants and the Maasai.

[3] The response of wildlife menace as one of the major problems could have been encouraged by the wording of the study questions. Water shortage and other problems are equally, not more, important as regards the threat to human life in the region.

Table 4.3 Perceived Major Problems in Masai Mara Region by Group Ranch

MAJOR PROBLEMS***	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Land shortage	17 (18.7%)	8 (8.2%) 25 (13.5%)	2 (1.8%)	2 (2.0%) 7 (2.3%)	3 (3.0%)	32 (6.4%)
Water scarcity	18 (19.8%)	20 (20.4%) 38 (20.1%)	48 (43.2%)	39 (39.0%) 124 (39.7%)	37 (37.0%)	162 (32.4%)
Poor health services	17 (18.7%)	18 (18.4%) 25 (18.5%)	20 (18.0%)	10 (10.0%) 37 (11.7%)	7 (7.0%)	72 (14.4%)
Food Supply/shortage	15 (16.5%)	17 (17.3%) 32 (16.9%)	11 (9.9%)	7 (7.0%) 22 (6.9%)	4 (4.0%)	54 10.8%
Wildlife menace	14 (15.4%)	19 (19.4%) 33 (16.5%)	20 (18.0%)	21 (21.0%) 57 (18.3%)	16 (16.0%)	90 18.0%
Others	10 (11.0%)	16 (16.3%) 26 (13.5%)	10 (9.0%)	21 (21.0%) 64 (21.0%)	33 (33.0%)	90 (18.0%)
Total Chi-squared: 84.010	91 (100.0%)	98 (100%) 189 (100%)	111 (100%)	100 (100%) 311 (100%)	100 (100%)	500 (100%)

4.2:4 Immigration in the Masai Mara region

Although traditionally a Maasai territory, the Masai Mara region is increasingly being occupied by non-Maasai immigrants. In addition, there are movements among the Maasai themselves, from Kajiado[4] (the other Maasai District in the country) and/or from other parts of Narok District, into the region. This immigration contributes substantially to the increase in the human population of the study area. When asked to state how long they have been living in the area of land they occupied, just over half (267) of respondents said since birth; the rest having migrated into the area. Most of the immigrants had been in the area for more than 30 years, some of them having moved in as early as 1954. About 176 came from outside the Mara region, Narok or Kajiado and were of non-Maasai origins. The most common reasons for migrating into the region revolved around land availability (82.7%), and the reuniting of families (14.3%). Another reasons cited was the search for employment (3%). Concerning whether they would consider moving out of the present location, the majority (89.2%) said no, while 10.8% would consider moving but only if they got better land elsewhere. Land is the main reason for rural to rural migration in Kenya. Those who stated that they might consider moving out, may have been recent immigrants who had not fulfilled their expectations.

One important result of immigration is land encroachment, especially onto good potential, dry-season grazing areas. These areas to which Maasai would normally resort for dry-season grazing pasture usually have good rainfall patterns, and are therefore recognized as being suitable for agricultural crops as well. In discussing the degree of conflict in the two zones, two issues are crucial. First, the actual human, livestock and wildlife carrying capacity of the areas both during the wet and dry seasons; and second, the existing and projected populations of humans, livestock and wildlife which will be supported by the given land (zone).

[4] There is no clear evidence that some Maasai moved from Kajiado to settle in Narok District (Masai Mara region). There are movements of Maasai between the two districts but mostly for jobs.

4.2:5 Wildlife Seen in the Region

Respondents were asked to state what animals they saw or encountered in their land use areas. The land use areas were defined as extending in an approximately 3 km radius around the "Manyatta". This included the homestead and the immediate surroundings. While Maasai graze over a wide area, especially during drought, the current trend of sedentarization restricts them to specific areas most of the year. This was meant to give specific locational information which could be correlated with conflict areas. In Angata Baragoi and Kimentet, for example, the animals reportedly seen were small mammals, large ones such as elephants and buffaloes were only seen during extended droughts. The large wildebeest populations may have contributed strongly to the increased sightings of the animal in the area. Wildlife occur throughout the region, except fewer and fewer were found in the upland areas where agriculture was expanding.

There is a striking difference in the density of wildlife populations in the five sample areas. The northern part of Lemek is increasingly falling under intensive cultivation and the wildlife density has declined tremendously over the years. Seasonal trends of conflict are likely influenced by two points. Firstly, since wildebeest migrate in large numbers, the attitudes of the local human population may be influenced by the sheer multitudes and biased views of the wildebeest may emerge. I have been unable to differentiate this bias. Secondly, wildebeest wander around and may therefore be easily observed out in the open plains feeding and competing at watering areas.

4.2:6 Relationships of the Socio-economic Factors

Socio-economic and demographic characteristics of the sample of residents in Masai Mara region suggests that the population varied, but was also similar in a number ways. Most Maasai were involved predominantly in pastoralism, while many of the non-Maasai were cultivators. The Maasai had lived in the area longer than the non-Maasai, and they encountered more wildlife problems on average than the non-Maasai. More livestock

depredation was reported by the Maasai than the non-Maasai. In contrast, the non-Maasai encountered more crop destruction and dealt more with the high cost of crop loss due to wildlife than did the Maasai.

Respondents with less or no formal education were older. The Maasai were not significantly different in terms of level of education from the non-Maasai. Perhaps if children were included then the survey could produce significant differences in the level of education. The focus of the study, however, was on the heads of the households. Those involved in other occupations such as cattle trading, were comparatively younger than those involved only in pastoralism. No significant difference between Maasai and non-Maasai, in terms of whether or not they actually owned any livestock. Older residents had more stock than younger ones. The wealthier, however, were not necessarily the most educated. Level of education did not necessarily translate into greater livestock or land ownership. Most of those indicating individual land ownership were non-Maasai. Long-term residency was significantly correlated with ethnic groups and livestock ownership.

4.3 Experience of Conflict

The conflict between wildlife and humans had increased over the years but there was variation in the intensity and frequency within the region. This section presents an overview of how the local people perceived conflict. Perception was examined with reference to the: (1) occurrence of wildlife damage, (2) types of damage, (3) overall destructive significance of wildlife species, (4) species responsible for damage, and (5) changes in the intensity of conflict over recent years. The overwhelming majority (96%), said they were aware of problems[5] with wildlife (Table 4.4). The 4% who said they had not personally experienced trouble, stated that they were aware that other people did encounter

[5] This question solicited the respondents perceived awareness or familiarity with wildlife problems in the area not their actual losses due to wildlife interference. Quantification of such losses, presented in the next section (effects of conflict on humans), tested respondents' actual encounter with wildlife problems.

problems. One local resident of Kimentet expressed his experience as follows:

> Wildlife cause a lot of problems in this area. They eat our livestock, crops and finish grass for cattle. In this place, one cannot think of growing crops. You cannot risk walking out at night. We are a prisoner to wildlife and yet the government protects them (L.R[6]. 01).

This was a common view held by many of the local people. Wildlife is seen as competing with livestock over pasture and water. Many local people of the Masai Mara region believed that wildlife received more attention from the government than they did. People felt that the government was putting little effort toward controlling wildlife problems. The responses varied significantly[7] between group ranches. In Angata Baragoi and Kimentet areas, the predominantly agricultural zones, a total of nearly 10% said they did not encounter wildlife problems, whereas in Koyaki and Siana, all respondents encountered problems. The explanation for this difference could be that agriculture had displaced wildlife (especially, the larger species). As agriculture and the number of people with attendant infrastructure increase, wildlife become completely displaced. But the general circumstance was clear: the local people were significantly affected by wildlife and were aware of difficulties of living in wildlife areas.

Of the 26 government officials interviewed[8], all stated that conflict was occurring and was causing concern. All 8 wildlife conservation experts interviewed also said that the conflict had increased and this posed a major long-term threat to wildlife conservation, not

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[6] Symbols are used to represent individual respondents quoted in the text in order to preserve their anonymity. For example, L.R. = Local Resident, G.O. = Government Official, and W.E. = Wildlife Expert. The numbers, for example, 01 indicate the number of the anonymous individual.

[7] Results of the statistical significance tests of the distribution of variables are indicated in the first columns of the tables. Two categories of tests of significance are run. The first are the tests for the variations of the results amongst group ranches, determining whether the observations differed amongst the sampled group ranch. The second are tests of the correlations amongst variables. The procedure is the same on all subsequent tables.

[8] The Government officials and wildlife conservation experts were asked four general questions. These were: (1) Is the conflict really there? How serious is it?; (2) What are the causes?, (3) How does the competition affect wildlife and the humans?; and (4) How can it be resolved? The discussion was very informal and the flow could often be influenced by the respondents. Their responses were recorded.

Table 4.4 Are You Aware of any Problems with Wildlife?[9]

AWARENESS OF WILDLIFE PROBLEMS**	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Yes	81 (89.0%)	90 (91.8%) 171 (90.4%)	109 (98.2%)	100 (100%) 309 (99.4%)	100 (100%)	480 (96.0%)
No	10 (11.0%)	8 (8.2%) 18 (9.6%)	2 (1.8%)	0 (0.0%) 2 (0.6%)	0 (0.0%)	20 (4.0%)
Total	91 (100%)	98 (100%) 189 (100%)	111 (100%)	100 (100%) 311 (100%)	100 (100%)	500 (100%)
Mann-Whitney[10] "U" 25.123						

only in Kenya but also in most other African countries. The informal interviews with the 13 local elders supported the view that problems were substantial and that virtually all residents experienced some form of difficulty with wildlife. Many elders also felt that today the needs of wildlife were put before those of the local people, while at the same time the local people were more restricted from protecting themselves from wildlife damage. Instead, the government gave anti-poaching activities a high priority to the point of harassing local people.

4.3:1 Types of Conflict Experienced

The interface between wildlife and humans in the Masai Mara region was manifest in a variety of ways. Each respondent was asked to list types of conflict in order of importance. Of the respondents encountering problems, 45.6% cited livestock depredation as the greatest problem followed, in a descending order, by crop destruction, human deaths

[9] A number of format procedures have been used in many of the tables and should be noted in order to facilitate an understanding of these results: (1) the percentages in brackets in the third row of each finding indicate the total responses by zone - upland or lowland zone. The first rows are responses by individual sampled group ranches.

[10] Because the chi-squared results had an expected all frequency of <5, the result was re-analyzed using Mann-Whitney "U' test.

or injuries, transmission of diseases to livestock, competition for resources, and other wildlife problems (Table 4.5). Many local residents of Masai Mara region complained of wildlife damage and believed that the government should do something about the wildlife menace. The problem entered other categories including wildlife damage to infrastructural development, such as fences, water pipes and granaries, and prevention of local residents, particularly children and mothers from going out of bomas[11].

Table 4.5 Wildlife Problems Cited as Most Important by Group Ranch

WILDLIFE PROBLEMS****	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Livestock predation	18 (22.2%)	21 (23.3%) 39 (22.8%)	63 (57.8%)	61 (61.0%) 181 (58.6%)	57 (57%)	219 (45.6%)
Crop Destruction or trampling	41 (51.8%)	42 (46.7%) 83 (49.8)	12 (11.0%)	7 (7.0%) 29 (9.3%)	10 (10%)	114 (23.8%)
Human deaths or injuries	9 (9.9%)	10 (11.1%) 19 (10.0)	11 (10.1%)	10 (10.0%) 34 (11.0%)	13 (13%)	51 (10.6%)
Transmission of diseases	6 (7.4%)	9 (10.0%) 15 (8.5%)	12 (11.0%)	11 (11.0%) 35 (11.6%)	12 (12%)	50 (10.4%)
Competition for space, pasture & water	5 (6.2%)	7 (7.8%) 12 (7.0%)	9 (8.3%)	11 (11.0%) 28 (9.4%)	8 (8.0%)	41 (8.5%)
Others	2 (2.5%)	1 (1.1%) 3 (1.8%)	2 (1.8%)	0 (0.0%) 2 (0.6%)	0 (0.0%)	5 (1.0%)
Total Chi-squared 146.474	81 (100%)	90 (100%) 171 (100%)	109 (100%)	100 (100%) 309 (100%)	100 (100%)	480 (100%)

The problems experienced varied significantly among the group ranches. Livestock

[11]. Bomas are homesteads dwelling for one or more family units. In some cases children going to school may have to be escorted through a known dangerous portion of their route, such as, a thick bush or river crossing known to be preferred by dangerous animals.

depredation was the most commonly cited as a problem, in Siana, Lemek and Koyaki group ranches, areas that were still predominantly occupied by the pastoral Maasai and where pastoralism was the dominant form of land use. Crop destruction, the eating and trampling of crops, was experienced more in Angata Baragoi and Kimentet, areas where agricultural activity was expanding. These are the areas being occupied by the immigrants who come from agrarian communities. Complaints about the transmission of diseases and competition for pasture were also made mostly in the pastoral lands. Human deaths or injuries were cited almost uniformly throughout the group ranches. Generally, with the exception of human personal injuries, major wildlife damage varied according to the predominant form land use.

4.3:2 Degree of Destructiveness of the Wildlife Species

Wildlife species vary in their degree of destructiveness. Respondents were asked to rate the destructive significance of species. Lions (*Panthera leo)*, wildebeests (*Connochaetes taurinus*), elephants (*Loxodonta africana)*, buffaloes *(Syncerus caffer)*, and leopards (*Panthera pardus)* were considered very destructive. Many local residents of Masai Mara region felt that large mammals were most problematic, but a substantial percentage also cited primates as. Only 1% said zebras (*Equus burchelli)* could be very destructive (Table. 4.6).

The responses on the degree of destructiveness of the different species varied significantly amongst the group ranches. Wildebeests were perceived as very destructive mostly in the pastoral areas of Lemek, Koyaki and Siana, probably because of their damaging effect on pasture and the transmission of disease to livestock. It is not clear why residents in Angata Baragoi and Kimentet perceived elephants, lions and leopards as very destructive since these are basically agricultural areas where most wildlife, especially, the larger ones had been displaced. This may be a reflection of the general knowledge people have of the destructive significance of the species. It may also mean that although

Table 4.6 Degree of Destructiveness of Selected Wildlife by Group Ranch (Numbers and Percentage)

ANIMAL/DEGREE OF TROUBLESOME	UPLAND ZONE			LOWLAND ZONE			MARA REGION	REMARKS[12]
	ANGATA BARAGOI	KIMENTET		LEMEK	KOYAKI	SIANA		
Wildebeest***								Damage crops, pasture and water. Carrier of malignant catarrh disease. Generally disliked by local people
Very Destructive	33 (36.3%)	32 (32.7%)	65 (34.5%)	98 (88.3%)	87 (87.0%)	95 (95.0%) 280 (96%)	345 (73%)	
Destructive	28 (30.8%)	26 (26.3%)	54 (28.6%)	7 (6.3%)	13 (13.0%)	5 (5.0%) 25 (8.3%)	79 (25%)	
Less Destructive	30 (33.0%)	40 (40.8%)	70 (36.3%)	6 (5.4%)	0 (0.0%)	0 (0.0%) 6 (2%)	76 (2%)	
Total	91 (100%)	98 (100%)	189 (100%)	111 (100%)	100 (100%)	100 (100%) 311 (100%)	500 (100%)	
Chi-squared: 146.537								
Elephant**								Damage crops, trees and fences. Dangerous to human. Occasionally fights cattle.
Very Destructive	73 (80.2%)	67 (68.4%)	140 (70%)	87 (78.4%)	55 (55.0%)	75 (75.0%) 217 (71%)	357 (72%)	
Destructive	17 (18.7%)	28 (28.6%)	45 (22.5%)	24 (21.6%)	45 (45.0%)	23 (23.0%) 92 (46%)	137 (27%)	
Less Destructive	1 (1.1%)	3 (3.0%)	4 (2.0%)	0 (0.0%)	0 (0.0%)	2 (2.0%) 2 (0.6%)	6 (1%)	
Total	91 (100%)	98 (100%)	189 (100%)	111 (100%)	100 (100%)	100 (100%) 311 (100%)	500 (100%)	
Chi-squared: 30.819								
Zebra**								Can damage crops. Compete for pasture. No known disease carrier. Generally seen as Harmless.
Very Destructive	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (1.0%)	3 (3.0%)	0 (0.0%) 4 (1.3%)	4 (1%)	
Destructive	26 (28.6%)	13 (13.3%)	39 (20.9%)	35 (31.6%)	13 (13.0%)	16 (16.0%) 64 (21.3%)	93 (19%)	
Less Destructive	65 (71.4%)	85 (86.7%)	149 (74.5%)	75 (67.5%)	84 (84.0%)	84 (84.0%) 243 (81%)	403 (80%)	
Total	91 (100%)	98 (100%)	189 (100%)	111 (100%)	100 (100%)	100 (100%) 311 (100%)	500 (100%)	
Chi-squared 27.580								

[12] The remarks are based on scientific findings and general knowledge about the behaviours of the wildlife species. Sources of information include (Dublin 1986; Riney 1983; Myers 1972). The remarks are provided here to collaborate the perceived degree of destructiveness of the individual species by the local people.

Buffaloes*					
Very Destructive	61 (67.0%)	66 (67.3%)	61 (54.9%) 67 (67.0%) 54 (54.0%)	309 (62%)	Dangerous to human. Attacks on sight. Extremely feared. Carrier of tsetse fly. Sometimes fights cattle.
	127 (67.1%)		182 (60.6%)		
Destructive	28 (30.7%)	27 (28.6%)	40 (36.0%) 25 (25.0%) 38 (38.0%)	93 (20%)	
	55 (29.6%)		103 (34.3%)		
Less Destructive	2 (3.3%)	6 (5.1%)	10 (9.1%) 8 (8.0%) 8 (8.0%)	8 (8%)	
	7 (3.5%)		26 (8.6%)		
Total	91 (100%)	98 (100%)	111 (100%) 100 (100%) 100 (100%)	500 (100%)	
	189 (100%)		311 (100%)		
Chi-squared 14.443					
Other Ungulates***					
Very Destructive	66 (73.6%)	52 (53.0%)	12 (10.8%) 2 (2.0%) 1 (1.0%)	158 (32%)	Some such as impala, warthog, eland generally considered less damaging. No known diseases. Use little pasture and water.
	118 (59%)		15 (5.0%)		
Destructive	22 (24.3%)	43 (43.9%)	14 (12.6%) 29 (29.0%) 9 (9.0%)	33 (7%)	
	65 (32.5%)		52 (17.3%)		
Less Destructive	3 (2.2%)	3 (3.1%)	85 (76.6%) 69 (69.0%) 90 (90.0%)	309 (61%)	
	6 (3.0%)		244 (81.3%)		
Total	91 (100%)	98 (100%)	111 (100%) 100 (100%) 100 (100%)	500 (100%)	
	189 (100%)		311 (100%)		
Chi-squared: 407.069					
Lion*					
Very Destructive	79 (86.8%)	84 (85.7%)	77 (69.4%) 80 (80.0%) 74 (74.0%)	395 (79%)	Preys on Livestock, especially cattle. Dangerous to human - often attacks people, especially while on kill.
	163 (81.5%)		231 (77%)		
Destructive	12 (13.2%)	14 (14.3%)	34 (30.6%) 20 (20.0%) 26 (26.0%)	105 (21%)	
	26 (13.0%)		80 (26.6%)		
Less Destructive	0 (0.0%)	0 (0.0%)	0 (0.0%) 0 (0.0%) 0 (0.0%)	0 (0%)	
	0 (0.0%)		0 (0.0)		
Total	91 (100%)	98 (100%)	111 (100%) 100 (100%) 100 (100%)	500 (100%)	
	189 (100%)		311 (100%)		
Chi-squared 14.440					
Leopard					
Very Destructive	57 (62.6%)	61 (62.2%)	76 (68.5%) 69 (69.0%) 73 (73.0%)	337 (67%)	Preys on livestock especially goats. Attacks people during the kill.
	118 (59%)		218 (72.6%)		
Destructive	33 (36.3%)	37 (37.8%)	35 (31.5%) 31 (31.0%) 27 (27.0%)	163 (33%)	
	70 (35%)		91 (30.3%)		
Less Destructive	1 (1.1%)	0 (0.0%)	0 (0.0%) 0 (0.0%) 0 (0.0%)	0 (0%)	
	1 (0.5%)		0 (0.0%)		
Total	91 (100%)	98 (100%)	111 (100%) 100 (100%) 100 (100%)	500 (100%)	
	189 (100%)		311 (100%)		
Chi-squared: 3.803					

Other Predators***					
Very Destructive	5 (5.5%)	14 (14.3%)	5 (4.6%)	9 (9.0%) 64 (64%)	97 (19%)
	19 (9.5%)		78 (26%)		
Destructive	32 (35.2%)	52 (53.0%)	81 (72.9%)	61 (61.0%) 33 (33.0%)	258 (52%)
	84 (42%)		175 (55%)		
Less Destructive	54 (59.3%)	32 (32.7%)	25 (22.5%)	30 (30.0%) 3 (3.0%)	145 (29%)
	86 (43%)		58 (19.3%)		
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%) 100 (100%)	500 (100%)
	189 (100%)		311 (100%)		
Chi-squared: 149.975					
Baboons**					
Very Destructive	61 (67.1%)	63 (64.3%)	71 (63.9%)	53 (53.0%) 49 (49.0%)	297 (59%)
	124 (62%)		173 (57.6%)		
Destructive	30 (32.9%)	35 (35.7%)	39 (35.1%)	44 (44.0%) 51 (51.0%)	199 (40%)
	75 (37.5%)		134 (48%)		
Less Destructive	0 (0.0%)	0 (0.0%)	1 (1.0%)	3 (3.0%) 0 (0.0%)	4 (1%)
	0 (0.0%)		4 (1.3%)		
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%) 100 (100%)	500 (100%)
	189 (100%)		311 (100%)		
Chi-squared: 17.463					

Some such as wild dogs, jackals - considered less dangerous to both livestock and people.

Damage crops. Can prey on goat calves. Crops and goats

elephants visited the areas only occasionally, their impact was significant. Although other species - zebra, buffalo, hartebeest, kudu (*Tragelaphus strepsiceros)*, porcupines (*Hystrix cristata)* and bush pig damage crops, elephants were the most widely feared because of their ability to eat and trample huge quantities of crops in a single night, the difficulty of stopping them with any barrier, and the danger they posed to human life. It is possible that a substantial population of lions and leopards still existed in the upland forests.

Clearly, some differences in the degree of destructiveness of species can be explained by the character of human land use. For example, whereas the wildebeest is most destructive in pastorally used lands, animals grouped under other ungulates seem to be most destructive in agriculturally used lands. The one animal perceived as very destructive in all group ranches, was the lion (between 74.0% and 85.7%). Primates were more likely to be cited as very destructive in the upland zone, the predominantly cropland areas.

4.3:3 Wildlife Species Involved in Conflict

Different wildlife species cause different problems. Respondents were asked to state which of the species inflict maximum damage regarding: (1) livestock depredation, (2) crop destruction (3) humans deaths and injuries, (4) transmission of disease to livestock, and (5) competition with livestock for resource use. Regarding livestock depredation, the majority cited lions (52%), followed by leopards and baboons (Table 4.7).

As to which wildlife caused maximum damage to crops in the region, 26% said elephant, 10% mentioned wildebeests, 42% cited "others". The "others" category included: bushpigs, baboons, monkeys, porcupines and hippopotami (*Hippopotamus amphibius)*. As one local resident of Angata Baragoi observed:

> Some of the most destructive wildlife here are the smaller mammals, porcupines, bushpigs and dikdik. Although their damages are small and often neglected, they are so frequent that by the time you harvest they have consumed at least a quarter of your crops. Yet the government does not consider them as dangerous (L.R. 02).

On the question as to which animals were primarily responsible for human deaths or injuries, 32.8% said buffalo, a substantial percentage mentioned elephant, a total of

Table 4.7 Wildlife Species Inflicting Maximum Damage in Various Problems by Group Ranch

WILDLIFE SPECIES/PROBLEMS	UPLAND ZONE			LOWLAND ZONE			MARA REGION	REMARKS
	ANGATA BARAGOI		KIMENTET	LEMEK	KOYAKI	SIANA		
Livestock Depredation**								
Lion	46 (50.5%)	46 (47.0%)		42 (38%)	66 (66.0%)	63 (63.0%)	263 (52%)	Livestock affected: cattle, goats and sheep. Chicken excluded
	92 (46%)			171 (55.3%)				
Leopard	14 (15.4%)	25 (26.0%)		27 (24%)	12 (12.0%)	15 (15.0%)	93 (19%)	
	39 (19.5%)			54 (17.0%)				
Hyena	8 (8.8%)	11 (11.0%)		11 (10%)	12 (12.0%)	7 (7.0%)	49 (10%)	
	19 (9.5%)			30 (9.6%)				
Others	23 (25.3%)	16 (16.0%)		31 (30%)	10 (10.0%)	15 (15.0%)	95 (19%)	
	39 (19.5%)			56 (18.3%)				
Total	91 (100%)	98 (100%)		111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)			311 (100%)				
Chi-squared: 36.378								
Crop Destruction***								Crops affected: maize, sorghum, vegetables, cassava, beans, wheat
Wildebeests	5 (5.5%)	8 (8.0%)		11 (9%)	21 (21.0%)	7 (7.0%)	50 (10%)	
	13 (6.5%)			39 (13%)				
Elephant	26 (28.6%)	23 (24.0%)		15 (14%)	32 (32.0%)	36 (36.0%)	132 (26%)	
	49 (24.5%)			83 (27.6%)				
Buffalo	4 (4.4%)	2 (2.0%)		72 (65%)	25 (25.0%)	8 (8.0%)	111 (22%)	
	6 (3.0%)			105 (35%)				
Others	56 (65.5%)	67 (66.0%)		13 (12%)	22 (22.0%)	49 (49.0%)	207 (42%)	
	123 (61.5%)			84 (28%)				
Total	91 (100%)	98 (100%)		111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)			311 (100%)				
Chi-squared: 303.766								

Human Death/Injuries* **				Occur when fighting off the predator(s), or when walking out at night
Buffalo	46 (50.5%) 22 (23.0%) 68 (34.0%)	37 (33%) 24 (24.0%) 31 (31.0%) 92 (30.6%)	160 (32%)	
Elephant	14 (15.4%) 37 (38.0%) 61 (25.5%)	34 (31%) 26 (26.0%) 27 (27.0%) 87 (29%)	138 (28%) 74 (15%)	
Lion	8 (8.8%) 20 (20.0%) 28 (14.0%)	10 (9%) 17 (17.0%) 18 (18.0%) 45 (15%)	125 (25%)	
Others	23 (25.3%) 19 (19.0%) 42 (21.0%)	20 (20%) 33 (33.0%) 24 (24.0%) 77 (25.6%)	500 (100%)	
Total	91 (100%) 98 (100%) 189 (100%)	111 (100%) 100 (100%) 100 (100%) 311 (100%)		
Chi-squared: 49.837				
Disease Transmission* **				Trypanosomiasis, anthrax, malignant catarrh (believed to be transmitted through grazing
Wildebeest	42 (46.1%) 62 (63.3%) 104 (62.0%)	98 (88%) 76 (76.0%) 64 (64.0%) 238 (79.3%)	342 (68%)	
Buffalo	31 (34.1%) 34 (34.7%) 65 (32.5%)	13 (12%) 16 (16.0%) 18 (18.0%) 47 (15.6%)	112 (23%)	
Elephant	15 (16.5%) 2 (2.0%) 17 (8.5%)	0 (0.0%) 5 (5.0%) 13 (13.0%) 18 (6.0%)	35 (7%)	
Others	3 (3.3%) 0 (0.0%) 3 (1.5%)	0 (0%) 3 (3.0%) 5 (5.0%) 8 (2.6%)	11 (2%)	
Total	91 (100%) 98 (100%) 189 (100%)	111 (100%) 100 (100%) 100 (100%) 311 (100%)	500 (100%)	
Chi-squared: 77.525				
Resource Competition* **				Resources competed for: pasture, water and space
Wildebeests	24 (26.4%) 46 (46.9%) 70 (35.0%)	59 (53%) 68 (68.0%) 68 (68.0%) 127 (42.5%)	265 (54%)	
Zebra	41 (45.0%) 43 (43.9%) 84 (42.0%)	34 (31%) 24 (24.0%) 27 (27.0%) 85 (28.3%)	169 (34%)	
Elephants	9 (9.9%) 7 (7.1%) 16 (8.0%)	5 (5.0%) 5 (5.0%) 2 (2.0%) 12 (4.0%)	35 (3%)	
Others	17 (18.7%) 2 (2.0%) 19 (9.5%)	12 (11%) 3 (3.0%) 3 (3.0%) 18 (6.0%)	31 (6%)	
Total	91 (100%) 98 (100%) 189 (100%)	111 (100%) 100 (100%) 100 (100%) 311 (100%)	500 (100%)	
Chi-squared: 49.998				

nearly 40% cited the predators (lion, leopard, cheetah and hyaena), while only a few mentioned "others". Species grouped under the latter category included crocodiles and hippopotami. When asked as to which animal was principally responsible for transmitting diseases to livestock, the majority (68%) said wildebeests, many said buffalo and only a few cited elephants. Disease transmission does occur from wildlife to domestic stock and vice versa (Karstad, et al. 1980). Many local livestock owners were concerned about wildlife diseases, in particular, Malignant Catarrhal Fever (MCF). Cattle are believed to contract MCF from wildebeest in the calving areas, through contact with parturient, newborn and very young wildebeest (Mushi et al. 1980). The issue of MCF in Masai Mara region, is however, debatable. For example, although there are a few resident wildebeest, the region is primarily a dry season grazing ground for the migratory wildebeest and not a primary calving area. Cattle and sheep can contract parasitic conditions from wildlife, such as strongyles and bot fly larvae (Douglas-Hamilton et al. 1988).

Species which competed most with livestock for pasture and water included, in ascending order, wildebeests, zebra and elephants (Table 4.5). Wildebeests and zebra were most frequently cited as the major culprits probably because of the abundance of the two species. Over the years, the number of wildebeest and other ungulates have increased considerably. These high wildlife populations have led to drastic declines in vegetative cover. From the informal interviews, residents talked of crocodiles killing livestock and sometimes humans in the Mara River. This occurred when the stock were taken for watering. The local people also classified the types of livestock the predators prefer. Leopards, for instance, kill goats, while lions attack cattle and hyaenas often prefer sheep.

Generally, the local people were aware that wildlife competed for space, and clear pasture that could otherwise be used by their livestock. It is notable that there was a diversity of opinion regarding the major impact of various species. It also became clear that there can be several important points of conflict for each species.

4.3:4 Changes in Intensity of Conflict

Respondents were asked to comment on their perception of change regarding the intensity of conflict over the past 30 years, and their expectations for the future. The majority, 84%, believed that conflict had increased over the past 30 years, 9% felt it had remained the same, while only 7% said it was becoming less acute (Table 4.8). Livestock depredation and crop destruction appeared to have increased most.

There were notable variations between group ranches. Nearly all of the respondents who stated that conflict had decreased lived in the Angata Baragoi and Kimentet areas. All (100%) of the respondents in Koyaki and Siana felt that the intensity had increased. This supports the view that wildlife were displaced in areas that were increasingly being committed to agriculture. It may also be an indication that residents in Kimentet and Angata Baragoi would rather report that conflict had reduced so as to discourage the government from seeing their area as an area with significant wildlife potential.

Overall, 60% said conflict would increase over the next 10 years with major concerns being livestock depredation (37%), crop destruction (29%), transmission of diseases (9%) and competition for pasture (15%). In contrast, the informal interview and in-depth discussions suggested that the conflict would subside when more intensive land uses took hold of the area, especially in group ranches already under increasing pressure such as Angata Baragoi and Kimentet.

Table 4.8 Response on Intensity of Conflict by Group Ranch

PROBLEMS/ INTENSITY	UPLAND ZONE		LOWLAND ZONE			MARA REGION	GENERAL REMARKS
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA		
General conflict* **							
Increasing	10 12%	11 12% 21 (12.0%)	104 (95%)	97 (97%) 301 (100.3%)	100 (100%)	401(84%)	All wildlife problems
Same	3 4%	0 0.0% 3 (2%)	4 (4%)	0 (0%) 4 (1.3%)	0 (0%)	43(9.0%)	
Decreasing	68 84%	79 88% 147 (86%)	1 (1%)	3 (3%) 4 (1.3%)	0 (0%)	36(7.0%)	
Total	81 100%	98 100% 171 (100%)	109 (100%)	100 (100%) 309 (100%)	100 (100%)	480 (100%)	
Chi-squared: 60.479							
Livestock predation* **							
Increasing	16 20%	27 17% 43 (18.5%)	68 (62%)	57 (57%) 170 (54.7%)	45 (45%)	403 (84%)	Killing and injuring
Same	12 15%	55 75% 67 (45.0%)	16 (15%)	29 (29%) 67 (22.0%)	22 (22%)	53 (11%)	
Decreasing	53 65%	8 8.0% 61 (36.5%)	25 (23%)	14 (14%) 72 (23.3%)	33 (33%)	24 (5%)	
Total	81 100%	90 (100%) 171 (100%)	109 (100%)	100 (100%) 309 (100%)	100 (100%)	480 (100%)	
Chi-squared: 54.856							
Crop Destruction* **							
Increasing	8 (10%)	12 (13%) 20 (11.5%)	27 (28%)	19 (19%) 52 (17.7%)	6 (6%)	355(74%)	Mostly in the farms
Same	29 (36%)	30 (33%) 59 (34.5%)	46 (41%)	39 (39%) 88 (28.0%)	4 (4%)	72(15%)	
Decreasing	44 (54%)	48 (54%) 92 (54.0%)	37 (31%)	42 (42%) 169 (54.3%)	90 (90%)	53(11%)	
Total	81 (100%)	90 (100%) 171 (100%)	109 (100%)	100 (100%) 309 (100%)	100 (100%)	480 (100%)	
Chi-squared: 352.685							

Human Deaths /Injuries**						
Increasing	12 (15%)	18 (20%) 30 (17.5%)	20 (22%)	24 (24%) 61 (21.0%)	17 (17%)	110(23%)	Occurs mostly at night
Same	35 (43%)	41 (46%) 76 (44.5%)	54 (50%)	47 (47%) 162 (52.7%)	61 (61%)	322(67%)	
Decreasing	34 (42%)	31 (34%) 65 (38.0%)	35 (28%)	29 (29%) 86 (26.3%)	22 (22%)	48(10%)	
Total	81 (100%)	90 (100%) 171 (100%)	109 (100%)	100 (100%) 309 (100%)	100 (100%)	480 (100%)	
Chi-squared: 25.716							
Others*							
Increasing	13 (16%)	15 (17%) 28 (16.5%)	10 (9%)	26 (26%) 58 (19.0%)	22 (22%)	187(39%)	Mainly during drought
Same	41 (51%)	43 (48%) 84 (49.5%)	59 (54%)	49 (49%) 163 (52.3%)	55 (55%)	247(51%)	
Decreasing	27 (33%)	32 (35%) 59 (34.0%)	40 (37%)	25 (25%) 88 (28.3%)	23 (23%)	46(20%)	
Total	81 (100%)	90 (100%) 171 (100%)	109 (100%)	100 (100%) 309 (100%)	100 (100%)	480 (100%)	
Chi-squared: 12.472							

4.3:5 Association Analysis of Perception of Conflict

Those who perceived crop destruction to be the main type of conflict felt that elephants were the most destructive species, while those who cited competition for pasture and water and the transmission of diseases listed wildebeests as the most destructive species. The destructive species also varied significantly with problems inflicted, and with predominant land use. Large mammals were reported more destructive in the lowland, while small and nocturnal animals were reported so in the upland. Therefore, in general, larger animals were more problematic in areas with low human density, whereas small animals, especially nocturnal ones such as porcupines, bushpigs were more destructive in areas of high human density and land development, such as in the upland regions.

4.4 Quantifying the Conflict

The previous section presented a general overview of how the local people viewed wildlife-human conflict in the Masai Mara region. This section presents a quantification of the conflict findings on the: (1) frequency of the type of conflict, (2) measures of losses the local people incurred due to wildlife damage, and (3) analysis of the correlations among measures of the degree of conflict in the Masai Mara region. Quantification of the conflict is important so as to establish the extent of the conflict in different areas so that one can determine whether coexistence is possible, and at what cost.

4.4:1 Frequency of Type of Conflict

Respondents were asked to state how many times they encountered wildlife problems per year[13]. On average, local people encountered wildlife problems 3.5 times per year (median = 3) (Table 4.9). The highest mean rate of general conflict occurred in Koyaki (5 times) and Siana (4.5 times) group ranches and the lowest mean rate occurred in Angata

[13]. Respondents were first asked if they encountered problems last month, and if they did how many times, then, last year, in the past two years, the past five years and the past ten years. The responses were recorded in Table (See interview schedule). I have decided to use the last one year because beyond one year, there was evidence of guessing and generalities. One month proved too short as some of the common areas of conflict, for example, crop production are annual.

Baragoi and Kimentet group ranches. The most frequently experienced damage was livestock depredation, 2.1 times per year. Human deaths appeared uniform throughout the region. The other categories included transmission of diseases and competition for space, pasture and water or destruction of property such as fences and water pipes.

Table 4.9 Mean Frequency of Occurrence of Conflict Per Year by Group Ranches

PROBLEMS	UPLAND ZONE		LOWLAND ZONE			MARA REGION	"F" SIG. LEVEL
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA		
General conflict[14]	2.1	2.3	2.8	5.0	4.5	3.5	63.520**
	2.2			4.1			
Crop destruction	2.3	2.7	1.3	0.1	0.3	1.3	150.977*
	2.5			0.6			
Livestock Depredation	1.7	1.7	1.7	2.5	2.7	2.1	33.319***
	1.7			2.3			
Human deaths/ injuries	2.1	2.0	2.0	2.4	2.0	2.1	4.893**
	2.05			2.1			
Others	1.8	1.8	1.9	2.0	2.2	1.9	3.852**
	1.8			2.0			

The frequency of the conflict varied significantly spatially among the group ranches. It is important to note that even within the group ranches, there were specific locations where conflict was most likely. The lowland ranches, Koyaki and Siana, experienced a higher over-all occurrence of conflict than the upland ones, Angata Baragoi and Kimentet, probably because they had a higher wildlife population density being located within the major wildlife migratory routes and bordering the reserve. Angata Baragoi and Kimentet experienced the highest crop destruction, while Koyaki and Siana experienced most of the livestock depredation.

[14] General conflict refers to all the problems local people encountered with wildlife. For instance, from the results, it can be said that wildlife damages is experienced in Masai Mara region an average of 3.5 times per year.

4.4:2 Measuring the Consequences of conflict

Measuring loss due to wildlife is essential to accurately assess the specific consequences of conflict on local people and on the local economy. This section examines the specific losses incurred by the local people including the type of loss covering livestock, crops, and personal deaths or injuries due to wildlife attacks on people, as well as other losses. The other losses included damage to property (public and private) such as, fences, water pipes, the cost of employing guards to protect property, and inconveniences such as preventing people (especially children and mothers) from going outside the bomas, as well as the restrictions to various personal aspirations and pursuits. Measuring the damage will help reveal the magnitude of the conflict which may explain why certain attitudes were held by the local people towards wildlife and wildlife conservation authorities. The damage was assessed as perceived by the "victims[15]".

4.4:2.1 Types of Losses

When asked if they had suffered any losses due to wildlife damage in the last one year, and if so, of what nature and with what material consequences, 66.5% of respondents said they had, while 33.5% had not (Table 4.10). The most common losses experienced were livestock depredation (57.0% of those who suffered losses), crop destruction (31.0%), and human injuries or deaths (that is, households which had members of the family injured).

Experiences of loss differed significantly between the group ranches. For example, fewer people suffered losses in Angata Baragoi, while more encountered wildlife problems in the other ranches. Livestock depredation occurred more frequently in Lemek, Koyaki and Siana group ranches but less in Angata Baragoi and Kimentet. In contrast crop destruction was more pronounced in Angata Baragoi and Kimentet ranches than Lemek, Koyaki and

[15] Damage by wildlife as reported in government records was also collected from official records covering the wildlife compensation of the claims for the damage (at the District level). Collecting data from government records permitted cross-checking. Often local perceptions of damage tend to exceed the value of the damage recorded by government for a variety of reasons. There is a strong feeling among locals that the government compensation scheme far underestimates damage costs.

Siana. These results are a reflection of the predominant types of land use in the two broad ecotones, agriculture in the upland zone and pastoralism in the lowland areas.

Table 4.10 Losses Due to Wildlife Per Year by Group Ranches

TYPES OF LOSS	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Suffered Loss*						
Yes	37 (46%)	70 (78%)	71(65%)	72 (72%)	69 (69%)	319 (66.5%)
	107 (53.5%)			**212 (70.3%**		161 (33.5%)
No	44 (54%)	20 (22%)	38(35%)	28 (28%)	31 (32%)	
	64 (32.0%)			**97 (32.6%)**		480 (100%)
Total	81 (100%)	90 (100%)	109(100%)	100 (100%)	100 (100%)	
	171 (85.5%)			**309 (100%)**		
Chi-squared: 7.293						
Type of Loss**						
Livestock Depredation	11 (29%)	19 (27%)	43 (60%)	54 (77%)	42 (62%)	169 (57%)
	30 (15%)			**140 (46.6%)**		
Crop Destruction	14 (38%)	34 (49%)	13 (18%)	2 (3%)	10 (13%)	73 (31%)
	48 (24%)			**24 (8%)**		
Human Deaths and Others	12 (33%)	17 (24%)	15 (22%)	15 (20%)	17 (25%)	77 (12%)
	29 14.5%)			**47 (16.3%)**		
Total	37 (100%)	70 (100%)	71 (100%)	72 (100%)	68 (100%)	319 (100%)
	127 (100%)			**212 (100%)**		
Chi-squared 16.562						

4.4:2.2 Loss of Livestock

The most common type of conflict within the region was livestock depredation. As Case No. 4.1 (see Box) illustrates despite the efforts of local people incidents of livestock depredation often occurred, and in some cases, especially where it involved leopard and goats as many as 48 goats could be lost in one incident.

Case Study No. 4.1 Forty-eight Goats in One Night

Mr. Wamchamnji is a teacher in a local primary school and a livestock keeper. He has a number of goats and because he earns some money from his teaching job, he has been able to put up a special structure for the goats. One night, in July 1991, a leopard attacked Mr. Wamchamnji's boma. It killed 48 goats. Mr. Wamchamnji had checked the goats around 2.00 a.m. that night and there was no problem. When he came out to check again at around 4.00 or 5.00 a.m, after suspecting a problem, he found a leopard was inside the corral. As usual, he raised an alarm, and men came within minutes to help. The leopard was then surrounded in the den and on attack was initiated. The beast was eventually killed, but only after it injured a total of six villagers, some very badly while others only slightly. Mr. Wamchamnji would have been compensated but since livestock depredation is no longer covered he will get nothing. He has no choice but to hold a grudge against the authority for protecting wildlife.

The livestock most commonly lost were goats (56% of all the respondents who lost livestock), while cattle accounted for 27%, and sheep a lesser 17% (Table 4.11). It is not clear why goats were the most depredated stock. It could be because of the leopards behaviour of killing en-mass or because in the Masai Mara region leopards preferred goats to natural prey. Goats appeared to be one of the most protected stock in the region. It should, however, be noted that there were other causes of livestock death such as disease, drought and natural causes. Again many of the diseases were claimed to be caused by wildlife.

Concerning the cost of the loss of livestock, 23% incurred between Kshs. 20,000-30,000 for the twelve month period. The majority lost between Kshs. 10,000-20,000. The loss of stock was a bitter experience for many families in the region, insidious, as it could occur at any time, especially at night. The figures suggest that 1 out of 25 households in Masai Mara region suffered livestock loss due to wildlife depredation per year. This included the killing of cattle by lions, goats by leopards and sheep by hyenas. It would be interesting to establish in monetary terms, how much loss each species caused to the local people and compare this with the income from tourism that each species provides. The problem with such analysis, however, is that the natural values of the species cannot be realistically measured. In many ways, loss of livestock caused significant difficulty to the local people

most of whom were small-scale pastoralists and farmers.

Table 4.11 Livestock Loss Due to Wildlife by Group Ranch

LIVESTOCK	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Types of Livestock***						
Goats	7 (63.6%)	10 (52.6%) 17 (57%)	21 (48.8%)	31 (56.4%)	26 (61.9%) 78 (39.4%)	94 (56%)
Cattle	3 (27.3%)	5 (26.3%) 8 (26%)	12 (27.9%)	15 (27.3%)	11 (26.1%) 38 (27.1%)	46 (27%)
Sheep	1 (9.1%)	4 (21.1%) 5 (17%)	10 (23.3%)	9 (16.3%)	5 (12.0%) 24 (17.0%)	29 (17%)
Total	11 (100%)	19 (100%) 30 (100%)	43 (100%)	55 (100%)	42 (100%) 140 (100%)	169 (100%)
Chi-squared 141.490						
Number Killed*						
0-10	6 (53.5%)	4 (21.1%) 10 (37.3%)	11 (25.6%)	13 (23.7%)	10 (23.8%) 34 (24.4%)	43 (26%)
10-20	4 (36.3%)	8 (42.1%) 12 (39.2%)	16 (37.2%)	23 (41.8%)	17 (40.5%) 56 (39.8%)	68 (40%)
20-30	1 (10.2%)	5 (26.3%) 6 (18.3%)	9 (20.9%)	11 (20.0%)	8 (19.0%) 39 (19.9%)	34 (20%)
30-	0 (0.0%)	2 (10.5%) 2 (5.2%)	7 (16.3%)	8 (14.5%)	7 (16.7%) 22 (16.5%)	24(14%)
Total	11 (100%)	19 (100%) 30 (100%)	43 (100%)	55 (100%)	42 (100%) 140 (100%)	169 (100%)
ANOVA "F" 4.121						
Cost[10] of Stock Killed*						
0- 10,000	7 (63.6%)	5 (26.3%) 12 (44.9%)	10 (23.3%)	10 (18.0%)	9 (21.4%) 29 (20.9%)	41 (24.3%)
10,000-20,000	3 (27.2%)	7 (36.9%) 10 (32.0%)	20 (46.5%)	26 (47.3%)	18 (42.9%) 64 (45.6%)	73 (43.8%)
20,001++	1 (10.2%)	5 (26.3%) 6 (13.0)	7 (16.3%)	10 (18.0%)	9 (21.4%) 26 (15.9%)	32 (18.9%)
	0 (0%)	2 (10.5%) 2 (5.1%)	6 (13.9%)	9 (16.7%)	6 (14.3%) 21 (14.6%)	23 (13.0%)
Total	11 (100%)	19 (100%) 30 (100%)	43 (100%)	55 (100%)	42 (100%) 140 (100%)	169 (100%)
ANOVA "F" 2.781						

Cases such as that of Wamchmnji were common in the region. Effective protection

[10] The costs were calculated in Kenya shillings. Exchange rate at the time of field work was US $ 1 equals Kshs.26.

for goats are specially built structures, which not many of the people could afford. For those who do not have special fences, the best alternative was to live with the goats inside the hut. But this becomes very difficult when one has a large herd given that the huts were usually very small. Mr. Wamchamji's home is located hardly 4 kilometres from a semi-permanent river (River Sand). He maintains his livestock with some of his earnings from teaching and he has spent nearly Kshs. 100, plus labour to import poles and construct the special goat pens.

4.4:2.3 Crop Loss

The other common type of conflict was crop destruction. The following case study (Case No. 4.2) illustrates an example of crop destruction. Often the amount destroyed and how long the destruction lasts depends on the species involved. Crop destruction occurred in all regions but mostly in the upland areas, although it was most severe on farms closer to the reserve boundaries. Many local people mentioned that crops grown near river banks could hardly survive game destruction, especially from the hippotatamus. As in the cited case, elephants can destroy a large area in just a matter of minutes. The case also shows the difficulties faced by the local people in getting prompt assistance from the rangers and the problems of the frustrating compensation process. Crop destruction takes place over most of the year but was most intense when crops were close to being harvested, usually in June/July. Early in the season wildlife destroy young shoots. Cattle also destroyed crops. Crops were destroyed both at night and during the day. Assessing the direct economic costs of crop raiding is difficult, because one has to calculate the projected crop yield in the absence of wildlife. It also depends on when the crop is harvested. In the arid areas, a substantial portion, if not the entire crop farm, may die or wither before harvest, so damage done early in the season by wildlife may have no impact on the final harvest.

Case Study No. 4.2 The Loss of an Entire Maize Field

Due to an unexpected elephant appearance one morning in May 1991, Mr. Kamaindi lost his entire maize farm in a matter of hours. Mr. Kamaindi, a resident of Kimentet group ranch, is located in a place considered comparatively safe from wildlife attack, being on the escarpment. The area being of agricultural potential, Mr. Kamaindi grows maize both for subsistence and for cash. He has fenced the farm using twigs mixed with barbed wires in some parts. As he is a comparatively wealthy individual, he is able to employ a guard. His farm also has scare-crows - white cloths over the fence intended to scare the wildlife. As Mr. Kamaindi became aware that morning, such techniques including a guard without a gun can only help in the case of smaller species - dik dik and baboons and the like. Mr. Kamaindi stands to lose all his investment in the farm that year since the government no longer compensates for crop damage. His guard attempted with no success to scare away the elephants. Attempts to get the game rangers to drive them away would not have been possible since they are far from the area, and could hardly have come in time to prevent such damages. Mr. Kamaindi, an influential individual, was not at home at the time of the incident. He believes that he must somehow get compensated for the loss.

Those who suffered crop destruction were asked to state the type of crops lost, size of farm damaged, quantity[17], and the approximate amount of loss in Kenya Shillings. When asked about the cost of crop loss, about 54% of respondents claimed they had lost between Kshs. 0-10,000 (approximately Cad. $0-150). Concerning the assessments of the proportion of crop destroyed by area, 37% of respondents claimed that between 0-2 acres of their farms were destroyed. Regarding the quantity of crops lost, 72% stated that they had lost between 0-3 bags, 24% claimed to have lost 6 and over bags (Table 4.12). It is also important to know what proportion of total crops produced was actually lost. In a study in Laikipia, 105 farms out of 2957 farms were assessed, and damage was estimated between 10 and 24 per cent of the total maize crop in the four subdivisions of the area (Thouless 1994). The highest damage was noted in the sparsely settled areas. Damage was less severe

[17] Before evaluating crop damage by wildlife, a method was developed to give at least a semi-quantitative index of the amount of damage. Assessments were made on wheat, maize and beans which were the main crops grown in some parts of the study area. Barley, vegetables, cassava and other crops are grown, but were not assessed since they are not primary. However, the same evaluation method could be modified for any crop. First, the area of the field damaged was given by the respondents. There could be over-estimation and this was assessed with care, second, the quality of crop was assumed to be the same in different areas. This is certainly not true but was accepted for the sake of simplicity. The estimation was based on the quality of crop before damage. Finally, a mean production figure of bags of wheat, maize and beans per hectare was given by the agricultural office, Narok and is estimated to yield 15 bags of maize per hectare. One bag of maize was about Kshs. 250 (Cad. $10).

Table 4.12 Crop Loss Due to Wildlife by Group Ranch Per Year

TYPE & AMOUNT LOST	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Acreage of Crop Damage**						
0-3	9 (64.3%)	11 (32.4%) 20 (48.4%)	1 (7.7%)	1 (50.0%) 7 (37.5%)	5 (55.6%)	27 (37.0%)
3.1-6	4 (28.6%)	18 (52.9%) 22 (40.8%)	4 (30.8%)	1 (50.0%) 8 (38.0%)	3 (33.3%)	30 (41.1%)
6.1- ++	1 (7.1%)	5 (14.7%) 6 (10.4%)	8 (61.5%)	0 (0.0%) 9 (24.2%)	1 (11.1%)	16 (20.6%)
Total	14 (100%)	34 (100%) 48 (100%)	13 (100%)	24 (100%)	2 (100%) 9 (100%)	73 (100%)
ANOVA "F" 9.333						
Type Damaged**						
Maize	11 (72.9%)	22 (64.7%) 33 (68.8%)	6 (46.1%)	2 (100.0%) 14 (70.9%)	6 (66.7%)	48 (65.8%)
Beans	3 (17.1%)	9 (26.5%) 12 (21.8%)	2 (15.4%)	0 (0.0%) 5 (16.2%)	3 (33.3%)	17 (23.2%)
Wheat	0 (0%)	3 (8.8%) 3 (4.4%)	5 (38.5%)	0 (0.0%) 5 (12.8%)	0 (0.0%)	8 (11.0%)
Others						
Total	14 (100%)	34 (100%) 48 (100%)	13 (100%)	24 (100%)	2 (100%) 9 (100%)	73 (100%)
Chi-squared 16.562						
Quantity (bags)**						
0-3	2 (18.6%)	4 (11.8%) 6 (15.2%)	7 (53.8%)	2 (100%) 13 (56.0%)	4 (44.4%)	19 (72%)
3.1-6	10 (71.4%)	24 (70.6%) 34 (71.0%)	3 (23.1%)	0 (0.0%) 5 (15.1%)	2 (22.2%)	39 (15%)
6-++	2 (10.0%)	6 (17.6%) 8 (13.8%)	3 (23.1%)	0 (0.0%) 6 (15.5%)	3 (33.3%)	15 (24%)
Total	14 (100%)	34 (100%) 48 (100%)	13 (100%)	24 (100%)	2 (100%) 9 (100%)	73 (100%)
ANOVA "F" 14.062						
Cost (KSHS) of Crop Damage[18]**						
0-10,000	4 (28.6%)	3 (8.8%) 7 (18.7%)	4 (30.8%)	1 (50.0%) 9 (41.7%)	4 (44.4%)	17 (54%)
10,001-20,000	9 (64.3%)	23 (67.7%) 32 (66.0%)	8 (61.5%)	1 (50.0%) 14 (55.7%)	5 (55.5%)	46 (44%)
20,001-	1 (7.1%)	8 (23.5%) 9 (15.3%)	1 (7.7%)	0 (0.0%) 1 (2.6%)	0 (0.0%)	10 (2%)
Total	14 (100%)	34 (100%) 48 (100%)	13 (100%)	24 (100%)	2 (100%) 9 (100%)	73 (100%)
ANOVA "F" 16.100						

[18] Estimates were based on the prevailing prices given at the District Office - Narok (see section 4.2 for more details).

in the heavily settled areas. The total value of crops lost on the surveyed farms was more than Kshs 100,000 ($US 33,000). There were reports of elephants damaging grain after harvest; they broke storage bins, especially during extensive droughts.

However, considerable variation exists between group ranches as regards the cost of crop damage. Maize is the staple crop, and damage to maize accounted for over half of all crop damage. Other major crops subjected to damage and destruction included beans (12%), as well as wheat, potatoes and cassava which collectively accounted for 1%. Wildlife also destroyed millet, onions, tomatoes and cabbages. The latter were grown under irrigation. In the lowland there was little cultivation but any attempts were easily and quickly destroyed.

4.4:2.3 Personal Injuries or Deaths

Another form of wildlife damage to local people was human personal deaths or injuries. Case No. 4.3 describes one incident of personal injury in the Koyaki group ranch. Many local residents of the Maasai Mara region believed that the number of people killed or injured by wildlife in the region had increased in the past few years.

Case Study No. 4.3: The Death of a Boy

One evening in December 1990, a son of Ole Kuyo of Koyaki group ranch was playing with other children in front of their hut. The manyatta lies about 300 metres from the park boundary. The Talek River separates the manyatta from the park. At the same time, a lion was roaming the park boundary possibly for its evening hunt. Apparently the noise of the children drew its attention and it pounced on the child and escaped back into the bush killing the boy instantly. An alarm was raised and immediately the local people chased and eventually killed the lion. In the meantime, the incident was reported to the park warden. The local people, however, rarely wait for assistance from the authorities . As previously stated, the study results suggested that the authorities, such as wardens, are slow to respond to the needs and concerns of the local human populations.

Twelve percent of respondents had experienced either loss of the family member, or personal bodily injury, or injury to one or more family member due to wildlife. Such attacks occurred mainly in the evenings or during the night, and mostly in homesteads

closer to the park or river valleys. Often, they occurred unexpectedly and the Maasai would take revenge by tracking the animal responsible. Game wardens are usually expected to come to assist the local people but this rarely happens in time. Due to the lack of facilities and vehicles, a common problem all over Africa (Bonner 1993; Olindo 1991), wildlife conservation authorities often fail to assist the local people in their attempts to reduce game damage. These cases illustrate the losses the local people incurred due to wildlife and how they responded to the problems. They also indicate how ineffective "the authorities" can be in assisting local people in real situations.

4.4:2.4 Other Losses

There were other seemingly more indirect losses incurred due to wildlife problems. These include time spent scaring wildlife (sleep-less nights while waiting to defend personal property from raiding animals), the cost of employing someone to safeguard property, and both the time and cost of constructing stronger structures or fences to protect the property. In some cases children were unable to go to school because of the risk involved in walking from their homes to school or because their parents required their assistance in chasing off animals. When respondents were asked if they employed a guard, only 21% said yes, meaning that the majority (79.0%) provided their own security. On the question of what property they guarded, 56.0% of those who employed guards said livestock, 44% said crops/farms. Most guards were males, largely because of the nature of the work. On the question of how much they paid the guards, 57% said between Kshs. 0 - 300., 31%, paid between Kshs. 300 - 500, and 12% paid Kshs 500 and above per month. When asked for what period of time the guards were engaged, 21% said for about 2 hours a day. Some of those who employed guards hired them only when their services were most needed. When asked to specify the period/time of the day that guards were employed, 67.4% said night-time.

Wildlife, especially elephants that also destroy fencing and water pipes, pose

physical hazard to stock and herders. Yet, somehow the local people learn to live with the wildlife. Crops grown in irrigation schemes, especially in the lowland, seemed to provide an attraction for wildlife and were often destroyed. Livestock were protected by herders in the day and corralled at night. There is also a conflict issue over access to water. The Mara river is the only permanent water source and although many temporary pools may form during the rains, they eventually dry up. The main possible consequence of cattle and wildlife using the same pool is the spread of disease. Elephant and buffaloes some times chase away cattle and kill them. It is difficult to establish how many cattle get killed by elephants in such encounters, since there is no compensation.

4.4:3 Correlation Analysis of Measures of the Degree of Conflict

The previous sections have revealed findings as regards the degree and intensity of the conflict within the Masai Mara region. This section aims to establish correlations between the degrees of intensity in order to determine the strength and direction of their relationships (Table 4.13). First, areas with intensive human settlement and cultivation, experienced less conflict, while those where agriculture was still low, encountered more conflict. This suggests that with intensification of agriculture and human settlement, especially in the upland zone, wildlife does become displaced (although small-bodied and nocturnal species such as porcupines are still present) and wildlife-human competition declines. The relative frequency of reported conflict with wildlife was significantly and inversely related to crop damage, monetary value of crop loss and land under cultivation. These were mainly in the upland zone where cultivation was rapidly expanding. In contrast, the frequency of reported conflict was significantly and positively related to the number and monetary value of lost livestock and losses per capita.

The results further show that human personal injuries or deaths, livestock predation and total wildlife damage were positively correlated with each other but inversely with crop damage. Reduction of personal injuries is associated with intensification of human

Table 4.13 Pearson Correlation Matrix for Measures of Degree of Conflict

	AGERE	COCRO	COLIL	DISAP	FREOC	FREOH	FREOL	FREQU	GRACA	GOATS	LEDUC	LEOST	NATIC	NULIL	SHEEP	WEALT
AGERE	1.000															
COCRO	-0.016	1.000														
COLIL	-0.030	-0.228**	1.000													
DISAP	0.017	-0.250**	-0.034	1.000												
FREOC	0.047	0.410**	-0.010	-0.075	1.000											
FREOH	-0.058	0.034	0.009	-0.035	-0.123	1.000										
FREOL	-0.013	-0.233**	-0.050	-0.008	-0.338***	0.096	1.000									
FREQU	-0.044	-0.259**	0.055	0.020	-0.432***	0.095	0.249**	1.000								
GRACA	0.045	-0.003	0.041	-0.068	0.090	0.046	-0.072	-0.022	1.000							
GOATS	0.051	-0.068	0.012	0.080	-0.143	-0.018	0.019	-0.005	-0.057	1.000						
LEDUC	-0.601***	0.043	-0.023	0.025	0.061	0.013	-0.053	-0.073	-0.032	0.012	1.000					
LEOST	0.420***	-0.403**	-0.061	0.313***	-0.484***	0.012	0.228**	0.264	-0.119	0.140	-0.336**	1.000				
NATIC	0.018	-0.026	0.062	0.067	-0.066	0.055	0.058	0.023	-0.024	0.377**	0.040	0.077	1.000			
NULIL	-0.013	0.248**	0.884***	-0.047	0.043	-0.010	-0.096	0.023	0.052	-0.011	-0.020	-0.103	0.100	1.000		
SHEEP	0.039	0.006	0.073	0.056	-0.048	-0.056	0.030	-0.044	-0.049	0.153	-0.000	0.116	0.190	0.047	1.000	
WEALT	0.010	0.034	0.061	0.014	-0.010	-0.070	0.023	-0.015	-0.016	0.364**	0.056	0.007	0.981	0.102	0.196	1.000

AGERE = Age of respondents; COCRO = Cost of crop destroyed; COLIL = Cost of livestock killed; DISAP = Distance from park; FREOC = Frequency of crop destruction; FREOH = Frequency of Human injuries; FREOL = Frequency of Livestock Depredation; FREQU = Frequency of all wildlife problems; GRACA = Grade cattle owned; GOATS = Goats owned; LEDUC = Level of education; LEOST = Length of stay; NATIC = Number of native cattle; NULIL = Number of Livestock killed; SHEEP = Sheep owned; WEALTH = Wealth of respondent

settlement and cultivation. Recent residents of the Masai Mara region have experienced less conflict than those who have lived in the region for along time because they tend to become highland cultivators. The Maasai remain lowland pastoralists, but are less likely than new arrivals to acquire grade cattle. Crop damage declined with distance from the reserve boundaries.

4.5 Factors Influencing Conflict

The previous section has presented a quantification of how often the local people encountered wildlife problems and how much losses they incurred due to wildlife damage. This section examines factors influencing wildlife-human conflict in Masai Mara region under the five headings: (1) overall causes of conflict, (2) population factors, (3) land use/environmental factors, (4) spatial and temporal factors, and (5) conflict management methods by the local people. Identification of the factors influencing conflict will help in the development of effective preventative management and policy strategies that can help in reducing the conflict.

4.5:1 Overview of Causes of Conflict

Respondents were asked about overall determinants of the conflict in the region. Their responses are classified in terms of population factors (increasing human, livestock or wildlife populations), land use issues (individualization of land, expanding cultivation and changing land use patterns) and wildlife-damage control. The largest number of the respondents (32.8%) cited increasing human population as the major cause of conflict, while 11.5% stated ineffective game control and restrictive conservation policies which had effectively excluded the local people from their traditional resources (Table 4.14). Overall, about 50% considered population change as the major cause, 38% indicated land use change and 13% indicated ineffective game control. Increased human numbers and changes in human activity are clearly seen as the major cause of conflict.

Table 4.14 Dominant Causes of Conflict in Masai Mara Region by Group Ranch

CAUSES OF CONFLICT**	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Population Changes						
Increasing human population	37 (40%)	46 (46.9%)	48 (43%)	54 (54.0%)	52 (52%)	237 (49%)
	83 (43.5%)		154 (29.7%)			
	24 (26%)	25 (25.5%)				
Increasing stock population	49 (25.8%)		38 (34%)	39 (39.0%)	38 (38%)	164 (33%)
	6 (6.6%)	6 (6.1%)	111 (37%)			
	12 (6.4%)					27 (5.0%)
Increasing wildlife numbers	7 (7.7%)	15 (15.3%)	8 (7.2%)	6 (6.0%)	1 (1.0%)	
			15 (4.7%)			
			2 (1.8%)	9 (9.0%)	13 (13.0%)	46 (9.0%)
			24 (7.6%)			
Land Use Changes						
Individuation of land	40 (49%)	37 (38.0%)	34 (34%)	34 (34.0%)	35 (35.0%)	180 (38%)
	77(43.5%)		103 (34.3%)			
	13 (14%)	12 (12.2%)	13 (12%)	15 (15.0%)	16 (16.0%)	69 (14%)
	25 (13.1%)		44 (14.3%)			
Changing land use patterns	13 (14%)	10 (10.2%)	7 (6%)	13 (13.0%)	11 (11.0%)	54 (11%)
	23 (12.1%)		31 (10.0%)			
	14 (15%)	15 (15.3%)	14 (13%)	6 (6.0%)	8 (8.0%)	57 (11%)
Expanding cultivation	29 (15.2%)		28 (9.0%)			
Game Control						
Ineffective game control	4 (4.7%)	7 (7.1%)	27 (18%)	12 (12.0%)	13 (13.0%)	63 (13%)
	11 (5.5%)		52 (14.3%)			
Total	81 (100%)	90 (100%)	109 (100%)	100 (100%)	100 (100%)	480 (100%)
	171 (100%)		309 (100%)			
Chi-squared = 50.735						

There was considerable variation between group ranches as to the major determinants of the conflict. For instance, many residents of the upland ranches (43.5%) believed that over-all population change was the most important factor, while 29.7% of the lowland ranches felt so. But more residents of the lowland (37.0%) felt human population increase was the single most important factor, while only 25.8% on the upland ranches felt so.

The interviews with government officials showed that 53.8% said increasing human population was the main cause of conflict but, in contrast, the majority (62.5%) of the wildlife conservation experts cited inappropriate policy as the main source (Table 4.15).

Table 4.15 Government Officials and Wildlife Conservation Expert Responses on Causes of Conflict

CAUSES/RESPONSES	GOVERNMENT OFFICIALS	WILDLIFE EXPERTS
Increasing human population	14 (53.8%)	2 (25%)
Changing land tenure system and land use patterns	7 (26.9%)	1 (12.0%)
Inappropriate conservation practices and policy	3 (11.5%)	5 (62.5%)
Others	2 (23.0%)	0 (0.0%)
Total	26 (100.0%)	8 (100.0%)

The experts' viewpoint is interesting as it reflects a recognition of the need to include the local people in wildlife conservation policy. Without local support, conservation efforts can not succeed. Government officials maintained the preservationists attitudes of blaming the local people. Thus from the government perspective the issue to be resolved is increasing human population.

4.5:2 Population Factors

The Masai Mara National Reserve is increasingly becoming an island of natural environment surrounded by a sea of man-altered environment. The open range for wildlife and pastoral uses is rapidly shrinking. This section examines the changing mosaic of human, livestock and wildlife populations' use of the land; as well as the general

environment and land use trends (including changes in agricultural practices). Background details on the demography and land use practices of the region, together with its physical characteristics, have been explained in chapter three. This information is essential in supporting decision on how to integrate wildlife conservation with human needs in the region. The changes are explored from the spatial and temporal perspectives. Data used emanated from KREMU and various reports on land uses, livestock, and wildlife populations of the region in the last 30 years.

4.5:3.2 Wildlife Population Changes

The populations of many wildlife species have changed a great deal in recent years (chapter 3) and residents are well aware of these changes: 87% of the respondents stated that the number of wildebeests had increased (Table 4.16) and 65% said that the elephant population had increased. According to wildlife experts, elephants have been driven northwards to the Mara region because of increased human activities and poaching in the northern regions of the Tanzanian Serengeti National Park (Dublin 1986; Lamprey 1984).

4.5:3 Land use/environmental changes

The future of Masai Mara region and the protected area will be determined to a large extent by changes in the patterns of land use. Findings documented in this section include perceived changes in the general environment and in land use. It is essential to understand the changes in land use and the issues of land tenure in order to put the nature and causes of the wildlife-human conflict in perspective. These are critical in designing integrated conservation projects for the region.

Table 4.16 Perceived Population Change of Sighted Wildlife by Group Ranch

WILDLIFE POPULATION CHANGE	UPLAND ZONE		LOWLAND ZONE			MARA REGION	REMARKS[19]
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA		
Wildebeest**							Increasing since 1960s
Increasing	70 (77%)	44 (44.9%)	79 (66%)	70 (70%)	60 (60%)	323 (68.2%)	
	114 (60.3%)		209 (65.3%)				
Decreasing	6 (7%)	19 (19.4%)	22 (20%)	2 (2%)	4 (4%)	53 (23%)	
	25 (13.2.9%)		28 (8.7%)				
Same (stable)	15 (16%)	35 (35.7%)	10 (9%)	28 (28%)	36 (36%)	124 (12%)	
	50 (26.5%)		74 (24.3%)				
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)						
Chi-squared 71.955				311 (100%)			
Elephant**							Increasing
Increasing	23 (26%)	11 (11%)	27 (24.3%)	25 (25%)	15 (15%)	91 (18%)	
	34 (18.5%)		67 (21.5%)				
Decreasing	55 (61%)	74 (76%)	82 (73.9%)	70 (70%)	75 (75%)	351 (70%)	
	129 (68.5%)		227 (73.0%)				
Same (stable)	13 (12%)	13 (12%)	2 (9.0%)	5 (5%)	10 (10.0%)	58 (12%)	
	26 (12.0%)		17 (8.0%)				
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)						
Chi-squared 23.767				311 (100%)			

[19] Studies of wildlife, especially ungulates in the Mara-Serengeti ecosystem have provided one of the longest time series of population data beginning in 1958 with Grzmek and Grzimek (1960), Darling (1960), Stewart and Talbot (1962) and Talbot and Talbot (1963). Censuses have been conducted on wildebeest, African buffalo, elephant, Zebra. Wildebeests and other species have increased. Details of these censuses are presented in chapter three and match relatively well with the respondents perceived increase. One increase, perceived by the respondents, that could be questionable was that of elephants, but scientific findings indicate that although elephant population has decreased in Mara-Serengeti ecosystem, the population have increased in Mara region due to extensive poaching and expanding human activities in northern and western Serengeti.

Zebra*** Increasing	21 (23%)	11 (11%)	62 (56%)	57 (57%)	55 (55%)	310 (62%)	Stable
	43 (27.0%)		174 (55.9%)			
Decreasing	62 (68%)	75 (76%)	18 (16%)	9 (9%)	4 (4%)	137 (27%)	
	127 (72.0%)		31 (10.0%)			
Same (stable)	8 (9%)	12 (12%)	31 (28%)	34 (34%)	41 (41%)	53 (11%)	
	20 (10.5%)		106 (34.0%)			
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)			311 (100%)		
Chi-squared 169.099							
Buffaloes*** Increasing	41 (46%)	43 (44%)	64 (58%)	79 (79%)	82 (82%)	207 (41%)	Stable Increasing
	84 (45.0%)		225 (72.3%)				
Decreasing	39 (43%)	51 (52%)	44 (40%)	3 (3%)	10 (0.0%)	167 (33%)	
	90 (47.5%)		57 (18.3%)				
Same (stable)	11 (11%)	4 (4%)	3 (3%)	18 (18%)	8 (0.0%)	126 (25%)	
	15 (7.5%)		29 (9.3%)				
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)			311 (100%)			
Chi-squared 231.495							
Other Ungulates*** Increasing	13 (13%)	14 (14%)	34 (31%)	60 (60%)	56 (56%)	176 (35%)	Stable
	27 (13.5%)		150 (48.2%)				
Decreasing	60 (67%)	63 (64%)	16 (14%)	3 (3%)	4 (4%)	146 (29%)	
	123 (70.5%)		23 (7.4%)				
Same (stable)	18 (20%)	21 (21%)	61 (55%)	37 (37%)	40 (40%)	178 (36%)	
	39 (20.5%)		138 (44.4%)				
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)			311 (100%)			
Chi-squared 227.348							
Lion Increasing	39 (43%)	51 (52%)	47 (42%)	40 (40%)	40 (40%)	224 (45%)	Increasing
	90 (42.5%)		127 40.8%)				
Decreasing	41 (44%)	34 (35%)	49 (44%)	40 (40%)	39 (39%)	202 (40%)	
	75 (39.5%)		128 (41.1%)				
Same (stable)	11 (12%)	13 (13%)	15 (14%)	20 (20%)	21 (21%)	74 (15%)	
	24 (12.6%)		56 (18.0%)				
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)			311 (100%)			
Chi-squared 4.193							

Leopard **			53 (48%)	70 (70%)	56 (56%)	250 (51%)	Stable
Increasing	35 (39%)	38 (39%)		179 (57.6%)		
	73 (39.0%)		43 (39%)	27 (27%)	29 (29%)	192 (38%)	
Decreasing	43 (48%)	50 (51%)		99 (31.8%)		
	93 (49.5%)		15 (14%)	3 (3%)	15 (15%)	58 (11%)	
Same (stable)	13 (13%)	10 (10%)		33 (10.6%)		
	23 (11.5%)		111 (100%)	100 (100%)	100 (100%)	500 (100%)	
Total	91 (100%)	98 (100%)				
	189 (100%)			311 (100%)		
Chi-squared 35.414						
Other Predators**						
Increasing	13 (14%)	16 (16%)	44 (40%)	57 (57%)	52 (52%)	182 (36%)	Increasing
	29 (15.0%)		153 (49.1%)				
Decreasing	72 (80%)	69 (70%)	33 (30%)	34 (34%)	37 (37%)	245 (49%)	
	141 (75.0%)		104 (33.4%)				
Same (stable)	6 (6%)	13 (13%)	34 (31%)	9 (9%)	11 (11%)	73 (15%)	
	19 (9.5%)		54 (17.4%)				
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)						
Chi-squared 110.066				311 (100%)			
Baboons**						
Increasing	68 (76%)	59 (60%)	58 (52%)	45 (45%)	48 (48%)	278 (56%)	Stable
	127 (68.0%)		151 (48.6%)				
Decreasing	8 (8%)	10 (10%)	24 (24%)	25 (25%)	22 (22%)	90 (18%)	
	18 (6.0%)		71 (22.8%)				
Same (stable)	15 (17%)	29 (30%)	28 (25%)	30 (30%)	30 (30%)	132 (26%)	
	44 (28.5%)		88 (28.3%)				
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)	
	189 (100%)						
Chi-squared 29.980				311 (100%)			

4.5:3.1 Perceived changes in the general environment

> The environment of this place has changed a great deal. When I first came here in 1958, we could horse ride all the way to Kericho, then there were numerous wildlife, rhino, elephant, the vegetation was dense. Today, just a handful of wild animals, instead all you see are mushrooming permanent human settlements (Wildlife consultant to Narok County Council (which includes the study area), Dr. David Roundturner (W.E 01).

Human actions are substantially altering the natural landscape of the Masai Mara region. Respondents were asked to comment on changes in the nature of vegetation cover change, on their own land use ownership and use and on changes in the number of homesteads. The majority report vegetation as less dense (97%) now than in 1960, and virtually everyone expects much lower density in the future (Table 4.17).

4.5:3.2 Changes in Land Use and Tenure System

The land tenure system has changed in the Masai Mara region in a number of ways and this has influenced the use of the land and, therefore, wildlife conservation. During the colonial times most of the Masai Mara land was used communally although with defined sections (Galaty 1992). Through various treaties the Maasai land was greatly reduced (Arhem 1985; Sindiga 1984). With the introduction of the group ranch concept in 1969, much of the region was organized into group and individual ranches. Initially many of the individual ranches were confined to the areas of high agricultural potential but with an increasing human population, more arid regions were being settled even though the ranches had not formally been subdivided.

Significant differences are evident in land use and tenure between upland and lowland ranches: in the lowland virtually all land was held as group ranches while in the highlands almost 80% was private. The majority of people in the lowland practised very little cultivation and human densities were as low as 6-10 persons per sq. km., compared with 25-45 people per sq. km. in the upland high agricultural areas (Douglas-Hamilton 1988). With individual private ownership, more land is fenced limiting communal grazing (See Plates 4.1 and 4.2). As a result, livestock have limited grazing areas and compete more severely with

Plate 4.1 Traditional range grazing system - unfenced

Plate 4.2 Fenced range for cattle grazing in Kimentet Group Ranch, especially for grade cattle

wildlife. Thirty-two percent indicated that the land they were living on was individual, privately owned, while 68% reported that it was communal[20]. All the respondents believed that the number of homesteads had increased.

Table 4.17 Perceived Changes in the General Environmental by Group ranch and Zone

CHANGES IN THE ENVIRONMENT	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
1960: Vegetation						
Very Dense	67 (75%)	76 (77%)	87 (85%)	83 (83%)	85 (85%)	400 (80%)
	143 (75.7%)		255 (81.9%)			
Dense	23 (25%)	22 (23%)	24 (26%)	17 (17%)	15 (15%)	99 (19.8%)
	45 (23.8%)		56 (18.1%)			
Less Dense	1 (1%)	0 (0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.2%)
	1 (0.5%)		0 (0.0%)			
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)
	189 (100%)		311 (100%)			
Chi-squared 3.777						
1991: Vegetation						
Very Dense	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	13 (3.0%)
	0 (0.0%)		0 (0.0%)			
Dense	3 (2%)	3 (3.0%)	0 (0.0%)	6 (6.0%)	1 (1.0%)	0 (0.0%)
	6 (3.2%)		7 (2.3%)			
Less Dense	88 (98%)	95 (97%)	111 (100%)	94 (94%)	99 (99%)	487 (97%)
	183 (96.8%)		304 (97.7%)			
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)
	189 (100%)		311 (100%)			
Chi-squared 4.515						
2021: Vegetation						
Very Dense	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	0 (0.0%)		0 (0.0%)			
Dense	0 (0.0%)	0 (0.0%)	3 (3%)	2 (2.0%)	5 (5.0%)	10 (2%)
	0 (0.0%)		10 (3.2%)			
Less Dense	91 (100%)	98 (100%)	108 (97%)	98 (98%)	95 (95%)	490 (98%)
	189 (100%)		301 (96.8%)			
Total	91 (100%)	98 (100%)	111 (100%)	100 (100%)	100 (100%)	500 (100%)
	189 (100%)		311 (100%)			
Chi-squared 1.877						

[20] Previous studies have explained how group ranches, especially those under private title are being subdivided into unequal individual family holdings (Galaty 1992; Kituyu 1991). The individual land holders sell portions of their land in the open market usually to immigrants. Galaty (1992) found that over 40% of individualized land in two areas had been lost by sale to non-Maasai. Even pressures to subdiv'de group ranches are promoted by non-Maasai who have acquired although without title deeds and fearing they may loose fight for the subdivision to receive the deeds.Most land bought are hardly developed and are held largely for speculation and collateral. Researchers (Galaty 1992) and Maasai alike have called upon the Government to revoke the group ranch Representative legislation under which individualization occurs encouraging subdivision. These calls may be late as during the field work of this study pressures were mounting and survey for subdivisions were in process in some ranches.

Sub-division of land into private individual ownership was increasing, although a number of people, especially elderly members were against it. Many believe that subdivision will reduce land available for grazing which will also affect wildlife. As one resident of Kimentet noted:

> With the sub-division, there will be fencing and wildlife will have no room. Even our cattle will not have enough space to move around. It is good for everyone to have his/her piece of land, but in this place, it will really restrict grazing (L.R. 03).

Human settlement patterns have changed a great deal in many parts of rangeland Kenya. More permanent homesteads have been constructed. Traditionally, there were mainly temporary settlements under the semi-nomadic pastoralism. Then, the Maasai lived in temporary villages, "bomas". Today, although the majority of homesteads are still of the traditional type (see Plate 4.3), increasingly modern permanent settlements are being constructed as people become sedentary (Plate 4.4). This trend changes the equation of range use by wildlife and humans.

Respondents were asked to state whether the number of permanent settlements had increased in the area where they lived (for immigrants since they first came to the area). The overwhelming majority (94.4%) said yes, only 5.6% said no, meaning it had remained the same. Almost all of those saying the population had remained the same were in Lemek, Koyaki and Siana areas. The traditional boma consists of a circular fence made of thorn bushes surrounding a series of huts made of wattle, mud, and dung. The livestock are driven inside the boma fence each evening and herded out to graze each day. The thorn fence keeps the livestock from straying and, provides protection against wildlife. The sites of villages were determined primarily by the availability of water and grazing and wildlife predation (Talbot 1990; Western 1976). Two or more times a year, when the rains start the Maasai move to the wet-season grazing grounds, and in the dry season they return to their permanent sources of water. Bomas may be reused for many years or may be abandoned, in which case the new one is usually built nearby. In the past there were no fences - the requirements for nomadic grazing precluded them - but each group of Maasai had

Plate 4.3 Common Maasai manyatta. Most are fenced with twigs but some are not. One of the reasons for fencing is to provide protection from wildlife to both humans and livestock, especially at night.

Plate 4.4 Modern homesteads with green corrugated roofs that blend with the environment.

recognized grazing areas and established dry-season water sources (Galaty 1981).

4.5:4 Spatial and Temporal Factors

This section examines temporal variations at seasonal and daily time scales, and geographic influences upon conflict including: (1) variations of conflict intensity according to season, and (2) time of day, and (3) variation of conflict according to distance from the reserve, and (4) geographical area. Understanding the temporal and geographic dimensions of the conflicts is essential to designing time and area specific conflict preventative and mitigative measures.

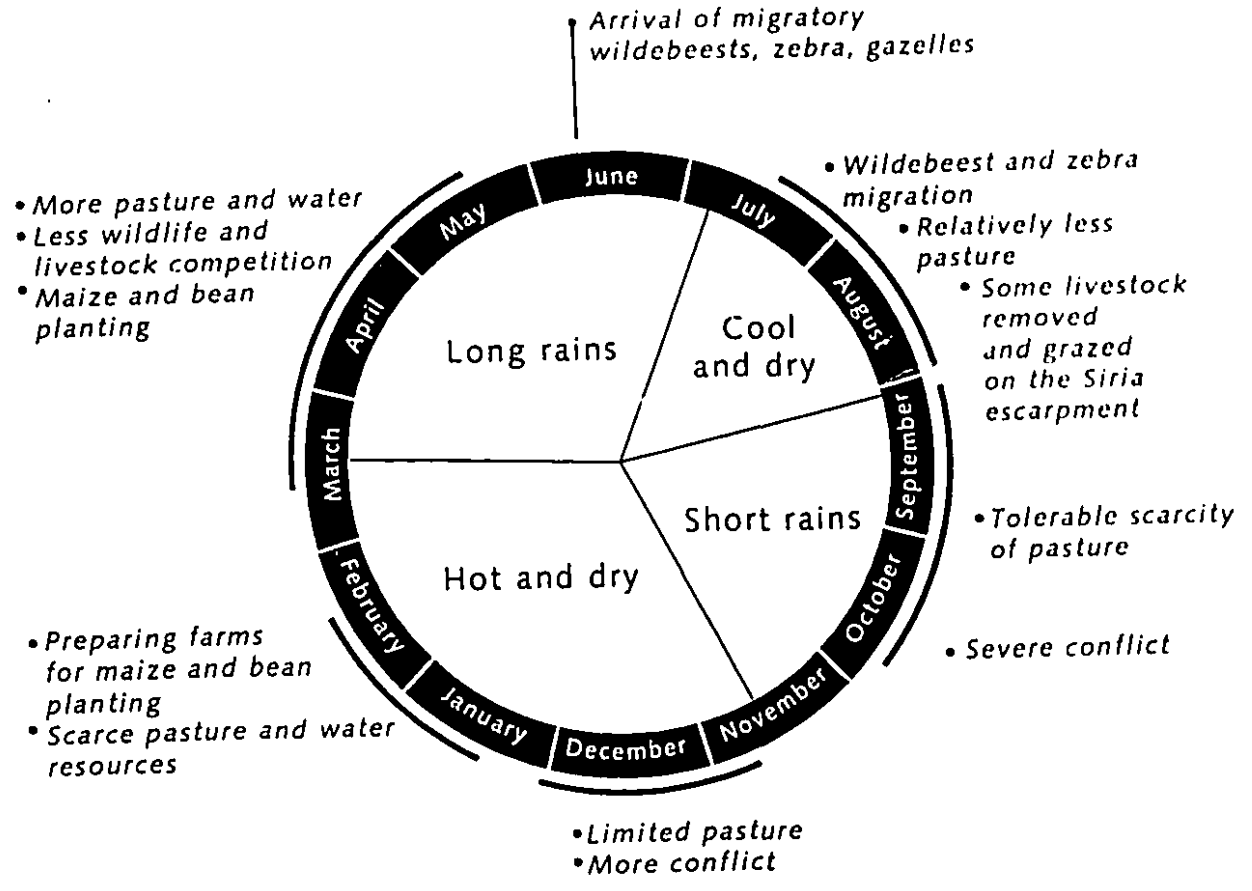
4.5:4.1 Seasonality and Time of Occurrence of Conflict

The intensity of conflict varies with season (wet or dry). When asked to indicate during which seasons the conflict was most severe, 76% indicated dry season when pasture and water were scarce. This was true for all forms of conflict except crop damage which was more evenly spread throughout the year, but reportedly more intense in the wet season (Table 4.18). Drought conditions could result from wildlife staying in well-watered areas close to human settlements or where cattle graze. Contact between wildlife and humans (and livestock as well) probably becomes more frequent during droughts therefore and increases the probability of conflict. At the same time, it is during droughts that wildebeest and other cattle migratory species move into Masai Mara region from Tanzania (Figure 4.1). As one local resident of Koyaki observed:

> During drought, there is not enough pasture and water down here (lowland) and competition becomes very severe. So we take our cattle up the escarpment. Also when the wildebeests move in we move out. They clear all the pasture and spread diseases to cattle, so we have to avoid them (LR 04).

The cattle from the lowlands were often moved to the areas above the Siria Escarpment during June to October, the dry period. With the expanding development, this practice was becoming impossible. Wildlife movement is also seasonal with different species appearing in different areas at different times of year. For example, the most

Figure 4.1 Schematic Representation of the Resource Use Cycle in Masai Mara Region



destructive species, elephant and lion, are much more likely to be encountered in the wet season. For most species the distribution is less seasonal in Koyaki and Siana than in the other ranches. This suggests that proximity to the reserve, less extensive land uses, or the basic physical differences in habitat, make the lower ranch areas more open to wildlife throughout the year. Respondents were asked to state the kind of animals they see within[21] 3 km of the homesteads. The majority saw wildebeests and zebras. In Kimentet and Angata Baragoi (basically agricultural areas), animals seen were mostly smaller mammals, dik dik, porcupine, bush-pig, baboons and monkeys. Large mammals were seen only occasionally,

[21] The area of land used most was defined as about 3 km radius around the homesteads. While Maasai move over a wide area, especially during drought, current trend of sedentarization restricts them to specific areas for most of the year.

Table 4.18 Seasonal Variations of Conflict Intensity by Group Ranch and Zone

CONFLICT SEASONALITY	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
General Conflict**						
Dry	46 (57%)	60 (67%)	62 57%	70 70%	55 55%	293 76%
	106 (62%)		187 (60.7%)			
Wet	8 (10%)	13 (14%)	17 16%	14 14%	13 13%	122 24%
	21 (12%)		44 (14.3%)			
Both	27 (33%)	17 (19%)	30 27%	16 16%	33 33%	65 6%
	44 (26%)		79 (25.3%)			
Total	81 (100%)	90 (100%)				480 100%
	171 (100%)		109 (100%)	100 100%	100 100%	
Chi-squared 13.413			309 (100%)			
Livestock Predation***						
Dry	52 64%	54 (60%)	60 55%	49 49%	49 49%	260 52%
	106 (62%)		158 (51.0%)			48 14%
Wet	27 33%	26 29%	22 21%	43 43%	45 45%	172 34%
	53 (31%)		110 (36.3%)			
Both	2 3%	10 11%	27 24%	8 8%	6 6%	480 100%
	12 (7%)		41 (12.7%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	
	171 (100%)		309 (100%)			
Chi-squared 35.678						
Crop Destruction**						
Dry	26 32%	31 34%	36 33%	38 38%	27 27%	157 31%
	57 (33%)		101 (13.7%)			222 44%
Wet	40 49%	40 45%	45 41%	41 41%	56 56%	101 20%
	80 (47%)		142 (46.0%)			
Both	15 19%	19 21%	28 26%	21 21%	17 17%	480 100%
	34 (20%)		66 (22.0%)			
			109 100%	100 100%	100 100%	
Total	81 100%	90 100%	309 (100%)			
	171 (100%)					
Chi-squared: 7.164						

Human Deaths/Injuries* **					
Dry	38 47%	59 65%	67 61%	71 71%	72 72%	337 67%
		97 (56%)		210 (68.0%)		29 6%
Wet	16 20%	10 11%	12 11%	8 8.0%	14 14%	114 23%
		36 (15.5%)		34 (11.0%)		
Both	27 33%	21 24%	30 28%	21 21%	14 14%	
		48 (28.5%)		65 (21.0%)		480 100%
Total						
	81 100%	90 100%	109 100%	100 100%	100 100%	
Chi-squared 32.939		171 (100%)				
				309 (100%)		
Others**						
Dry	46 57%	47 52%	60 55%	52 52%	66 66%	110 22%
		93 (54.5%)		178 (57.8%)		
Wet	15 19%	15 17%	23 21%	12 12%	24 24%	261 52%
		30 (18%)		59 (19.0%)		
Both	20 25%	28 31%	26 24%	36 36%	10 10%	40 8%
		48 (28%)		72 (23.3%)		
			109 100%	100 100%	100 100%	
Total	81 100%	90 100%		309 (100%)		480 100%
		171 (100%)				
Chi-squared 8.521 14.028						

especially during severe droughts. Lion, leopard and hyaena, however, occurred in riverine and isolated bushes. In Lemek, Koyaki and Siana, mainly wildebeest, zebra and other plains game (impalas, Grant's and Thompson's gazelles) were seen. Elephant, buffalo, lion, leopard and hyaena were also sighted frequently. Responses on seasonality of conflict varied significantly among group ranches.

The intensity of conflict also varied with time of day. Sixty-three percent of respondents said most conflict occurred at night (Table 4.19). Night-time conflict involved crop damage, livestock depredation and attacks on humans. Crop destruction along river valleys, for instance, by hippopotamus, occurred mostly at night when the hippos come out of the water. Competition for pasture occurred both during the day and night. However, many attacks on humans occurred when trying to fight-off predators from livestock or when walking outside the "bomas". As one resident of Siana observed:

> At night, few people would risk walking out of the "bomas". You are likely to be attacked by the wild animals. But if you have to, you must be at least two people and be fully armed....sometimes it is inevitable that one has to go out at night like when somebody is sick. You see, there are so many inconveniences caused to us by wildlife in this area which the government does not consider as problems (L.R.05).

The finding that wildlife damage most occurs at night implies that the incidents occurred inside the "boma". Most predators (lions, spotted hyenas) are normally nocturnal (Kruuk 1972; Schaller 1976). Although no information was collected, other circumstances during which people have been killed or injured by wildlife include the herding of livestock, harvesting crops in daylight, collecting firewood, walking through the bush or riding a bike. In rare cases some victims have lost their lives to wildlife by spending the nights out, especially after drinking and being unable to return home. No information was collected on the sex of the different wildlife species responsible for the various damage. For instance, is it the lion or the lioness that attacks the most, or the bull elephants that destroy crops

Table 4.19 Time of Occurrence of Conflict by Group Ranch

TIME OF CONFLICT	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
General conflict* **						
Night	40 44%	60 61%	77 69%	80 80%	73 73%	330 63%
	100 (58.5%)		230 (74.0%)			
Day	29 32%	21 21%	26 23%	14 14%	20 20%	110 30%
	50 (29.2%)		50 (19.0%)			
Both	12 12%	9 9%	6 5%	6 6%	7 8%	40 7%
	21 (12.3%)		20 (7.0%)			
						480 100%
Total	81 100%	90 100%	109 100%	100 100%	100 100%	
	171 (100%)		309 (100%)			
Chi-squared 20.928						
Livestock predation* **						
			57 51%	52 52%	56 56%	232 46%
			165 (53.4%)			
Night	37 41%	45 46%	36 32%	20 20%	10 10%	188 37%
	82 (48.0%)		66 (21.3%)			
Day	20 22%	24 25%	16 14%	28 28%	35 35%	60 12%
	44 (25.8%)		79 (25.6%)			
Both	24 25%	21 21%				
						480 100%
Total	81 100%	90 100%	109 100%	100 100%	100 100%	
	171 (100%)		309 (100%)			
Chi-squared: 90.167						
Crop Destruction* **						
Night	64 71%	74 76%	96 87%	76 76%	73 72%	382 76%
	138 (80.7%)		234 (75.7%)			
Day	1 1%	1 1%	3 2.8%	24 24%	29 29%	87 17%
	2 (1.2%)		56 (18.1%)			
Both	16 18%	15 15%	10 9%	0 0%	0 0%	11 2%
	31 (18.1%)		10 (3.2%)			
						480 100%
Total	81 100%	90 100%	109 100%	100 100%	100 100%	
	171 (100%)		309 (100%)			
Chi-squared:57.882						

Human Deaths* **						
Night	37 42%	47 48%		59 53%	58 58%	53 53%	254 51%
	84 (49.1%)			170 (55.0%)		
Day	16 17%	19 19%		18 16%	12 12%	20 20%	169 34%
	35 (20.5%)			50 (16.2%)		
Both	28 31%	24 25%		32 29%	30 30%	28 28%	57 11%
	52 (30.4%)			90 (29.1%)		
Total	81 100%	90 100%		109 100%	100 100%	100 100%	480 100%
Chi-squared 77.837	171 (100%)			309 (100%)		
Others						
Night	45 48%	52 53%		62 56%	67 67%	72 72%	321 66%
	97 (56.7%)			201 (65.0%)		
Day	13 14%	10 10%		23 21%	8 8%	4 4%	135 28%
	23 (13.5%)			35 (11.3%)		
Both	23 38%	28 29%		24 23%	25 25%	24 24%	24 5%
	51 (29.9%)			73 (23.6%)			480 100%
Total	81 100%	90 100%		109 100%	100 100%	100 100%	
	171 (100%)			309 (100%)			
Chi-squared: 63.123							

often. Sometimes livestock depredation or attacks on humans may be attributed to individual animals at a given geographical area. Such knowledge is crucial for specific management strategies. It is known for instance that female elephants with calves or lone buffaloes will charge on sight. One getting into a herd of elephants can hardly escape an attack if the elephants have calves. Local people also have enormous survival skills. For instance, they know elephants have poor visibility and smell, and can easily dodge possible death.

4.5:4.2 Locational Factors

The degree of wildlife-human competition varies geographically redundant depending largely upon resource distribution and distance from major wildlife concentrations. When asked to indicate areas where conflict was most likely to occur, 48% of the respondents identified areas closer to the protected area, 23% stated areas around sources of water (Table 4.20). One local resident of Lemek observed:

> There are some areas where you go prepared for anything, because they are preferred by species like buffalo or lion. For instance, in some bushy areas, the chances of being attacked are very high (L.R. 06).

It is clear that proximity to the park (or migratory routes) influences the frequency of conflict. Disease transmission and competition for resources are less affected by distance.

Table 4.20 Spatial Patterns of Conflict by Group Ranch

SPATIAL PATTERN OF CONFLICT	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
General conflict* **						
Close to reserve	39 43%	38 39%	43 39%	44 44.0%	50 50.0%	237 48.0%
	77 (41.0%)		137 (44.3%)			
Water sources	23 26%	22 22%	34 31%	31 31.0%	28 28.0%	110 23.0%
	45 (24.0%)		93 (30.1%)			
Wildlife routes	11 12%	20 20%	22 20%	17 17.0%	12 12.0%	83 17.0%
	31 (16.0%)		51 (16.5%)			
Forested areas	8 8%	9 10%	9 8%	8 8.0%	10 10.0%	43 9.0%
	17 (9.0%)		27 (8.7%%)			
Other places	0 0%	1 1%	1 1%	0 0.0%	0 0.0%	14 3.0%
	1 (0.5%)		1 (0.3%)			
Total						480 100%
	81 100%	90 100%	109 100%	100 100%	100 100%	
Chi-squared: 228.471	171 (100%)		309 (100%)			
Livestock predation* **						
Close to reserve	12 13%	20 20%	31 28%	32 32.0%	22 22.0%	202 42%
	32 (11.5%)		85 (27.5%)			141 29%
Water sources	25 28%	36 38%	3 3%	3 3.0%	47 47.0%	72 15%
	61 (33.0%)		53 (17.2%)			54 12%
Wildlife routes	5 4%	32 34%	44 40%	40 40.0%	29 29.0%	11 2%
	37 (19.0%)		113 (36.6%)			
Forested areas	38 42%	2 2%	31 28%	25 25.0%	2 2.0%	480 100%
	40 (22.0%)		58 (18.8%)			
Other places	1 1%	0 0%	0 0%	0 0.0%	0 0.0%	
	1 (0.5%)		0 (0.0%)			
Total			109 100%	100 100%	100 100%	
	81 100%	90 100%	309 (100%)			
	171 (100%)					
Chi-squared: 164.062						

Crop Destruction*						
Close to reserve	24 27%	49 (31.5%)	35 36%	53 48%	34 34.0% 135 (43.7%)	48 48.0% 197 41%
Water sources	38 46%	85 (47.0%)	47 48%	45 41%	33 33.0% 129 (41,7%)	51 51.0% 114 24%
Wildlife routes	15 17%	20 (11.0%)	5 5%	9 8%	19 19.0% 29 (9.4%)	1 1.0% 87 18%
Forested areas	4 4%	7 (2.5%)	3 3%	2 2%	14 14% 16 (5.2%)	0 0.0% 67 14%
Other places	0 0%	0 (0.0%)	0 0%			
Total	81 100%	171 (100%)	90 100%	109 100%	100 100% 309 (100%)	100 100% 480 100%
Chi-squared: 15.783						
Human Deaths/Injuries**						194 40%
Close to reserve	34 38%	56 (30.0%)	22 22%	47 42%	38 38.0% 125 (40.4%)	40 40.0% 102 21%
Water sources	4 4%	30 (15.5%)	26 27%	13 12%	19 19.0% 53 (17.2%)	21 21.0% 89 18%
Wildlife routes	33 38%	67 (36.5%)	34 35%	47 42%	35 35.0% 114 (36.9%)	32 32.0% 52 11%
Forested areas	10 11%	8 (4.0%)	8 8%	2 3%	8 8.0% 17 (5.5%)	7 7.0% 43 10%
Other places						
Total	81 100%	171 (100%)	90 100%	109 100%	100 100% 309 (100%0	100 100% 480 100%
Chi-squared:41.997						
Others***						
Close to reserve	7 8%	22 (11.5%)	15 15%	32 33%	13 13.0% 49 (15.9%)	4 4.0% 173 36%
Water sources	16 18%	55 (25.5%%)	39 43%	23 24%	43 43.0% 117 (37.9%)	50 50.0% 95 20%
Wildlife routes	22 24%	54 (28.5%)	32 33%	28 29%	11 11.0% 63 (20.3%)	24 24.0% 71 15%
Forested areas	35 39%	39 (22.0%)	4 5%	26 27%	33 33.0% 81 (26.2%)	22 22.0% 43 9%
Other places	1 1%	1 (0.5%)	0 0%			98 20%
Total	81 100%	171 (100%)	90 100%	109 100%	100 100% 309 (100%)	100 100% 480 100%
Chi-squared 57.882						

4.5:4.2:1 Distance From Protected Area

Wildlife-human conflict varies with distance from the wildlife concentration area. The mean perceived distance of respondents from the protected area was about 19.7 km. (a median of 15 Km, minimum 1 km, maximum 55 km.) (Table 4.21). In fact, from field observations, it appeared that some residents were within the park boundary as there were no clear cut marks.

Table 4.21 Distance (km) of Respondents from Protected Area by Group ranch

DISTANCE***	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Minimum	2	2	6	1	1	1
	2			2.7		
Maximum	18	45	55	51	47	55
	26.5			51		
Mean	8	17	32.6	18	19	19.7
	22.5			23.2		
Standard Dev.	3.5	9.4	12.4	15.3	14.2	14.1
	6.5			10.8		

N = 500, "F" = 54.877

4.5:5 **Management of Conflict**

This section examines how local people managed or prevented conflict and how effective they believed their actions were. Knowledge of the local peoples' wildlife-damage control tactics could be useful in designing appropriate programs for reducing the conflict.

4.5:5.1 Present Conflict Control Actions

Forty-six percent of Masai Mara residents fenced their property to protect them from wildlife depredation, some reported to the government, while others scared the animals away (Table 4.22). Local residents of the Masai Mara region employed a wide variety of methods to control wildlife including construction of twigs and barbed wire fences (Plate 4.5), erecting scarecrows (sometimes human effigies), chasing wildlife with dogs and/or

posting guards, contacting wildlife officers, hanging tin cans, making noise, beating drums and using fires and spotlights. Many complained that wildlife officers do not come in time to help. The posting guards was employed primarily in the upland ranches amongst the agricultural areas, the non-Maasai communities. This may mean that Maasai provided their own guards. For livestock, especially for goats and cattle, special fences were constructed whereby tall poles which could not easily be climbed by wildlife (lion and leopards) were used (Plates 4.6). Fencing was also used for newly cultivated areas (Plate 4.7) and to separate wildlife areas and spread of cultivation (Plate 4.8). Surprisingly, not very many residents of Masai Mara reported to the wildlife officers for help. This may be a reflection of the little help they get from from wildlife authorities while in danger.

Table 4.22 Measures Taken to Prevent or Control Wildlife Problems by Group Ranch

CONTROL MEASURES**	UPLAND ZONE			LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET		LEMEK	KOYAKI	SIANA	
Fencing	48 52.2%	33 33.7%	81 (47.4%)	51 45.9%	30 30%	46 46% 127 (41.1%)	208 46.0%
Killing	3 3.9%	14 14.4%	17 (9.9%)	5 4.5%	19 19%	16 16% 40 (12.9%)	71 14.2%
Scaring the animals	7 7.7%	15 15.3%	22 (12.9%)	2 1.8%	16 16%	11 11% 29 (9.4%)	51 10.2
Reporting to Authority	21 25.3%	24 24.5%	45 (26.3%)	26 23.4%	19 19%	14 14% 59 (19.1%)	106 21.2%
Others	2 2.4%	4 4.1%	6 (3.5%)	25 24.3%	16 16%	13 13% 54 (17.5%)	64 12.8%
Total Chi-squared: 108.034, P<.001	81 100.0%	90 100%	171 (100%)	109 100%	100 00%	100 100% 309 (100%)	480 100%

Fencing was the most common action taken by the local people against wildlife problems. These included fencing homesteads, farms, and livestock "bomas". Considerable variation exists between group ranches as to the type of action taken in controlling wildlife. Whereas fencing was common in both the pastoral and farming areas, scaring of wildlife

Plate 4.5 Barbed wire fence around a wheat farm in Lemek group ranch with white strip of cloth on top. The piece of cloth is believed to scare wildlife a way but sometimes may attract them. The fence is made of twigs and local poles.

Plate 4.6 A Cattle corral made of tall poles often imported into the region. They are constructed inside or outside the bomas and often communally used.

was done primarily in agricultural ranches, while night-guarding was common in the predominantly pastoral areas. The actions grouped under other categories included killing wild animals, separation or avoiding, self-arming against animals, home structure arrangements whereby the livestock corral is located at the central position of the manyatta to ensure effective guarding, and the sighting of homestead locations in areas less frequented by wildlife. Separation or avoidance was practised mostly by the pastoralists who often removed their livestock from wildebeests areas to avoid contracting disease. It is widely believed among the pastoralists that wildebeests spread malignant catarrh to livestock.

Most of these actions, for example, fencing off the farms or homesteads, scaring wildlife away and killing them, either displace wildlife, block their migratory routes or eliminate them. The actions taken depend on the wildlife problem. Some people report maintaining a 24-hour guard in their manyattas against wildlife. Special structures are constructed to prevent leopards from attacking goats (Plate 4.3).

4.5:5.2 Effectiveness of the Local Wildlife-Damage Control Actions

Usually effectiveness of the method depended on the property fenced and the wildlife species excluded. Smaller species such as monkeys, dik dik proved difficult to effectively exclude through fencing. When respondents were asked to state whether the action they had undertaken was effective, 42% indicated that they were effective (Table 4.23). Concerning fencing, 46% said fencing could be very effective. The success of local people in controlling wildlife damage was mixed. Many of the local people reported having problems with wildlife, almost all tried to deter wildlife in some way. Although some methods were effective in deterring some wildlife, none worked in preventing elephants from destroying crops. Game rangers could scare elephant by firing shots in the air or by firing with shot guns at their rumps, but this usually just resulted in the elephants moving to neighbouring farms.

Plate 4.7 Conventional fence of twigs used to protect corn field in Lemek group ranch.

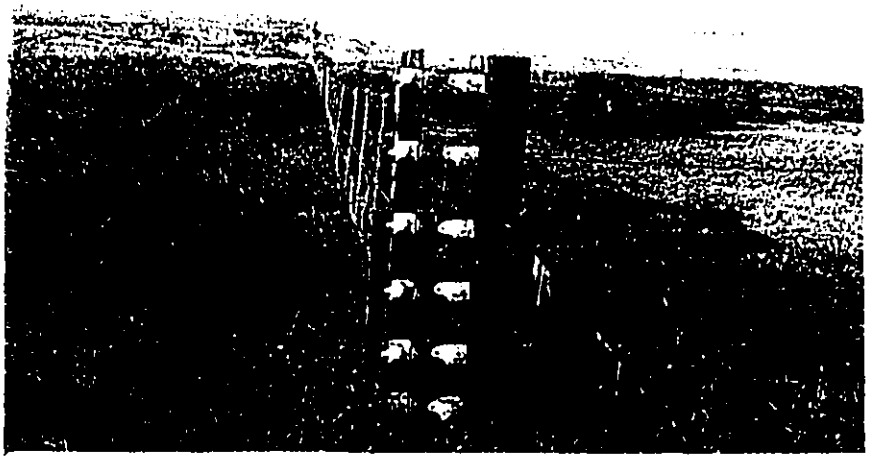


Plate 4.8 An electric solar powered fence constructed in 1983 to separate wildlife and agricultural development in Lemek group ranch. This is a more effective deterrent than the conventional ones but more lethal to wildlife.

Table 4.23 Degree of Effectiveness of the Actions Taken to Control Conflict by Group Ranch

Effectiveness	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Are they Effective?***						
Yes	37 45.7%	44 45%	41 40%	42 42%	47 47%	211 42%
	81 (47.4%)		130 (43.0%)			
No	44 54.3%	46 48%	68 61%	58 58%	53 53%	269 58%
	91 (53.2%)		179 (57.3%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	480 (100%)
	171 (100%)		309 (100%)			
Chi-squared: 3.306, P=.508						
Fencing**						
Not Effective	4 6.2%	11 11%	29 26%	3 3%	1 1%	19 5%
	15 (8.8%)		33 (10.0%)			
Less effective	21 25.9%	29 30%	54 49%	34 34%	27 27%	158 32%
	50 (29.2%)		115 (36,7%)			
Effective	36 44.4%	41 42%	24 22%	51 51%	54 54%	229 46%
	77 (45.0%)		129 (42.3%)			
Very effective	20 24.7%	10 10%	2 2%	12 12%	9 9%	74 14%
	30 (17.5%)		23 (7.7%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	480 100%
	171 (100%)		309 (100%)			
Chi-squared: 167.054, P=.000						
Scaring Wildlife Away***						
Not Effective	39 48.1%	24 25%	36 32%	36 36.0%	36 36.0%	171 34%
	63 (36.8%)		108 (34.7%)			
Less effective	18 22.2%	25 26%	19 17%	21 21.0%	24 24.0%	107 21%
	43 (25.1%)		64 (20.7%)			
Effective	16 19.8%	33 34%	42 38%	34 34.0%	36 36.0%	159 32%
	49 (28.7%)		112 (36.0%)			
Very effective	8 9.9%	9 9%	12 11%	9 9.0%	5 5.0%	43 9%
	17 (9.9%)		26 (8.3%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	480 100%
	171 (100%)		309 (100%)			
Chi-squared: 19.858, P=.070						

Reporting to Authority**										
Not Effective	52 58%		48 49%		63 57%	56 56.0%		53 53.0%		272 54.0%
		100 (58.5%)				173 (54.7%)				
Less effective	16 18%		19 19%		13 12%	18 18.0%		20 20.0%		86 17.0%
		35 (20.5%)				51 (17.7%)				
Effective	11 12%		24 25%		33 30%	26 26.0%		28 28.0%		122 24.0%
		35 (20.5%)				87 (28.0%)				
Very effective	0 0%		0 0%		0 0%	0 0.0%	0 0.0%			0 0%
		0 (0.0%)				0 (0.0%)				
Total	81 100%		90 100%		109 100%		100 100%		100	
Chi-squared: 11.166, P=.193		171 (100%)				309 (100%)			100%	480 100%
Others**										
Not Effective	31 34%		21 21%		27 24%	26 26.0%		32 32.0%		107 27.0%
		52 (30.4%)				85 (27.3%)				
Less effective	17 19%		26 27%		30 27%	26 26.0%		17 17.0%		116 23.0%
		43 (25.1%)				73 (23.3%)				
Effective	19 21%		30 31%		37 33%	34 34.0%		39 39.0%		159 32.0%
		49 (28.7%)				100 (35.3%)				
Very effective	12 13%		14 14%		15 14%	14 14.0%		13 13.0%		68 14.0%
		26 (15.2%)				42 (13.7%)				
Total	81 100%		90 100%		109 100%		100 100%		100	
Chi-squared:12.438, P=.411		171 (100%)				309 (100%)			100%	480 100%

Perception of the effectiveness of the actions varied significantly between ranches. However, considerable variations exist between group ranches as to the success of local people in controlling wildlife. This variation is a function of the predominant land use in a given area. Local residents of lowland ranches were not successful in controlling wildlife damage. Upland residents were equally unsuccessful in their attempts to controlling wildlife damage. This lack of effective control is most likely due to the presence of larger mammals in the lowland and smaller ones on the upland. Both large and small species are difficult to control through the conventional local control tactics.

While some respondents felt satisfied with the effectiveness of their actions, many were dissatisfied. When asked what they would do if the problems of wildlife persisted, the majority indicated that they would continue with fencing, others said they would kill the troublesome wild animals, while some said they would employ watchmen. Some already employed guards, but the majority acted as guards themselves often in groups rotating responsibility with others in their "manyattas".

Employment of guards varied significantly by group ranch. Most of those who employed guards were residents of Kimentet. Few residents of Lemek, Koyaki and Siana, which are predominantly Maasai, employed guards implying that the majority of Maasai provide their own protection. Immigrants were able to employ guards but they had significantly higher incomes.

Local people were generally less effective in controlling small-bodied species than large-bodied ones. Some of the large-bodied species also proved difficult to control. Reported success in controlling wildlife varied significantly between the ranches. Upland ranches with high population densities and greater levels of development were significantly less effective. This may be because most species of these areas were small-bodied or climbers such as baboons. Porcupines were sometimes difficult to control even to trap. Reports of the use of poison and snares were mainly in the upland areas. Such methods not only kill wildlife but can injure them. As local people increase and agriculture expands,

such activities may increase. It is also likely that snaring wildlife, such as antelope, will also increase with the expanding population of game-eating communities in the region and with increasing food shortages.

The degree of effectiveness of control measures can be compared with the type of control used by the respondents. Respondents who stated they were ineffective were more likely to erect scarecrows or hang up tins or contact wildlife officers. In contrast, respondents who stated they were effective were more likely to post guards or have special fences (54%). In general, local people who provided fences and those who posted guards were more effective. Special fences were more effective among the pastoral communities, but less so in the agricultural areas. It was also reported that control measures can be species-specific. Almost no method was effective in dealing with smaller species in the agricultural areas such as porcupines. Some respondents reported using traps, but some stated that some species like bushpigs often cut the traps, so it depends on the type of trap used. Respondents who reported that they were effective in controlling wildlife were less likely to cite wildebeest or elephants as very destructive (32%, 5%, 10% and 2% of all responses, respectively) than people who reported that they were ineffective. Conversely, local people who reported that they were ineffective in controlling wildlife were more likely to report other animals, including porcupines, bushpigs, that are nocturnal (34%; 7% and 4% of all responses, respectively) than people who reported that they were effective. In general, local people were less effective in controlling smaller mammals than in controlling megafauna. There were, however, exceptions to this trend. Those who employed guards were more effective in their control efforts than those who did not. Similarly, those who fenced stated effectiveness. Many local residents of the Masai Mara region felt that wildlife officers could be effective if they reported in time and if there were more regular patrols. Many felt that the rangers were too far from them and difficult to reach. Many wildlife officers do not have access to a vehicle and, therefore, cannot respond quickly.

4.6 Attitudes Towards Conservation and Government Wildlife Programs

The findings presented in this section are divided into two broad categories: attitudes towards wildlife conservation, and attitudes towards government wildlife conservation programs.

4.6.1 Attitudes towards Wildlife Conservation

Successful wildlife management will succeed or fail depending upon the involvement of the local people. Understanding local conservation attitudes is therefore essential to the formulation of appropriate local management and policy strategies. Findings reported in this section include (1) how the local people understand wildlife, (2) the value they attribute to wildlife (including benefits from the reserve), (3) why wildlife should be conserved (including whether conservation is necessary to the nation or the local people of Masai Mara region or the individual respondent), (4) the importance of the protected area (again whether it is important for the nation or the local people or the individual respondent), and (5) what the local people think of the role of wildlife conservation authorities, especially in terms of wildlife-damage control (including what the respondents would like the authorities to do).

4.6:1.1 Knowledge of Wildlife

Respondents were asked to express what they meant and understood by the term "wildlife". The majority (61.4%) gave definitions which emphasized the ecology of the species, that is, untamed animals living in the natural landscape, but almost one third gave answers that emphasized the administrative status of the animals, that is, animals protected by the government for tourism. In Kenya, all wildlife belong to the state (GOK 1989). Many local communities are therefore likely to see wildlife as government protected property. About four percent provided other definitions, for example, animals to be hunted (Table 4.24). When respondents named wildlife species, wildebeests, lions, leopards, elephants and buffaloes were most commonly mentioned. Generally, predators and large ungulates

dominated the discussion, and only occasionally were zebra mentioned even though it is one of the species most numerous and visible. This lack of attention to zebra could be due to its being a less destructive species. Apart from its competition for pasture and water, zebras, unlike wildebeests, are not known (to the local people) to spread disease to livestock nor do they fight or chase cattle from watering areas like elephants and buffaloes.

Table 4.24 Respondents First Answer In Defining Wildlife by Group Ranch and by Zone

WHAT IS WILDLIFE?	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Undomesticated Animals living in the bush	53 (58.2%)	58 (59.2%) 111 (58.7%)	68 (61.3%)	63 (63.0%)	63 (63%) 194 (62.4%)	308 (61.4%)
Animals protected by the government	34 (37.4%)	36 (36.7%) 70 (35.0%)	33 (33.3%)	33 (33.0%)	32 (32.0%) 98 (31.5%)	172 (34.4%)
Others	4 (4.4%)	4 (4.1%) 8 (4.3%)	5 (5.4%)	4 (4.0%)	3 (3.0%) 12 (3.9%)	21 (4.2%)
Total Chi-squared: 1.877, P=0.985	91 (100%)	98 (100%) 189 (100%)	111 (100%)	100 (100%)	100 (100%) 311 (100%)	500 (100%)

Comparatively little variation existed in knowledge of wildlife between the group ranches. About as many residents of the upland ranches -Angata Baragoi and Kimentet expressed their understanding of wildlife as untamed animals (58.7%) or animals protected by the government (35.0%) as as residents of the lowland ranches - Lemek, Koyaki and Angata Baragoi (62.4% and 31.5%, respectively). This lack of variation in the understanding of wildlife is probably a reflection of the uniformity of perceptions of wildlife.

4.6:1.2 Valuation of Wildlife

Respondents were then asked to state how they valued wildlife. Just over half, (52.6%), described wildlife as a nuisance to human interests, 29.2% described it as useful for tourism that brings in foreign exchange for the government, while 18.2% gave "any other

values" which included: natural heritage, education and research, and wildlife as a source of food and cultural products (Table 4.25). Many residents of Masai Mara considered wildlife as an awesome burden to them given that they do not benefit from its conservation. Many felt that the government was putting the needs of wildlife before theirs. In general, it was clear that wildlife was increasingly being devalued not only because the local people do not gain from its conservation but also because of the changes in population, land use and socio-economic framework within the region.

Table 4.25 First Response of Respondents to Question of Value of Wildlife by Group Ranches

VALUATION OF WILDLIFE**	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Nuisance to human	47 (51.6%)	55 (56.1%) 102 (54.0%)	62 (56.1%)	52 (52%)	58 (58%) 172 (55.3%)	264 (52.6%)
Tourist attraction; brings foreign exchange earnings create jobs	26 (28.6%)	19 (19.4%) 45 (23.8%)	43 (38.7%)	33 (33%)	25 (25%) 101 (32.5%)	146 (29.2%)
Others	18 (19.8%)	24 (24.5%) 42 (22.2%)	17 (15.3%)	15 (15%)	17 (17%) 49 (15.8%)	90 (18.2%)
Total Chi-squared = 12.805	91 (100%)	98 (100%) 189 (100%)	111 (100%)	100 (100%)	100 (100%) 311 (100%)	480 (100%)

Again almost as many residents of upland ranches perceived wildlife as a nuisance to humans as resic' s of lowland ranches. However, there was significant variation between upland and lowland ranches residents in terms of their perception of wildlife as tourist attractions. This variation is probably a reflection of the location of the residonts in relation to the main tourists routes to the reserve and the distributions of tourism benefits. Lowland residents see more of the tourists fleets going to the reserve, and probably interact more with tourists in their cultural manyattas most of which were located in the lowland amongst the Maasai, than the residents of upland ranches of Angata Baragoi and Kimentet

ranches. Most tourism facilities outside the reserve such as tented camps have also been established in the lowland where wildlife is plentiful.

4.6:1.3 Why Should Wildlife be Protected?

Understanding why wildlife should be conserved is essential if the local people are to support conservation strategies. Asked why wildlife should be protected, slightly over half (51.6%) mentioned tourism. It was indicated by 36% that natural heritage was a primary reason for conserving wildlife, while 12.4% of respondents mentioned other reasons which included material benefits from animal products and education opportunities (Table 4.26). Material benefits included wildlife byproducts such as feathers, skins, wigs, and many others. A few residents of Masai Mara region felt that wildlife was protected for future generations and that it was beauty of nature and a reminder of the past.

Surprisingly, there was absolute uniformity in the belief that wildlife held value for humankind as well as for Kenya, but it is important to note that local people talk of the government when referring to Kenya rather than Kenyan people. Few people saw wildlife conservation as a necessity for the region (local people of Maasai Mara region), and even fewer believed that it was a necessity to them as a person or individual (Table 4.27). Many cited the dangers of wildlife as the spreading of disease and eating of their livestock, crops and sometimes their family members.

Given the recognition of a value for wildlife, the question of local compensation for losses incurred as a consequence of wildlife protection arises. If there is a value, locals should share in the benefits not least. Many people benefit directly or indirectly from wildlife resources, including tour and hotel operators, as well as tourists and commercial game ranchers. Many other workers and businesses derive their livelihood from wildlife-related activities, and the public indirectly benefits from wildlife through government subsidies generated from wildlife revenues. However, the local people who live among the wildlife and whose cooperation is necessary for maintaining wildlife benefit little.

Table 4.26 First Response of Respondents to Question of Value of Wildlife by Group Ranches

Reasons for wildlife protection	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Ethical values natural heritage	31 (34.1%)	34 (34.7%) 65 (38.0%)	43 (38.7%)	36 (36%) 115 (37.2%)	36 (36%)	180 (36.0%)
Tourism revenue foreign exchange	42 (57.1%)	43 (52.0%) 85 (49.7%)	54 (48.6%)	51 (51%) 155 (50.2%)	50 (50%)	258 (51.6%)
Others	8 (8.8%)	13 (13.0%) 21 (12.3%)	12 (12.6%)	13 (13%) 39 (12.6%)	14 (14%)	62 (12.4%)
Total Chi-squared: 10.651	81 (100.0%)	90 (100%) 171 (100%)	109 (100%)	100 (100%) 309 (100%)	100 (100%)	480 (100%)

There were considerable variations between the group ranches as to why wildlife should be conserved. This result is comparable to other studies on local attitudes to conservation in Africa. In Swaziland for example, Hackel (1990) found that 90% of the local people support the protection of wildlife. In general, while local residents of Masai Mara region view wildlife protection as a worthwhile goal, they did not support its taking precedence over people. Local people have not realistically reconciled their views about the use of resources and economic benefits and wildlife preservation, nor have they recognized the link between wild animals and their habitat. Many local residents hold views that are conflicting. As expressed by one local resident of Koyaki:

> It is good to preserve an area for wildlife but not to deny the local people their rights to graze within the reserve or allow wildlife to destroy people's property. Otherwise they should confine the wildlife inside the reserve (L.R. 07).

4.6:1.4 Importance of Protected Area

Although people support wildlife conservation in general, they do not support land being taken from them for the absolute protection of wildlife. However, when asked whether the creation of the protected area was a good idea, 53% said yes, stating that it was important to keep a place for wild animals, while 47% said no (Table 4.28).

While many supported the idea of a protected area, they placed conditions of use such as:

the local people should be allowed to graze inside the reserve and wildlife should not be allowed to interfere in peoples' interests. Many felt that the interests of the local people should be considered before animals in any conflict over resources. Many residents did not like the idea of locking land for the absolute use of wildlife. They saw that as locking away resources that they could otherwise use. As one local resident from Koyaki said:

> The protected area is a waste of land. All the pasture is left for animals. It would be good to allow people to graze inside the park, especially during the droughts. [L.R. 08].

A number of local people also saw protected areas as useful only to wealthy foreign tourists, but not to themselves. Local people were divided almost into half on the issue. Even those indicating favourable attitudes towards protected areas, during discussions, had conditions, that is, "be allowed to graze within the reserve". Restriction of access to the reserve was of critical concern to many local residents of Masai Mara region. As one local resident of Angata Baragoi noted:

> Whether we are allowed or not, we (the local people of Masai Mara region) will always graze within the reserve especially during the droughts for we have no alternative. What does the government want us to do? It is unfair to deny people the right to graze within the reserve, while wildlife often come out here and eat our livestock, yet we are required by law not to kill them. The only thing we are allowed to do is "scare" them away, unless our lives are in danger. The reserve land was originally ours. Today, when we happen to enter the boundary of the reserve, we are arrested and sometimes shot at by game rangers. These regulations are unfair and only show us that the government cares more about the wildlife than it does about us. The reserve does not necessarily have to be degazzetted, all we need is to be allowed to graze inside the reserve as wildlife graze on our land and that is what used to happen before it was taken from us (L.R. 09).

Recently, following the much publicized security problems just months before the survey of this study in Masai Mara, when the British lady, Ward, was mysteriously murdered, and poaching problems accelerated, the government ordered (presidential decree) that anybody found walking within the reserve be shot on sight, without question. Local people are often forced to enter the reserve not only to collect firewood but also merely to cross to the other side to visit relatives and friends. It is obviously difficult to deny people the ability to even cross through the reserve. These conditions also heighten the conflict.

Table 4.27 Necessity of Wildlife Conservation by Group Ranch

VALUE OF WILDLIFE CONSERVATION	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
To Kenya (National Benefits)						
Yes	81 100%	90 100%				
No	171 (100%)		109 (100%)	100 (100%)	100 (100%)	480 (100%)
	0 0.0%	0 0.0%	309 (100%)			
	0 (0.0%)		0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	81 100%	90 100%	0 (0.0%)			
						480 (100%)
Chi-squared: 6.805	171 (100%)		109 (100%)	100 (100%)	100 (100%)	
			309 (100%)			
To Mara people (Regional Benefits)						
Yes	40 49.4%	39 33.3%	36 (33.2%)	49 (49%)	62 (62%)	223 (45%)
	79 (41.9%)		149 (48.4%)			
No	41 50.6%	59 66.7%	73 (67.8%)	41 (59%)	38 (38%)	257 (55%)
	110 (55.1%)		152 (54.3%)			
Total						480 (100%)
	81 100%	90 100%	109 (100%)	100 (100%)	100 (100%)	
Chi-squared: 7.123	171 (100%)		309 (100%)			
To respondent (Personal benefits)						
Yes	12 14.8%	22 23%	26 (23.9%)	27 (27%)	20 (20%)	99 (29.8%)
	44 (23.0%)		103 (34.7%)			381 (70.2%)
No	69 85.2%	76 78%	83 (76.6%)	73 (73%)	80 (80%)	
	145 (77.4%)		208 (66.5%)			480 (100%)
	81 100%	90 100%	109 (100%)	100 (100%)	100 (100%)	
Total			309 (100%)			
	171 (100%)					
Chi-squared 14.718						

At the same time, conservation of wildlife in most of the developing countries has a lot to do with tourism, yet the local people who share their land resources with the wildlife, hardly benefit from the tourism revenue. The revenue generated often goes almost entirely to the national treasury and may not necessarily be ploughed back to develop the region wildlife inhabits. When asked whether they received any benefits from park tourism revenue, the overwhelming majority, (76.4%) said no, while only 23.6% said yes (Table 4.28). One local resident of Lemek group ranch observed that:

> Wildlife conservation is beneficial only to the government. We don't get anything. Some people benefit but not us (me). The animals are kept for tourists and we are not allowed to go inside the reserve even for our daily livelihoods [L.R. 10]

The benefits include (1) employment, (2) infrastructure, (3) others. Wildlife and park management issues are often treated largely as government responsibilities. Without the support of the local people the future of wildlife and their protected areas are insecure. Involvement of the local people in the making of conservation policy and its management through employment could influence their attitudes towards wildlife. The majority of those employed often come from outside the local region. When asked if there was a member of their family working with the reserve or wildlife authority, 21% of the interviewed households responded affirmatively, whereas 79% did not (Table 4.28). Local residents see people from other areas working among them and that causes additional antagonism towards conservation and the conservation authority. Even though they may not have the skills required for some of the jobs (especially the managerial positions), it is important to encourage their employment in less skilled positions.

> In order to keep room for wildlife, it must provide some assistance to the local people with whom it shares land resources. Merely educating the local people and talking about tourism value of wildlife is not enough. Talking about cultural heritage can not appeal to the local people. What is at stake is their immediate needs (W.E. 02).

Table 4.28 Benefits from the Protected Area Tourism by Group Ranch

BENEFITS	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Benefit from Tourism?**						
Yes	19 23.5%	20 22.2%	25 22.9%	25 25.0%	27 27.0%	116 (23.6%)
No	39 (22.8%)		77 (24.9%)			
	62 76.5%	70 77.8%	84 77.1%	75 75.0%	73 73.0%	364 (76.4%)
	132 (77.2%)		232 (75.1%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	
	171 (100%)		309 100%			480 (100%)
Chi-squared 24.162						
Is Family Member Employed in Wildlife/Tourism?***						
Yes	16 19.8%	19 21.1%	23 21.1%	25 25.0%	30 30.0 %	103 (21%)
No	35 (17.5%					
	65 (80.2%	71 (78.9%)				377 (79%)
Total	136 (75.5%)		78 (25.2%)			
	81 100%	90 100%	86 78.9%	75 75%	70 70.0 %	480 (100%)
	171 (100%)		231 74.8%			
Chi-squared 66.325						
			109 100%	100 100%	100 100%	
			309 100%			
Benefit from Park Protection?*						
Yes	18 22.2%	13 14.4%	28 25.2%	27 27.0%	33 33.0%	129 (26.9%)
No	31 (16.7%)		98 (26.4%)			
	63 77.8%	77 85.6%	83 74.8%	73 73.0%	67 63.0%	351 (73.1%)
	158 (83.4%)		223 (70.3%)			
			309 100%			480 (100%)
Total	81 100%	90 100%				
	171 (100%)					
Chi-squared 17.490						

Forms of Park Protection Benefits**						
Security	68 84.0%	76 83.3%	83 (83.8%)	79 (79%)	70 (70.0%)	384 77.9%
Transportation	143 (83.6%)		232 (75.4%)			
Others	12 14.8%	12 13.4%	13 (11.7%)	10 (1.0%)	20 (20.0 %)	66 13.8%
	24 (14.0%)					
Total	1 1.2%	3 3.3%				30 6.3%
	4 (2.4%)		43 (14%)			
			5 (4.5%)	11 (0.0%)	10 (10.0 %)	480 (100%)
Chi-squared 53. 086	81 100%	90 100%				
	171 (100%)		26 (8.4%)			
			309 100%			
Benefits from Rangers?**						
Yes	15 17%	15 15.3%	18 (16.2%)	30 (30.0%)	36 (36.0%)	114 23.8%
	30 (16.2%)		84 (17.4%)			
No	76 84%	83 84.7%	93 (83.8%)	70 (70.0%)	64 (64.0%)	366 76.2%
	159 (84.4%)		227 (72.6%)			
Total	81 100%	90 (100%)	109 (100%)	100 (100%)	100 (100%)	480 (100%)
	171 100%		309 100%			
Chi-squared 20.304						
Forms of Benefits from Rangers**						
Security	63 13.2%	71 8.0%	79 (72.5%)	69 (69.0%)	68 (68.0 %)	350 72.9%
Help with transport	134 (78.4%)					
Others	14 15%	13 14%				92 19.2%
	27 (15.8%)		216 (69.9%)			
Total	4 23%	6 10.2%	16 (14.7%)	26 (26.0%)	23 (23.0 %)	38 7.9%
	10 (5.8%)					
Chi-squared 33.104						
	81 100%	90 100%	65 (21.0%)			480 100%
	171 (100%)		14 (12.8%)	5 5.0%	9 (9.0%)	
			28 (9.1%)			
			109 (100%)	100 (100%)	100 (100%)	
			309 (100%)			

Some experts urge caution:

> Increasing consumptive utilization and encouraging local participation, may in itself lead to rapid depletion of the resource. It should be noted that this is the same wildlife viewed by tourists within the reserve, and opening the reserve or introducing consumptive use may lead to wildlife extermination (W.E. 03).

The survey results revealed that negative feelings and perceptions are widespread amongst the local people as regards state policies and wildlife programs.

> Wildlife is a major problem to us farmers. Probably the Maasai down there don't mind them. If you look around, every home has fenced their farms and even with the fence, smaller species such as porcupines know no fence. We need government assistance. But their office is very far, and when you call them they say there is no vehicle. I think the best thing is for them to fence in their animals inside the reserve and leave us alone (L.R. 11).

> I lost all my goats many years ago to wildlife. We called the rangers but they did not come in time so we killed the beast. I reported the loss and they recorded the details (showing the over ten year old paper). The game officials came and took the skin. I am still waiting for the money. Where is the money?. Have you brought it?. When you go back tell them I want the money. I am told they no longer pay for the losses, how about us we lost long time ago and have not been paid (L.R. 12).

There is significant variation between group ranches as to whether or not the protected area is a good thing. Many said it is good for humankind or for Kenya but not so much for them as individuals (Table 4.29).

4.6:1.5 Role of Wildlife Conservation Authority

When asked to state what they thought the wildlife conservation authority does the majority, 52%, stated that the government was doing nothing, 33% said they control wildlife, while 12% answered that they were inadequate and that the government needed to do more to save people from wildlife damage (Table 4.30). Further asked to suggest what they would like the authority to do to reduce wildlife-human conflict, 72% said that they (the authority) should provide effective game control measures, confine wildlife inside the park and patrol more frequently. Twenty-three percent said that they should be paid compensation promptly and generously, while 5% had nothing to suggest. It is clear that local people hold less than positive attitudes towards the wildlife conservation authority.

Table 4.29 Value of Protected Area by Group Ranch

VALUE OF PROTECTED AREA	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
To Kenya (National Benefits)						
Yes	81 100%	90 100%	109 (100%)	100 (100%)	100 (100%)	480 (100%)
	171 (100%)		309 (100%)			
No	0 0.0%	0 0.0%	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	0 (0.0%)					
Total	81 100%	90 100%	109 100%	100 100%	100 100%	480 100%
	171 (100%)		309 (100%)			
Chi-squared 4.312						
To Mara people (Regional Benefits)**						
Yes	16 19.8%	21 23.3%	53 48.6%	42 42%	28 28%	159 33.1%
	36 (21.0%)		123 (39.8%)			
No	65 80.2%	69 77.7%	56 51.4%	58 58%	72 72%	321 66.9%
	134 (78.4%)		186 (60.2%)			
Total	81 (100%)	90 (100%)	109 100%	100 100%	100 100%	480 100%
	171 (100%)		309 (100%)			
Chi-squared 18.900						
To respondent (Personal Benefits)**						
Yes	9 11.1%	16 17.8%	38 34.9%	15 15%	19 19%	97 20.2%
	25 (14.6%)		72 (23.3%)			
No	72 88.9%	74 82.2%	71 65.1%	85 85%	81 81.0%	383 79.8%
	146 (85.3%)		237 (76.7%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	480 100%
	171 (100%)		309 (100%)			
Chi-squared 19.550						

The finding of a lack of support for the wildlife/protected area authority is consistent with the reported attitudes of local people towards wildlife/protected area authorities in many areas. In Tanzania, Newmark et al. (1993) found that 47% of all people interviewed, stated that authorities do nothing, and when the no response answers were combined in the Newmark et al. study, 71% of all people living in the vicinity of the six protected areas probably held either neutral or negative feelings about wildlife authorities. Infield (1988) found that 68% of those residing close to the Umfolozi/Hluhluwe/Corridor Conservation Complex held either negative or neutral feelings towards the Natal Park Board.

Some stated that the authorities simply followed people to ensure that they do not kill wildlife, poach or support poachers. Other people however, noted that wildlife authorities sometimes provide medical assistance and transportation to them. This contradicts a recent study finding by Newmark, that the local people appear not to associate the positive attributes of adjacent protected area or protection of wildlife as being derived from the management activities of the employees.

> Conservation authorities are operating "anti-people preservation strategies" which fail to recognize the link between indigenous culture and the survival of wildlife. Without involving the local people, no room should be expected for wildlife (W.E. 04).

> Wildlife authority do not want us. They see us as poachers or protectors of poachers. We never poach. We have lived with wildlife for years -- although they cause problems to us we can still live with them, but the government must not intervene. Why take our land and refuse us to graze it (L.R. 15).

The response on whether protected areas are a good thing varies. Many said it is good for humankind or for Kenya but not so much for them as individuals (Table 4.30).

Table 4.30 Role of Wildlife Authority by Group Ranch

AUTHORITY	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
What do they Do?						
Protect Game	30 33%	25 25%	38 34%	37 37%	33 33%	163 33%
	55 (29.0%)		108 (36.0%)			
Nothing	41 46%	53 54%	53 48%	52 53%	59 59%	259 52%
	94 (50.0%)		165 (53.3%)			
Others	10 10%	13 13%	18 16%	10 10%	8 8%	58 12%
	21 (11.6%)		36 (11.3%)			
Total	81 (100%)	90 (100%)	109 100%	100 100%	100 100%	480 (100%)
	171 (100%)		309 (100%)			
Chi-squared 6.421						
What Should they Do?						
Provide effective game control measures	56 69.2%	68 75.6%	79 72.5%	75 75%	65 65%	343 71.5%
	124 (72.5%)		219 (70.9%)			
Pay compensation promptly	21 25.9%	17 18.9%	26 23.9%	19 19%	29 29%	112 23.3%
	38 (22.2%)		74 (23.9%)			
I don't know	4 4.9%	5 5.5%	4 3.6%	6 6.0%	6 6.0%	25 5.2%
	9 (5.3%)		16 (5.2%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	480 (100%)
	171 (100%)		309 (100%)			
Chi-squared 10.023						

4.6:1.6 Summary of Analysis of Conservation Attitudes

There is a high correlation between the conservation attitudes examined. Those who held negative attitudes towards the value of wildlife were more likely to hold negative attitudes towards the importance of the protected area. Those who held positive attitudes towards wildlife conservation authorities were more likely to suggest more positive solutions to the wildlife problems. Similarly, local people who considered the cause of conflict as ineffective game control were more likely to see wildlife negatively. Households who valued wildlife as a tourist attraction were more likely to suggest that the protected area was important as a tourist attraction and that the wildlife conservation authority was keeping wildlife away.

Results further reveal that (1) those who indicated that they indirectly benefit from wildlife-tourism valued wildlife more positively than those who did not, (2) that they perceived wildlife protection as a necessary and worthwhile course, (3) they perceived the role of the protected area as for the conservation of wildlife, and (4) considered the wildlife conservation authority as undertaking useful work than those who indicated they do not benefit. Direct benefits included employment in the reserve or receiving income from wildlife-based tourism. The results imply that if many of the local people are employed in the sector, there would be more support for conservation. Although some people, especially in Lemek and Koyaki, were generally aware of the benefits of wildlife, such as building schools, and a health centre, they were concerned that the destruction (costs) by wildlife to "wananchi", could outweigh those benefits.

Establishing factors that are crucial in the formulation of the attitudes of local people towards wildlife is essential in designing a model for integrating wildlife conservation with human development needs. Households who had had problems with wildlife in the past held more negative attitudes towards wildlife conservation than those who had not. Most of them felt that wildlife was a nuisance to humans, while only a few of those who had not felt so. Additionally, those who had experienced wildlife problems were more likely to hold negative

attitudes towards the wildlife conservation authority than those who had not. Seventy-six of them felt that the wildlife conservation authorities did nothing, while only 23% of those who had not had problems felt similarly. At the same time, they viewed the importance of the protected area more negatively and perceived the dominant causes of conflict more negatively, that is, as increased wildlife population or ineffective game control than those who had not encountered problems. Similarly, they were more likely to recommend that wildlife be completely fenced in or killed than those who had not experienced conflict.

This finding is comparable with recent studies in other countries in Africa and elsewhere. In a study of local people living adjacent to five protected areas in Tanzania, Newmark et al. (1993) found that 22% of the local people who expressed support for the abolishment of the adjacent protected area cited the elimination of problems with wildlife as their main reason. Oli et al. (1994) in a study of snow leopard (*Panthera uncia)* in Nepal found that those who had experienced losses were more negative towards snow leopard than those who had not. Experiences of wildlife problems causes a very permanent feeling, especially where it involves loss of human life or an entire source of livelihood. In communities with subsistence economies even small losses can be of great economic importance and can generate negative attitudes towards wildlife and conservation in general (Mishra 1982; Oli et al. 1994; Upreti 1986).

Respondents who had not received compensation for loss(es) due to wildlife also held more negative attitudes towards wildlife than those who had received compensation. Those who received compensation showed more understanding of wildlife as a government protected property for tourists than those households who had received compensation. Those households who indicated benefiting from wildlife/tourism held more positive towards wildlife protection than non-benefited households. Attitudes towards the importance of the protected area were also affected by the experience of benefits, although less significantly. Many of the benefited household thought that protected area plays a crucial role in wildlife protection compared with the non-benefited. Benefited households held positive attitudes

towards the wildlife conservation authority. The most common benefit to households were employment in the Masai Mara National Reserve and schools built for the communities. It is generally considered that direct benefits from wildlife-based industry, such as working in the park, improve local people's attitude to wildlife (Western, 1982; Mackinnon et al. 1986; Infield, 1986, Lewis et al. 1988; Parry and Campbell, 1992). The problem, however, is that few individual households have direct benefits from wildlife-based tourism.

Respondents who had knowledge of wildlife conservation priorities showed significantly more support for the value of wildlife than those who had not. Those who did not know of priorities were more likely to view wildlife as a nuisance to humans than those who did. Conservation education appeared to be an important factor in influencing attitudes towards wildlife conservation. Another important factor in the formulation of conservation attitudes was whether local people felt that they were effective in controlling wildlife problems. Individuals who reported that they were ineffective were more likely to hold negative attitudes towards the wildlife conservation authorities than those who said they were effective. Households who indicated a shortage of grazing and water resources were more likely to be negative towards wildlife and its protected area than those who did not. Those who viewed wildlife as a nuisance to humans were more likely to suggest that they be confined within the reserve than those who saw it as a tourist attraction. While this relationship may be spurious, it could be a reflection of greater antagonistic attitudes towards wildlife.

Results also show that wealthier households, especially those with a stake in tourism activities were more likely to view the protected area positively than those who were not involved. Ethnicity, age, level of education and occupation did not have significant influence upon the attitudes towards conservation. They valued wildlife much the same way as the uneducated. However, respondents with education were different when it came to suggestions of solutions and articulating causes of conflict. Clearly, conservation attitudes are strongly influenced by problems with wildlife which appear to be the main source of

antagonistic attitudes towards wildlife conservation in the region.

4.6:2 Government Wildlife Programs

A number of wildlife conservation activities aimed at controlling wildlife-human conflict are undertaken in Kenya (see chapter 3) including: (1) compensation for wildlife damage, and (2) wildlife conservation education. This section reports on the findings as regards the local peoples' experiences with these activities. Experiences by the local people with the government conservation programs may influence their perception of wildlife and their general attitudes towards its conservation.

4.6:2.1 Wildlife-Damage Compensation Scheme

Traditionally, claims for wildlife-damage compensation fall into four main categories: (1) crop damage, (2) livestock death or injury, (3) personal injury or death, and (4) property damage, such as to fences, buildings and water troughs[22]. Respondents were asked if they had heard about a wildlife compensation scheme. Sixty-eight percent responded positively, 32.1% said no. Asked whether they had claimed compensation, 83% had, while 17% had not. Of those who had claimed, only 22% had ever been compensated, meaning that 78% of the claimants had not been paid. Many people complained that compensation for wildlife damage was not forthcoming. Asked how long it took them to get compensated, 72% said between 1-3 years, while for 18% of the respondents, it took over 3 years. Only 10% of the successful claimants got their due within one year. From these responses it is clear that the compensation program was not functioning properly.

Eighteen percent of the respondents who had problems with wildlife never submitted a claim (Table 4.31). The main reasons stated for not claiming included lack of payment (44%) and a waste of time (a long procedure yet little chance of success) (35%). Twelve

[22] Recently (in 1989), following the review of the Wildlife Conservation and Management Act, compensation was changed such that only human injuries and deaths are covered. Crop and livestock damage were dropped. The New Act came in effect in 1990 but the change in compensation was not yet known to many of the local people at the time of the field work for this study.

percent claimed that the government offices were too far, and 7% gave other reasons including lack of time and knowledge that a compensation scheme existed. Clearly wildlife must pay for its survival, if the local people are to support its conservation. People were dissatisfied with the scheme. As one resident of Kimentet observed:

> Nobody wants to hear about compensation any more, although they need it. The problem has been how it is provided. It is a good idea to compensate but why raise peoples expectations for what will never come or if it does, after so much sufferings and sometimes it is much less than the loss (L.R. 16).

One government official explained that the government was looking for a better method of compensating the local people. In general, respondents who did not fill the claim forms (as well as those who did) complained about the very slow proceedings of the compensation scheme and were sceptical about the payment. The compensation claim had become very unpopular and had proved too expensive even for the Government. It was abused by those who could influence the process and had become very costly, as a result of increased wildlife damage. The large number of claims may also have been as a result of increased awareness of the scheme. At the beginning not many were aware that they could claim compensation for loss due to wildlife from the government. Even today, some people (especially in other parts of the country) are not aware of their right to be compensated.

When asked what they thought should be done with the scheme, 26% suggested it should be replaced with a permanent grazing fee, 53% suggested that the payment procedure be re-organized so that victims could receive it more promptly, 15% suggested other changes, while 6% had no comment (see Table 4.31). From the informal interviews, it was clear that some local people were already aware of the amendments of the Wildlife Conservation Act which limited compensation only to human death and injuries. Many were dismayed by the decision and felt that the move could lead to more suffering on their part or even some act of civil disobedience by some members of the society such as the killing

Table 4.31 Questions on Wildlife-Damage Compensation Scheme

COMPENSATION QUESTIONS	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Have you heard of wildlife compensation scheme?						
Yes	63 77.8%	57 63.3%	77 70.6%	73 73%	70 70%	340 67.9%
	60 (26.6%)		89 (30.3%)			
No	18 22.2%	33 36.7%	32 29.4%	27 27%	30 30%	140 32.1%
	120 (64.0%)		220 (70.7%)			
Total	81 100%	90 100%	109 100%	100 100%	100 100%	480 100%
	171 (100%)		309 (100%)			
Chi-squared 5.273						
Have you made any compensation claims?	27 (72.9%)	50 (71.4%)	63 (88.7%)	64 (88.8%)	58(84.0%) 185	264 83.8%
	77 (71.9%)			(54.3%)		
Yes	10 (27.1%)	20 (28.6%)	8 (11.3%)	7 (11.2%)	11 (16.0%)	55 17.2%
No	30 (28.1%)					
Total	37 100% 70 100%		71 (100%)	72 (100%)	69 (100%)	319 100%
	107 (100%)			212 (100%)		
Chi-squared						
Have you received compensation?	3 32%	8 4 28%	30 42.3%	28 38.9%	16 23.2%	85 32.2%
	11 (30.0%)			74(34.9%)		
Yes	24 67%	42 9 64%	41 57.7%	44 62.1%	53 (76.8%)	179 67.8%
No	66 (60.6%)		138 (65.1%)			
Total	27 (100%) 13	60(100%) 77	71 100%	72 100%	69 100%	264 100%
	(100%)			212 (100%)		
Chi-squared						
How long did it take to receive?* **			4 13.3%	2 7.1%	3 18.8%	9 10.5%
	0 0%	2 18.2%	9(12.2%)			
0-1	2 (14.2%)		25 83.3%	19 67.9%	10 62.5%	61 71.8%
1-3	2 66.7%	5 63.6%	58 (78.4%)			
3 +	7 (64.2%)		1 4.4%	7 25%	3 (18.8%)	15 17.7%
	1 33.3%	1 18.2%	7 (9.5%)			
Total	2 (21.4%)					85 100%
	3 (100%)	8 (100%)	30 (100%)	28 (100%)	16 (100%)	
Chi-squared 95.276						
	11 (100%)		74 (100%)			

Was compensation adequate?	1 33.3%	2 25.0%	9% (30%)	8 28.6%	5 31.3%	25 29.4%
	3 (27.3%)		22 (29.7%)			
Yes	2 (66.7%)	6 75.0%	21 (70%%)	20 71.4%	11 68.8%	60 70.6%
No	8 (72.7%)		52 (70.3%)			
			30 (100%)	28 (100%)	16 (100%)	85 100%
Total	3 (100%)	8 (100%)	74 (100%)			
	11 (100%)					
Chi-squared 1.505						
Have suffered damage but not claimed?	8 21.6%	10 14.3%	17 23.9%	12 16.7%	11 15.9%	58 18.2%
	18 (16.8%)		40 (18.9%)			
Yes	29 78.4%	60 85.7%	54 76.1%	60 83.3%	58 84.1%	261 81.8%
No	89 (83.2%)		172 (81.1%)			
Total	37 (100%)	70 (100%)	71 (100%)	72 (100%)	69 (100%)	319 (100%)
	107 (100%)		212 (100%)			
Chi-squared 13.125						
Is compensation a good or a bad idea?	57 70.4%	53 58.9%	69 44%	60 60%	55 55%	294 61.3%
	110 (64.3%)		184 (59.5%)			186 38.8%
Good idea	24 29.6%	37 41.1%	40 54%	40 40%	45 45%	
	61 (35.8%)		125 (40.5%)			
Bad idea			109 100%	100 100%	100 100%	480 100%
	81 100%	90 100%	309 (100%)			
Total	171 (100%)					
Chi-squared 11.032						
Reasons for not forwarding claims***	3 41%	8 49%				
	85 (45.0%)		10 51.0%	5 54.0%	5 25%	22 44%
1. Never receive	4 48%	2 43%	135 (43.3%)			
	85 (45.5%)		3 48.0%	6 46.0%	4 44%	28 46%
2. Time wasting	1 0%	0 0%	14 (42.7%)			
	0 (0.0%)		4 0.0%	0 0.0%	0 0.0%	12 6%
3. Far offices			0 (0.0%)			
4. Didn't know	8 100%	10 100%				
	18 (100%)		17 100%	12 100%	11 100%	58 100%
5. Others			40 (100%)			
Total						
Chi-squared 115.723						

Importance of Compensation Scheme**				
1. Show of Government's concern	23 28.4%	42 43%	48 43.0% 42 42% 39 39%	273 54%
		65 (35.7%)	129 (62.0%)	
2. Helps sufferers	27 33.3%	48 49%	61 55.0% 58 58% 0 0%	207 41%
		75 (41.2%)	123 (62.0%)	
3. Others	31 38.3%	0 0.0%	0 0% 0 0.0% 0 0.0%	0 0%
		31 (19.2%)	0 (0.0%)	
Total	81 100%	90 100%	109 100% 100 100% 00 100%	480 100%
		171 (100%)	309 (100%)	
Chi-squared 6.675				
Suggestions for better compensation*				
1. Pay through local leaders	5 65.4%	5 52%	5 45% 6 55.0% 4 42.0%	19 32%
		14 (58.7%)	14 (47.3%)	
2. Replace with annual payment	27 33.3%	25 26%	4 37% 3 30.0% 13 23.0%	15 38%
		52 (27.0%)	9 (45.0%)	
3. Others	1 1.7%	14 14%	8 16% 5 15.0% 15 15.0%	8 26%
		15 (7.5%)	8 (23.0%)	6
Total	11 100%	9 100%	17 100% 32 100% 42 100%	58 100%
		17 (100%)	39 (100%)	
Chi-squared 29.681				

wildlife simply for the sake of it. As one local elder said:

> Stopping payment means we can now do what we want with wildlife. If the government does not re-introduce the scheme, more wildlife will be killed. It should either be reintroduced or replaced with a better program (L.R. 17).

The wildlife compensation scheme commenced in 1979, but by 1986, the claims had exceeded the Government's ability and willingness to pay cash compensation. The accuracy of the claims was difficult to police and the administration was an awesome burden. The Government has been pursuing ways of reducing damage and limiting the conflict by encouraging complementary land use in wildlife dispersal areas and the construction of game proof barriers.

4.6:2.2 Wildlife Conservation Education and Extension Services

Wildlife conservation education and extension services are important components of the government wildlife programs, carried out by KWS, aimed at creating awareness of the importance of wildlife among the public (chapter 3). When asked if they had ever heard of wildlife conservation education, 56% of the respondents said no, while 44% had (Table 4.32). The main sources of information for those who had heard of wildlife conservation were: chief's baraza (local meetings, in other words, through government officials other than the KWS staff) (74%), teachers (16%), radio, newspapers or colleagues (10%).

Table 4.32 Knowledge of Wildlife Conservation Education by Group Ranch

KNOWLEDGE OF CONSERVATION EDUCATION PRIORITIES	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Knowledge of Conservation Education						
Yes	39 (48.3%)	43 (47.8%) 82 (46.5%)	40 (38%)	42 (42%)	47 (47%) 131 (42.3%)	211 (44%)
No	42 (51.9%)	47 (58.2%) 99 (55.5%)	69 (62%)	58 (58%)	53 (53%) 184 (59.0%)	269 (56.0%)
Total	81 (100%)	90 (100%) 171 (100%)	109 (100%)	100 (100%)	100 (100%) 309 (100%)	480 (100%)
Chi-squared 2.566 P=.631						
Source of Information						
Chief's Baraza	19 (54%)	24 (54%) 43 (54%)	20 (27%)	18 (28%)	26 (26%) 38 (27.0%)	76 (35%)
KWS Extensions	11 (18.7%)	12 (32%) 23 (25.4%)	15 (28%)	13 (32%)	15 (45%) 28 (36.3%)	92 (38%)
Others	9 (23.5%)	7 (28%) 16 (25.8%)	5 (41%)	11 (0.0%)	6 (46%) 16 (29.0%)	31 (26%)
Total	39 (100%)	43 (100%) 82 (100%)	40 (100%)	42 (100%)	47 (100%) 309 (100%)	211 (100%)
Chi-squared:						

Conservation education and extension services could be an effective way of disseminating information about the importance of wildlife to local communities, thus reducing the conflict, but as explained elsewhere in this thesis, most of the conservation education centres are located in urban areas where they are visited largely by school children most of whom are from richer families based in urban areas. Few of the children come from wildlife areas where they could help influence their parents attitudes towards wildlife. The other educational movement, the wildlife Club of Kenya is similarly composed of members of non-wildlife areas. Although it is important for them to know about Kenya's wildlife, they do not directly effect its future. Attempts at educating the local people are also based largely on a "western model" which may not be relevant to the local situation. Little efforts are made to establish what the local people actually know about wildlife and the environment or where their misconceptions lie, by scientific or "western" standards. The Maasai, for example, have often said that they have "lived with wildlife for years", and that they do not need to be educated about wildlife. Such statements have been treated by conservationists largely as political rhetoric. It is important that educational programs seek to bridge the gap between the local peoples' knowledge and misconceptions.

4.6:3 Relationships of Government Wildlife Programs

Respondents who received compensation were more aware of wildlife conservation education than those who did not. Those educated had more knowledge of wildlife conservation priorities than the non-educated respondents. Similarly, knowledge of wildlife conservation was related to receipt of wildlife damage compensation implying that some of those who had received wildlife damage compensation were more aware of wildlife conservation priorities.

4.7 Respondents Recommendations

Strategies for resolving wildlife-human conflict must take into account the views and

recommendations of the concerned parties, if they are to be successfully implemented. This section reports on respondents recommendations as to how the conflict can be reduced including (1) who should do it, and (2) the consequences of continued conflict in the region.

4.7:1 The Local People Recommendations

When asked to state what they thought could be done to reduce wildlife-human conflict in the region, completely fencing off of the reserve to enclose wildlife within the protected area was thought of by most local residents (34%) to be the only remedy worth considering. Many residents of Masai Mara region were wary of wildlife problems, and felt that to reduce the suffering, total separation could be the best alternative. However, a substantial percentage (13.6%) believed that the government should institute more effective game control measures to curb the wildlife menace, believing that the government was not doing enough. About 10% felt that the government should fence their homesteads, farms and livestock bomas to offer them more effective protection from wildlife. Many residents would prefer to see the government take serious steps in controlling wildlife damage to their property, their crops and livestock, and felt that too much effort was being spent on programs such as education as opposed to the confining of wildlife within the reserve or protecting them (the local people) from wildlife menace. One local resident of Lemek group ranch observed that:

> No amount of education will prevent wildlife from coming to attack us. Nor will economic incentives. What we need is elimination of wildlife damage. Why can't the government fence or give us money to fence our property (L.R. 18).

Thirteen percent felt that the local people should be compensated more generously and promptly for the losses incurred (Table 4.33). The issue of compensation for losses incurred was of great concern to many residents. Few residents ever got compensated and even those who were lucky to receive some compensation, waited far too long. Finally, despite the apparent dissatisfaction with wildlife issues, only 6.6% suggested that the reserve be opened up for human use. This contradicts the prevailing conservationists

assumption that the local people in wildlife areas are less concerned with wildlife protection. Commenting on the idea of opening-up the reserve for human use by the local people, one resident of Koyaki noted:

> If the reserve is opened to human use, many people will graze their livestock there and wildlife will soon be gone. It is good to allow people to graze inside the reserve, especially during the droughts but not to completely open the reserve entirely for human settlement (L.R. 19).

It was clear that although a number of residents did not mind wildlife and the existing reserve, they did not support the idea of being restricted from utilizing the reserve's resources. The denial of grazing land and water points within the reserve was bitterly disputed by many residents and was the constant cause of civil disobedience (illegal livestock encroachment). As one resident of Siana provocatively put it:

> Whether we are allowed or not, we (the local people) will always graze inside the reserve, especially during the droughts for we have no alternative. What does the government want us to do? Where do we get the water during droughts? It is unfair to deny us the right to graze within the reserve, while wildlife often come out here. After-all this was originally our land (L.R. 20).

During the droughts, much of the wells and pools of water in the group ranches dry up. Also most of the Mara river which is the only permanent water source falls within the reserve. So local people may actually have no choice and fencing the reserve may never stop them from entering its area. This means that the long term solution must include integrating local communities into wildlife conservation interests. Such an approach may be the only way to assure the future sustainability of the reserve. Finally, 6.2% made suggestions grouped under "any others" which included: (1) that the local people be made aware of the importance of wildlife, (2) that some consumptive use of wildlife be introduced, and (3) that local people be given priority in wildlife management and other employment opportunities. There is little variation between the group ranches as to how the conflict should be resolved. For instance, almost as many residents of upland ranches wanted the reserve fenced as residents of the lowland (62.9% an 67.0%) respectively. This shows the widespread dissatisfaction with wildlife damage by farmers as well as pastoralists, and the

Table 4.33 Respondents Recommendations for Reducing Conflict by Group Ranches and Zones

PROPOSED SOLUTIONS**	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Game Control			69 (70%)	63 (63%)	68 (68%)	170 (34%)
Fence the park to keep wildlife away from the people	62 (63%)	62 (62.7%)	36 (32%)	34 (34%)	35 (35%)	
	124 (62.9%)		105 (33.7%)			68 (13.6%)
Institute more effective game control	33 (36.3%)	32 (32.7%)	14 (13%)	12 (12%)	15 (15%)	
	65 (34.6%)		41 (13.3%)			51 (10%)
Fence local peoples' homes and farms to protect them from wildlife damage	13 (14.3%)	13 (14%)	14 (13%)	11 (11%)	10 (10%)	44 (8.8%)
	26 (14.2%)		35 (11.3%)			
Kill wildlife causing damage	5 (9.9%)	7 (7.1%)	9 (8.1%)	6 (6%)	8 (8%)	
	12 (8.5)		23 (7.3%)			
	11 (12.1%)	10 (10.2%)				
Compromises/Concessions						
Open park for farming and grazing	6 (6.6%)	8 (8.2%)	5 (4.5%)	8 (8.0%)	6 (6.0%)	33 (6.6%)
	14 (7.4%)		19 (5.8%)			
Compensation/Economic						
Local people own wildlife	5 (5.5%)	3 (3.1%)	7 (6.3%)	7 (7.0%)	7 (7.0%)	29 (5.8%)
	8 (4.3%)		21 (6.7%)			
Restrict incompatible land uses	2 (2.2%)	1 (1.0%)	2 (1.8%)	3 (3.0%)	1 (1.0%)	9 (1.8%)
	3 (1.7%)		6 (1.9%)			
Give economic incentives to local people	9 (9.9%)	13 (13.3%)	13 (13.5%)	15 (15.0%)	13 (13.0%)	65 (13%)
	22 (11.1%)		41 (13.8%)			
Others	3 (3.3%)	10 (10.2%)	9 (8.1%)	4 (4.0%)	5 (5.0%)	31 (6.2%)
	13 (6.8%)		18 (5.7%)			
Total	81 (100%)	90 (100%)	109 (100%)	100 (100%)	100 (100%)	480 (100%)
	171 (100%)		309 (100%)			
Chi-squared 17.481						

lack of government action to arrest the situation. Although many suggested fencing the reserve, others expressed a great sense of awareness of the dangers of such an eventuality. As one local resident of Koyaki noted:

> If the wild animals were completely fenced inside the reserve, they will die. Just like our livestock, they need to move and roam outside here. But since we get no benefit from wildlife, why should we be asked to allow them on our land. This is not fair. We should also be allowed to graze inside the reserve the way we used to do [L.R. 21]

This view demonstrates the indigenous knowledge of wildlife ecology. It is often assumed by conservationist and researchers that the local people do not understand or care about the ecological requirements of the migratory wildlife. This further implies that with some appropriate actions and with the support of the local people, there could be co-existence. It should be emphasized that the integrative activities must be supported by the local communities, otherwise aims might not be achieved. Commenting on compensating local people through the provision of cattle dips, dispensaries, schools and other facilities by the wildlife conservation in an attempt to acquire support for conservation, one resident of Siana group ranch had the following to say:

> We are told this and that is from wildlife, that wildlife brings development, without wildlife and tourism we will not have the cattle dips, there will be no roads here. I would like to know, what is the government doing in this area? I thought these facilities are provided by the government just like anywhere else in the country? In any case, these facilities do not benefit us as much as they benefit tourists and park employees and those who have a lot of cattle (L.R. 22).

4.7:2 Recommendations of Government Officials and Conservation experts

In the in-depth discussions with government officials and wildlife conservation experts, a substantial proportion (38%) of the government officials felt that the reserve should be fenced to keep wildlife inside, 27% felt that the local people should be made to benefit from wildlife, while 23% suggested that they (the local people) be educated about the values of conservation, and 12% suggested other programs including consumptive utilization of wildlife. In contrast, the majority (50%) of the wildlife conservation experts suggested that the local people be made to benefit from wildlife, 25% felt that conservation

education highlighting the economic importance of wildlife rather than ethical considerations be increased, and only 12.5% suggested fencing the reserve (Table 4.34).

From these suggestions it is clear that wildlife experts now agree that wildlife must pay for its survival. As one expert observed:

> In order to keep room for wildlife, it must provide some assistance to the local people with whom it shares land resources. Merely educating the local people and talking about tourism value of wildlife is not enough. Talking about cultural heritage can not appeal to the local people. What is at stake are their immediate needs. We must consider initiating some wildlife consumptive utilization in areas like Masai Mara (W.E. 07).

Some experts however, were hesitant about consumptive utilization:

> Increasing consumptive utilization and encouraging local participation, may in itself lead to rapid depletion of the resources. It should be noted that this is the same wildlife viewed by tourists within the park, and opening the park or introducing consumptive utilization may lead to more abuse and hence undermine the very species we want to conserve. If we have to protect wildlife, we must safeguard the protected area. Without the protected areas, probably no wildlife would be available in the region or any other parts of the country (W.E. 08).

In my view, such consumptive programs when supported with adequate knowledge will not necessarily deplete the resources. The question is knowing which species to cull and at what rate, their levels of reproduction and where exactly they can be harvested.

Table 4.34 Recommendations by Government Officials and Wildlife Conservation Experts

SOLUTIONS/RESPONSES	GOVERNMENT OFFICIALS	WILDLIFE EXPERTS
Local people should benefit and be involved	7 (27.0%)	4 (50.0%)
Fence-off (completely) the protected area	10 (38.0%)	1 (12.5%)
Increase wildlife education, highlighting wildlife's economic importance rather than ethical consideration	6 (23.0%)	2 (25.0%)
Others	3 (12.0%)	1 (12.5%)
Total	26 (100.0%)	8 (100.0%)

4.7:3.1 Implementing Solutions

Successful implementation of the strategies for integrating wildlife conservation and local development will to a large extent depend upon who is in charge and whether the responsible organization is acceptable to the local people. When asked to state who they thought should implement their recommendations, the majority (65%) said the government, 23% stated a joint body, in other words, the government and the local people, and 12% said others (Table 4.35). These results suggest that many local people still see the government as the key player in wildlife conservation matters. As with any resource the government must play a leading role in its allocation. The substantial percentage suggesting joint management points to the fact that many people are beginning to see benefits from wildlife and would want to be involved in its management. It is however surprising that many did not see the Narok County Council (NCC), currently responsible for the management of the reserve as a better institution for co-management. This may mean that few of the local residents perceive wildlife conservation matters as being the responsibility of the NCC. Although NCC manages the reserve, wildlife outside the reserve is the responsibility of the KWS. It may also mean that many of the respondents did not differentiate NCC from KWS and saw them both as the government. County councils are often referred to as the government.

Those surveyed were asked to state what would happen in the area if no measures were taken to control the conflict. Slightly over half of the respondents said that people would lose more of the property (Table 4.36). As one local resident of Lemek said:

> If the trend continues, then the situation will get worse. All our crops and stock will be destroyed, we will continue to suffer. Wildlife cannot get hurt because they are protected by the Government (L.R. 24).

Table 4.35 Recommended Institution(s) for Reducing Conflict by Group Ranch and Zone

WHO SHOULD DO IT?**	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
The Government	47 (58.0%) 106 (61.8%)	59 (65.5%)	40 (36.7%) 139 (45.2%)	57 (57.0%)	42 (42.0%)	230 (46.0%)
Local communities	14 (17.4%) 25 (14.8%)	11 (12.2%)	22 (20.2%) 54 (14.2%)	15 (15.0%)	17 (17.0%)	91 (18.2%)
Government and the people	6 (7.4%) 10 (5.9%)	4 (4.4%)	16 (14.7%) 34 (10.9%)	10 (10.0%)	8 (8.0%)	49 (9.8%)
County Council	11 (13.5%) 21 (12.3%)	10 (11.1%)	15 (13.8%) 43 (13.6%)	9 (9.0%)	19 (19.0%)	61 (12.2%)
I don't know	2 (2.5%) 5 (2.3%)	3 (3.3%)	9 (8.3%) 25 (8.1%)	8 (8.0%)	8 (8.0%)	26 (5.2%)
Others	1 (1.2%) 4 (2.3%)	3 (3.3%)	7 (6.4%) 18 (5.8%)	5 (5.0%)	6 (6.0%)	23 (4.6%)
Total Chi-quared: 30.677	81 (100.0%) 171 (100%)	90 (100%)	109 (100%) 309 (100%)	100 (100%)	100 (100%)	480 (100%)

But one resident of Kimentet noted:

> If nothing is done, wildlife will be displaced. They will disappear from here and go to the reserve. But if the government improves the situation at present, then we will continue living with wildlife. In any case, we have always lived with them (L.R. 25).

In-depth discussions with Government officials and wildlife conservation experts revealed some startling predictions. If nothing was done, all of the Masai Mara region would be dominated by intensive human activities and wildlife would be confined within the small area of the protected zone. A number of suggestions were made, especially from the informal discussions, which may be useful to consider. One such suggestion was that the government should lease land from the local people (just as the commercial farmers do) for wildlife use. In the words of one local resident of Lemek (where leasing of land to outsiders is gaining popularity):

> People are leasing land for crop cultivation, and wheat farming. If the government feels that this area is good for wildlife why don't they (the government) lease the land for the wildlife. Then they can control the uses they do not want. I think people (we) can accept such a deal as long as our right to graze is not restricted (L.R. 26).

The leasing of land, and sometimes even the sale of land, is increasing in most parts of the Maasailand (Galaty 1992). According to Galaty, over 40% of land has changed hands. One ranger working with the reserve, but a resident of Kimentet group ranch, had a different suggestion:

> There is so much wildlife outside the reserve. In fact sometimes we see more wildlife in the group ranches than inside the reserve itself. Why can't we have the area declared a wildlife conservation area of the Masai Mara region? The government can control the use but benefits go to the local people. I hear that in some countries they do that and the local people have benefitted and allowed wildlife on their land (L.R 27).

This view of the ranger is interesting as it reflects the commitment of a wildlife employee (who benefits from wildlife but who at the same time suffers from its nuisance) to compromise both needs. It also shows the influence of the contemporary attempts in other African countries especially Zimbabwe and Zambia where consumptive wildlife programs are being introduced to benefit the local people.

Table 4.36 Perceived Consequences of Failing to Resolve the Conflict by Group Ranch and by Zone

VIEWS OF RESPONDENTS**	UPLAND ZONE		LOWLAND ZONE			MARA REGION
	ANGATA BARAGOI	KIMENTET	LEMEK	KOYAKI	SIANA	
Wildlife will be displaced	42 (51.8%)	54 (60.0%)	48 (43.2%)	35 (35.0%)	39 (39.0%)	237 (47.4%)
	96 (56.1%)		112 (36.2%)			
People will loose more lives, crops and stock	37 (45.7%)	30 (33.3%)	50 (45.0%)	57 (57%)	53 (53%)	232 (46.4%)
	67 (39.2%)		160 (51.8%)			
I don't know	2 (2.5%)	4 (4.4%)	8 (6.3%)	5 (5.0%)	6 (6.0%)	20 (4.0%)
	6 (3.5%)		19 (11.1%)			
Others	1 (1.0%)	2 (2.2%)	3 (2.7%)	3 (5.0%)	2 (2.0%)	11 (2.2%)
	3 (1.8%)		8 (2.6%)			
Total	81 (100%)	90 (100%)	109 (100%)	100 (100%)	100 (100%)	480 (100%)
	171 (100%)		309 (100%)			
Chi-squared 49.425						

Some local people were concerned with the distribution of the tourism benefits. One local resident of Angata Baragoi suggested that if any money was to be given, then all should benefit equally, and if possible the benefits should be given to individuals rather than group ranch leaders or to the households rather than developing community facilities. He felt that as it was some people benefited more than others. There was also the issue that benefits from wildlife be given on the basis of which group ranch contained more wildlife and on which group ranch people were not cultivating. The same resident felt that it was unfair to exclude residents from Angata Baragoi as they too suffer from wildlife damage. This brings to question the spatial area that was necessary for wildlife use and the mechanisms of distributing the wildlife benefits. Who should get what and on what basis? Should those living closer to the park get more than those far from it? Should those cultivating be excluded? Although such issues were outside the scope of this study they become relevant when considering the implementation of the developed model.

4.8 Summary and Conclusions

This chapter has presented the results of the wildlife-human conflict study in the Masai Mara region, presenting an analysis of the nature and causes of the problem and offering some insight as to how it may be resolved. Important factors and issues were presented, such as: the setting for the conflict, perception of the conflict, quantification of conflict, factors influencing conflict including management of conflict, and respondents recommendations as to how the conflict can be reduced. Factors important in establishing the degree of conflict and in formulating conservation attitudes have been identified and analyzed.

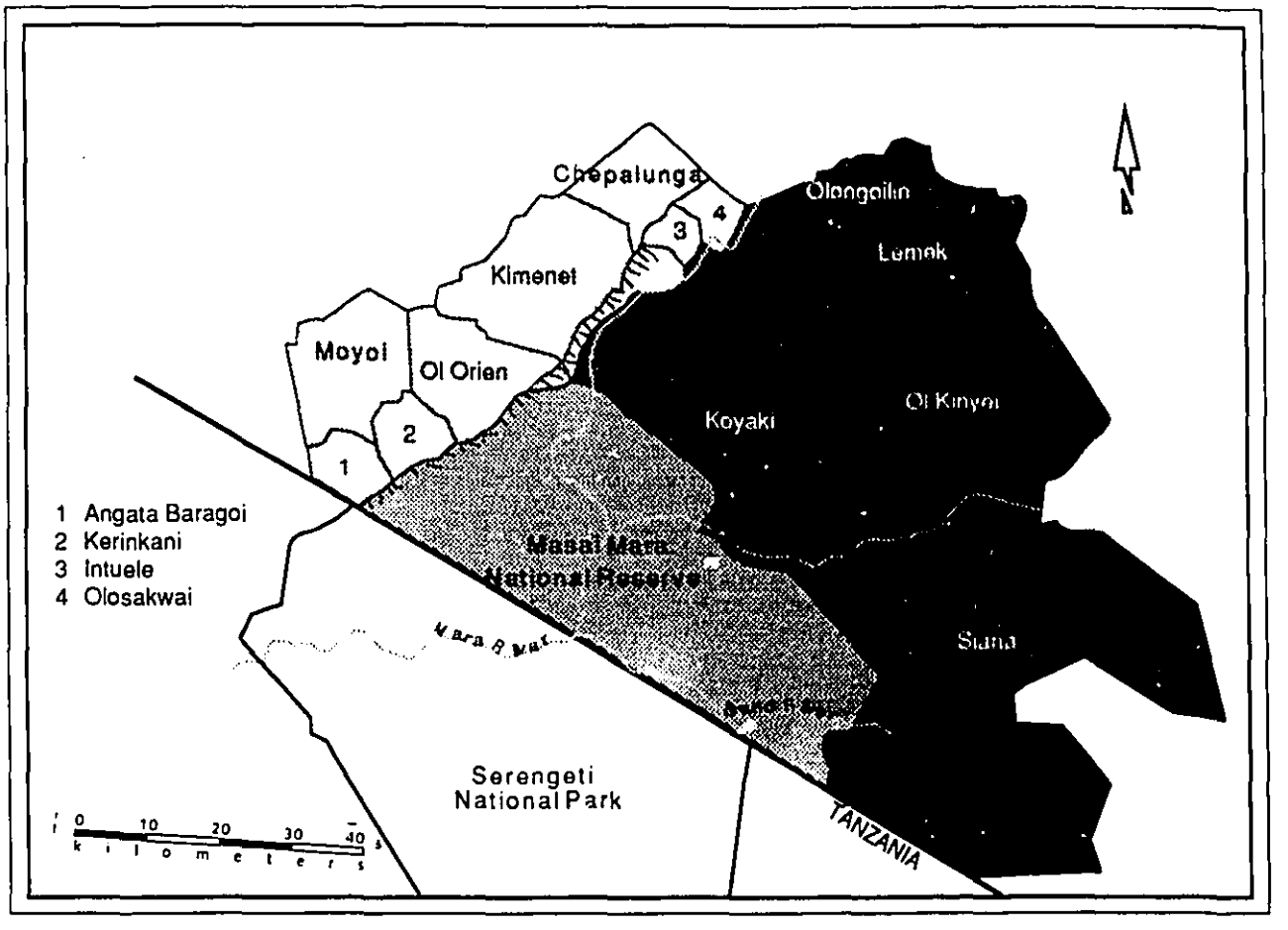
1. Since 1960, human, livestock and wildlife populations have increased tremendously in the region. At the same time, considerable changes in the general environment and in land use have occurred. These changes have set the stage for the wildlife-human conflict.

2. The findings indicate that conflict has increased over the last 30 years in Masai Mara region. An overwhelming majority (96.0%) of the local people of the Masai Mara region were aware of the existence of wildlife problems. The most common types of conflict were livestock depredation, crop destruction, disease transmission, human deaths or injuries, competition for resources (such as space, pasture and water), and others (such as destruction of fences, water pipes and granaries). Crop destruction occurred primarily in the upland ranches where agriculture was practised. Livestock depredation was common in the plains (lowland) and so was the transmission of diseases. Human bodily injuries or death occurred almost uniformly within the region. The most destructive predators were found to be lions, leopards and hyenas, while wildebeests lead in disease transmission. The most frequently sighted wildlife were wildebeest and zebra largely due to their large numbers as well as their resident and migratory nature. Conflict occurred more frequently in areas closer to the reserve, at riverine and permanent water points, and became more acute during droughts when the resources for which they were competing became scarce.

3. The degree of conflict is spatially varied within the region (see Map 4.1). Upland ranches with high land potential, high human and livestock population densities, and more agricultural development, experienced less conflict. In such ranches the previously abundant wildlife, especially the large herbivores, had been displaced and were increasingly being confined to the lowlands and ultimately, to the reserve. Lowland ranches, still predominantly pastoral areas, were comparatively more arid and exhibited a high wildlife density, but low human and livestock population densities. These areas experienced high, frequent and intensive levels of conflict. As human population increases and agriculture expands in the uplands, more and more wildlife and livestock will be displaced and confined to the lowland ranches leading to grazing pressures and encroachment into the protected area. This pressure will be exacerbated during times of drought since it will be the only place for the pastoralists to turn for water and pasture.

4. The degree of conflict also varied with distance from the protected area, such that

Map 4.1: Spatial Variations of Wildlife - Human conflict intensity in Masai Mara Region



LEGEND:

Low conflict intensity - predominantly human use (upland)

Low conflict intensity - the reserve region

High conflict intensity - predominantly pastoralism and wildlife (lowland)

Escarpment

areas closer to the reserve experienced a higher degree of conflict than areas further away from it. Such areas also had high wildlife, human and livestock population densities. Human populations were attracted largely by the development resulting from tourism. Cost and amount of crop damage, and the numbers and cost of livestock killed by wildlife also varied with distance from the reserve such that the number and costs were higher in areas closer to the reserve than those further away from it. Conflict intensity also varied seasonally. Conflict was more acute during times of droughts when the resources being competed for became scarcer than usual.

5. Factors causing wildlife-human conflict were found to be varied. The primary factors were increasing human population density and changing land use patterns. Immigration into rangelands had altered the land use systems of the region. Many of the lands which had been settled by immigrant farmers were previously included within the dry grazing resource base of the pastoral peoples and wildlife. Rangeland grazing space had also been further reduced by the designation of specific areas exclusively for wildlife. The nomadic movements of the Maasai was becoming increasingly restricted to smaller areas, especially in the lowlands. Conflict was also influenced by expanding agriculture and general changes in the patterns of land use, including the establishment of permanent human settlements. Agricultural expansion led to habitat destruction and fragmentation. Agriculture had increased tremendously, initially leading to an increase and then a reduction in the degree of conflict. The conversion of rangeland into agricultural land was blocking wildlife and pastoral movement forcing more Maasai into the lowland areas. This in turn has put pressure on the Masai Mara National Reserve, where grazing is formally prohibited but which is the last area available for Maasai expansion.

6. Many of the local people supported the conservation idea, although few supported the protected area and the government authority. Many were unhappy with the fact that they suffered wildlife damage and yet received no direct benefits from wildlife conservation and were denied access to resources within the reserve. Many residents of the Masai Mara

region acknowledged the importance of the protected area, were aware of wildlife use as a tourist attraction, and understood how it engendered foreign exchange for the government. However, many other local residents of Masai Mara perceived wildlife as a nuisance to human interests. Wildlife was defined both in ecological terms, as wild animals living in the bush, and administrative terms, as animals protected by the government. Households who had experienced direct benefit from wildlife or whose relative(s) were working in wildlife-based tourism as well as those who were aware of wildlife conservation priorities were more positive towards wildlife conservation. Households who had past problems with wildlife, those who had not been compensated, people who had experienced a shortage of grazing land and water or who perceived their actions against wildlife as ineffective held more negative attitudes towards wildlife conservation and government wildlife programs. Households who were aware of wildlife conservation priorities positively perceived the needs to conserve wildlife. Although many felt wildlife conservation authorities were not helpful, there appeared to be little evidence of hostility towards the conservation authorities. In times of difficulties such as sickness, local residents often turned to the reserve authorities. There were also various social activities, including local sports such as soccer, that the local people shared with the reserve employees. Level of education, long-term residency, system of land ownership, and the provision of wildlife community facilities had little influence upon the attitudes towards wildlife conservation and government wildlife programs.

7. Generally, the local people believed wildlife was not an asset but a nuisance and that they would be better off without it. This attitude must be changed if wildlife is to be sustained. At the same time, the local people perceive wildlife and the protected area from an entirely utilitarian and materialistic viewpoint. Material benefits can always dry up. For instance, tourism revenue is dependent upon tourists' visits. Ethical reasons for conservation are more enduring. Attempts must be made to instill ethical reasons over materialist reasons. This may mean a change in the contemporary wildlife conservation

education approach. Conservation education should strive first to understand what the local people do or do not know and how their knowledge differs from that of the contemporary conservation programs. The local people have lived with wildlife for years and assuming they do not know or understand the ecology of wildlife is improper.

8. Expanding development has to a restriction of the seasonal migratory patterns for wildlife. Because migrations are undertaken in the quest for grazing land and water, which are the controlling factors for both wildlife and pastoralism, any impediment to movement, resulting in constriction of the herds to the reserve could lead to the deaths of many species. Local people lose a substantial portion of their resources to wildlife. Substantial man-hours were spent by local people guarding their property from possible wildlife attack, watching farms over night and constructing scarecrows. In-depth discussions with Government officials and wildlife conservation experts reveal some startling predictions. If nothing is done, all of Mara region will be turned over to intensive human activities and wildlife will be confined within the small area of the protected zone.

9. The results revealed that there is no one single solution to wildlife-human conflict within the region. Many residents of the Masai Mara region suggested that the protected area be completely fenced to enclose wildlife so as to prevent the animals from coming outside and damaging their property, whereas others suggested that property belonging to the local people be fenced-in to protect it from wildlife damage. Many felt that compensation for losses due to wildlife should be paid promptly. A number of residents felt that they did not gain any direct benefit from wildlife through tourism, but that if local people did benefit then, they might support conservation. Some felt that the local people should be provided with priority as regards employment opportunities in the reserve management. If the conflict is not resolved, many residents of Masai Mara believed that they (the local people) will lose more of their property. Wildlife will, however, increase in the region; since it is protected by the government. Still other residents felt that wildlife would eventually be displaced from the region by expanding agriculture and human activities.

10. In conclusion, there is still room for co-existence between wildlife and humans in the Masai Mara region, but only with careful planning and proper management that involve and benefit the local population. Time is rapidly running-out, if no tangible action is taken in the near future, within at most the next ten years, it would be difficult to reverse the trends currently occurring. Wildlife will be displaced from the group ranches and the fragile environment will be damaged. Although tourism will continue in the enclosed reserve, much of the world's natural resources would have been lost. Strategies should aim at controlling cultivation and the associated land uses. The most important action for reducing wildlife-human in the region include effective wildlife-damage control, the provision of benefits for local people from tourism revenue, appropriate conservation education, and an efficient compensation scheme in response to loss due to wildlife damage. The aim is to improve the attitudes of the local people towards conservation and the government wildlife programs.

CHAPTER FIVE

Chapter 5

THE PROPOSED PROGRAM FOR INTEGRATING WILDLIFE CONSERVATION WITH HUMAN NEEDS IN MASAI MARA REGION

5.1 Introduction

The major goal of this work was to provide information on wildlife-human conflict around Masai Mara National Reserve and to make management recommendations. Four of the five objectives outlined from page 11 to 14 have been addressed in the preceding chapters. This chapter develops the fifth goal, management alternatives for integrating wildlife conservation with human needs in the region.

5.2 Integrating Conservation-with-Development (INCODE) Program

Wildlife conservation must be culturally and economically valuable to the local people if it is to be sustained (Firey 1960; Lusigi 1978). This study showed two major trends in the conflict between wildlife and human settlements. The first is the continuing conversion of land from open extensive use to enclosed intensive use. Once, humans, domestic animals and wildlife interacted with one another within a diverse habitat that offered an array of sustaining resources under different seasonal circumstances. Increasingly, cultivation in permanent and fenced farms is displacing both nomadic pastoralism and wildlife. The consequential increase in pressure on domestic grazing range means that wildlife is less likely to be tolerated and more likely to be displaced. Only the reserve is protected for wildlife, but migratory animals cannot exist in confined spaces.

The second trend is the increasingly antagonistic attitudes of local people towards both wildlife directly and to the existing tourism industry which seems to value animals above people, foreigners above nationals, and the urban tour operators above local agro-pastoralists. There is clearly both an ecological and social crisis looming, but they are both

parts of a single problem.

Some means must be found to reconcile the needs of wildlife with the legitimate needs and aspirations of the local communities. Any solution to the needs of wildlife conservation in the region depends to a large extent on the solution to the needs of the local people. There must be some measures to protect the local people, their livestock, and their crops from wildlife depredation. Furthermore, there must be genuinely involvement and active participation of the local population in the process of wildlife conservation. An integrative approach is the only way to ensure long-term conservation of wildlife and the management of a wildlife ecosystem.

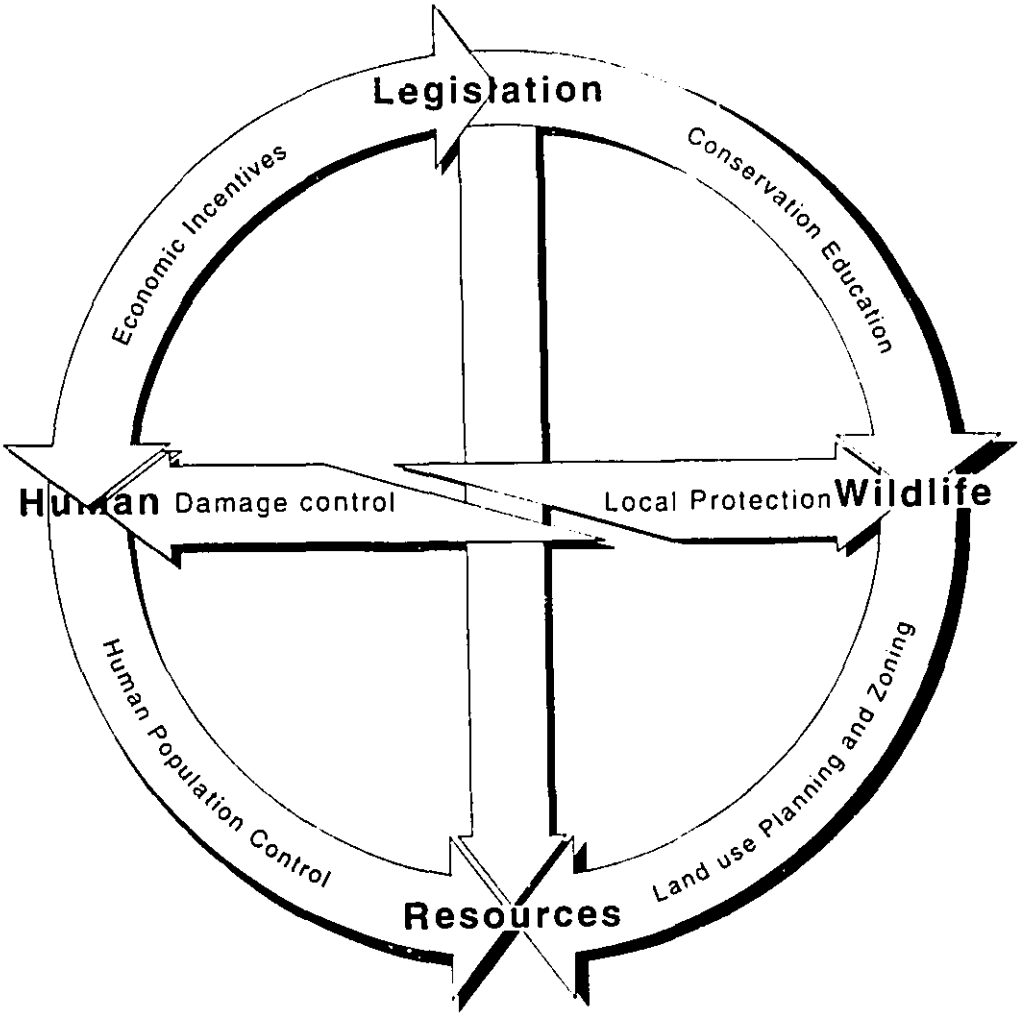
It must be remembered that conflict is not constant or, in limited measure, intolerable. For most of the year, wildlife (elephants, buffaloes, lions, leopards and other wild animals) live close to people with limited conflict. In many areas where wildlife occurs outside protected areas, it shares land with people, agriculture and livestock (Lindsay 1987). When conflict does arise, it does not necessarily require elimination of humans or wildlife from the area. Both human and wildlife can endure some measure of conflict. Effective conservation must involve reducing and mitigating conflict.

A two-phase program for managing and minimizing conflict is proposed. The first phase involves land use planning and zoning of the region. The second phase presents the integration of wildlife conservation and human interests through community wildlife-damage control (COWICO), compensation for losses, sharing of tourism benefits with local people, conservation education, wildlife consumptive utilization, and local participation in wildlife conservation policy. Although wildlife-human conflict in the region might never be eliminated, with careful planning and management, the conflict can be significantly reduced and mitigated. The proposal is based on (1) the current debate on integrating wildlife conservation with human development needs presented in chapter two, (2) the past and present situation of wildlife-human issues in Masai Mara region and the entire country, as

reviewed in chapter three, and (3) this study's empirical findings presented in chapter four. The program employs an adaptive and dynamic approach and is, therefore, flexible. Its implementation and operation must be monitored and modified accordingly and requires continued research and evaluation. The proposed program will address five different elements (Figure 5.1) aimed at reducing conflict.

1. Direct economic benefits - including compensation for losses
2. Game damage control activities that involve local people
3. Land use planning and zoning - including appropriate policies
4. Appropriate conservation education that includes preventing wildlife damage
5. Local participation in wildlife conservation decision-making, policy and activities

Figure 5.1 Strategies for Reducing Wildlife-Human Conflict in Masai Mara Region



The proposed program relates to the concepts of Biosphere Reserves (Francis 1989; Hulshoff and Gregg 1985; UNESCO 1974) and The Conservation Unit Approach (Lusigi 1978; 1981; 1987). The two provide a flexible means for integrating conservation with human activities. This integration is thoroughly applied in the program presented and, once implemented, aims at a higher standard of living and a higher level of security for the local people. As a result, the human pressure on wildlife resources and the protected area will be reduced and, therefore, the region's resource for tourism activity will be preserved. Maintaining the base for a tourism industry in this way provides intensive local involvement in this economic sector and its shared revenues.

Projects with similar goals have been started in Zimbabwe and Zambia, where income derived from safari hunting has stimulated rural development in a broad way and dramatically improved wildlife conservation (Child 1990; Murindagomo 1990; Ramberg 1993). The Zimbabwe's CAMPFIRE program started in a semi-arid area, provides the community with the authority to manage their own resources. It gives an immediate pay-off to the local people and provides higher income (Grootenhuis et al. 1990; Kiss 1990; Lewis et al. 1990). As a result, the attitudes of the local people towards wildlife have changed from that of hostility to one of appreciation, and land use plans have been established that accommodate both wildlife and people (Grootenhuis et al. 1990; Taylor 1982). Despite their achievements, the remaining problem of these programs is their imposition from above and their lack of true local participation. In fact, recent evaluation studies covering different parts of the world suggest that there may be no on-going projects with genuine local participation (Ramberg 1993; Wells and Brandon 1992).

5.2:1 Phase I: Zonation and Land Use Planning

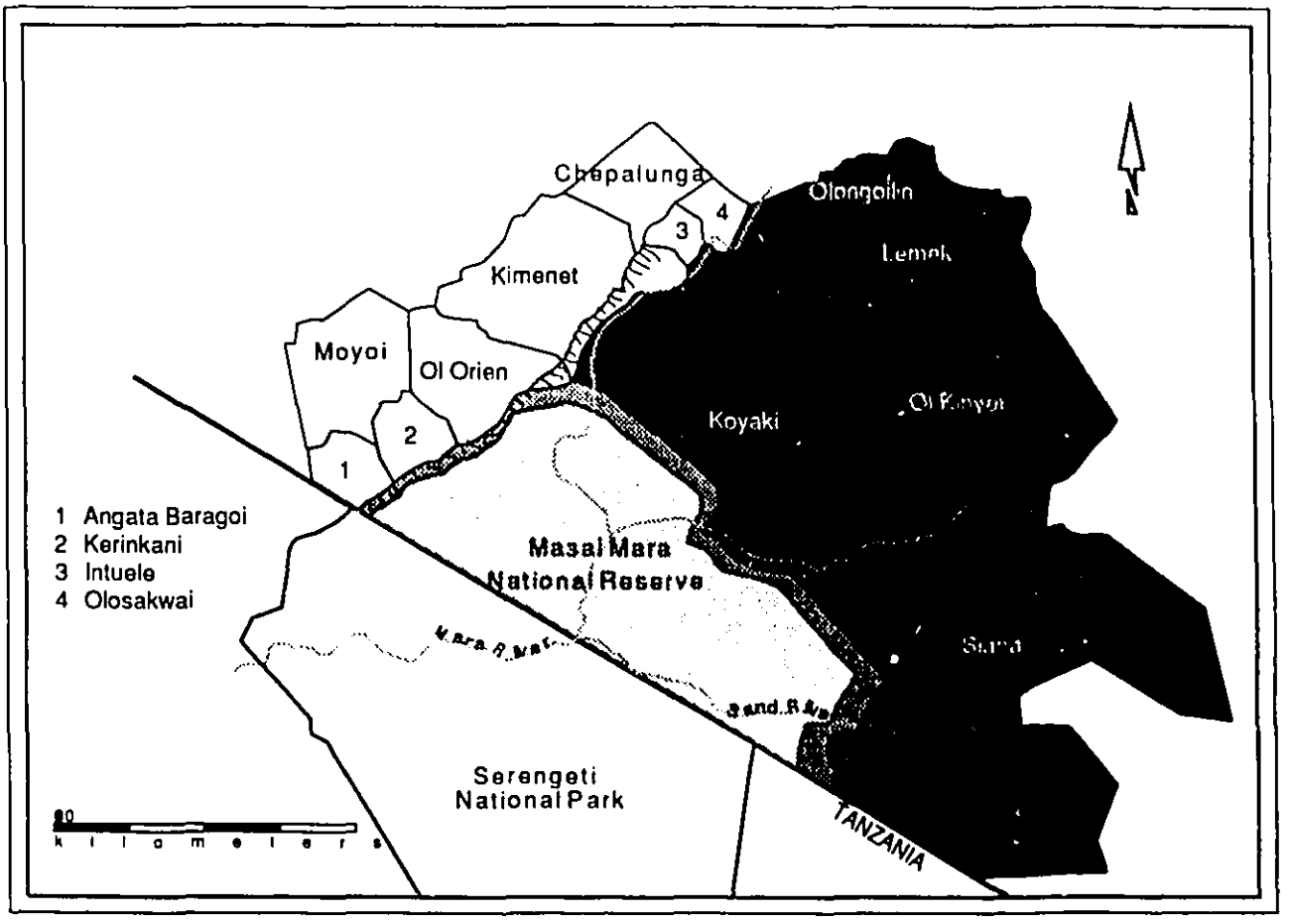
The zonation and land use planning is based upon the nature and degree of conflict as assessed in the field. It also considers the physical characteristics, the ecology, and the

land use development levels of the region, including land use potential. Upland ranches have high land use potential, high human and livestock population densities, and more development of agriculture. They experience low wildlife-human conflict. Lowland ranches are more arid and have lower human density and little agriculture, but have high wildlife and livestock population densities and experience high conflict. Areas closer to the protected area or along rivers, where habitat for wildlife is relatively abundant, experience more conflict. Four zones (Map 5.1) are therefore identified for effective management of the region to reduce wildlife-human conflict: Zone A presents the protected area, Zone B the peripheral area, Zone C describes the multiple use (lowland) zone, and Zone D depicts agriculture - intensive human settlements (upland) zone in which development is permitted but regulated for environmental protection.

I. **Zone A = The Protected Area:** This is the Masai Mara National Reserve, an area of about 1,316 sq. km. The primary purpose of this zone will remain to be conservation. Although this area is crucial for wildlife and tourism and the maintenance of the ecosystem, local people could be allowed controlled access to reserve resources for grazing during droughts. It was found in this study that one of the reasons why local people do not wholly support conservation, and the protected area in particular, is that they are denied access to the resources of the protected area. Many residents of the Masai Mara region believed that the reserve is a liability to them. Some of the benefits which the reserve generates such as game viewing, tourism revenues used in community development projects, and the protection of wildlife for future generations, do not benefit the local people.

Most of the Mara river which is the only permanent water source in the region is within the reserve. Although there are plenty of pasture and water outside the reserve during wet season, in dry periods, only the Mara river contains adequate water. Examples of arrangements whereby local people use park resources on a rotational basis exist in

Map 5.1: Proposed Land Use Planning and Zoning Map



LEGEND:

Zone A: The Protected Area

Zone B: The Peripheral Zone

Zone C: The multiple use zone (lowland)

Zone D: The intensive agriculture & human use zone

Escarpment

some countries. In Nepal, for instance, local people are allowed seasonally to cut wood for home use in Chitwan National Park (Mishra 1982). Cutting blocks are designated, and harvest levels set and rotated to ensure sustainable use.

II. Zone B = Peripheral Area: The peripheral zone can stretch for about 1-2 km. around the reserve. In this zone, there should be very limited human use, and the bush must be maintained or artificially created. The zone should be considered only for forestry and livestock use. Only a few lodges can be located in this zone. Most communal tourism facilities should be located in the multiple use zone (zone 3). Grazing and game viewing would be permitted. When required to control herd size, wildlife may be harvested for sale of meat and hides under a closely supervised management plan. Such wildlife utilization methods have been used in some South African countries including Zimbabwe (Bonner 1993; Martin 1986; Taylor 1985). Live capture of wildlife for sale could also be considered as a means of controlling the wildlife population. Water development and habitat manipulation could be instigated to maintain or increase the carrying capacity of the ranges. In future, it may be necessary for conservation organizations to informally provide money to purchase land within this zone. Such a move could become necessary, especially if the selling of land continues and there is no legal provision to stop it.

III: Zone C = Multiple Area: Pastoral land/wildlife dispersal areas. This is currently a predominantly pastoral area with high wildlife population density. It has limited agricultural potential. This zone is critical for the future of the entire ecosystem. It is approximately 3000 sq. km. Human population density is still low (about 6 person per sq. km.) compared to over 45 person per km. in the upland zone. In this zone, there is some degree of compatibility between the primary land uses wildlife and pastoralism. Dispersal of wildlife from the reserve into this zone is allowed. Experimental projects for wildlife utilization such as game

cropping, culling, and safari hunting can be initiated in this zone, but only after adequate research. Although the Maasai do not feed on game meat, immigrants do. Other game trophies such as hides and tail-hair (eg. from wildebeests) can be processed and sold outside the region. Industry to process the game by-products can be established in this zone. This will create employment opportunities and provide the local people with direct benefits. Tourism facilities would be permitted. The main use of the zone would be wildlife management and livestock production. Cultivation would be discouraged. Professional safari hunting concessions, game cropping programs can be introduced but the revenue generated must go directly to the local people. Tourism activities would be organized mainly by the local residents.

Incompatible uses are shifted to non-sensitive sites through restrictions, setbacks, and other measures. Non-sensitive areas must be identified. Only limited agriculture around or within homesteads is permitted. Immigration is prohibited. The objective in this zone is to protect the natural landscape from further development through enforcement of relevant restrictions. The Mara river and other riverine areas must be protected. The impact of permitted uses will be minimized by regulating design, location, and even construction materials (this should include homesteads of the local people). Environmentally aesthetic development should be encouraged. Tourist lodges should also be well sited, and their development must be controlled. During the time of this study several lodges were haphazardly being developed. It is recommended that planning be emphasized to control such developments. Maintaining this area will ensure the continued viability of the nature reserve. The lucrative developments in the semi-arid lowlands are tourism and livestock husbandry. The most common form of tourism at the moment is game viewing and lodge developments. Cultivation and permanent settlements must be restricted.

IV: Zone D. Intensive Settlement Area (Upland): This is the zone of high rainfall, good

soil and higher ground. The ecological conditions encourage cultivation. It is the densely settled part of the region and has less conflict. The zone should be protected from land degradation through appropriate land management. Intensive agriculture can cause soil erosion and the drying up of a fragile environment. The loss of forest habitat will lead to the disappearance of some of the Mara's rarer species, such as the giant forest hog and the red duiker. Cultivation adjacent to the boundary discourages the dispersal of wildlife, which together with the subsequent killings of wildlife, creates compression problems in wildlife areas. Although wheat farming is currently not found in the group ranches immediately adjacent to the reserve, it is fast expanding in upland areas including in the Olchorro Forest, north of Aitong.

Commercial wheat production is an economically attractive alternative to landowners but it is not labour intensive and contributes nothing to the group ranch economy, except the lease fee (at present about Kshs. 150 shillings per acre annually). These fees, though quite substantial, rarely benefit all members of a group ranch.

5.2:2 Phase II: Integrating Human Interests with Wildlife Conservation

The second phase involves six components that can help reduce conflict, and thus contribute to the integration of wildlife conservation and human needs. These include: (1) community wildlife-damage control; (2) wildlife compensation programs; (3) sharing of the tourism revenue; (4) wildlife conservation education; (5) pilot wildlife consumptive utilization programmes; and (6) local participation in wildlife conservation policies and management.

5.2:2.1 Community Wildlife-Damage Control (COWICO)

The traditional game control measures include game ranger patrols of the villages, harassing, capturing or shooting of the problem animals and/or fencing parts of the protected area to contain wildlife and prevent human encroachment. From the surveys, it

was found that game officers rarely provide effective game control. Many of the Masai Mara residents felt that the officers do nothing to protect them from wildlife damage. Ecologically it is inappropriate to fence the protected area. It was further found that the local communities undertake various measures to control wildlife damage including night-guards of their homesteads, sometimes in groups of manyatta.

It is recommended that community-based wildlife-damage control programs be encouraged. Local people should be employed to guard their property, livestock, homesteads and farms. They know the area well. Many local residents felt that the government should provide them with resources to protect themselves from wildlife damage.

Involving the local people in wildlife damage control will reduce the incidence of death and suffering that occur during wildlife invasion. Most importantly, it will help manage problem animals, minimize conflict, and increase tolerance of the animals by the local people. Local involvement in damage control will reduce the cost of providing vehicles by the government, mobilizing manpower and resources to respond to crisis situations as well as providing local people with employment, thus improving their standards of living. This is a more economical and ecological alternative to wildlife damage control. It would promote sound and sustainable options and enhance conservation. If professional safari hunting is introduced, the professional hunters can be restricted to focus their hunt on problem animals. In addition, the hunting fees should go directly to the local people.

In agricultural areas such as the upland ranches, various wildlife-damage control measures can be tried. For instance, locally recruited game control scouts can visit gardens that have been damaged by wildlife; they can spend the nights in the farms, guarding the normal way owners guard; if wildlife approaches the farm, it can be scared away by beating drums. If animals return frequently to the same farm, the scouts can shoot or immobilize and then capture them.

From the survey, it was found that households who had suffered wildlife damage were likely to hold more negative attitudes towards wildlife than those who had not, and they were more likely to suggest that wildlife be confined within the reserve. Those who felt that they were less effective in controlling wildlife damage held less positive attitudes towards wildlife. Persistent attacks by wildlife on humans hinder support among local people for wildlife conservation. Many residents of Masai Mara region expressed hostile attitudes towards wildlife owing to the wildlife threats to livestock, crops and people. It would appear that if wildlife damage is controlled, local people may start having less antagonistic perceptions of wildlife. Effective control of wildlife damage will also reduce loss of stock and crops to wildlife, as well as compensation claims. It is not surprising that a substantial proportion of local residents of Masai Mara region suggested that the government should provide the local people with resources to protect their property from wildlife damage. Special corrals and fences should be constructed to keep livestock safe at night. In addition, I suggest that local people should be employed as night-guards to help protect livestock from attacks by wildlife. The livestock owners will then in the evenings drive their stock to be guarded by locally employed guards supplied with guns. These people would be taken for paramilitary and wildlife conservation training. Such arrangements, where the community is involved in game management, have been attempted in some areas such as Botswana (Bonner 1993) but mostly to help identify poachers amongst the local people. In this study it is being proposed as a practical way of protecting people from wildlife problems, hence reducing the conflict.

The proposal that the guards be given guns faces two challenges and may be opposed by some parties. Many may see it as lethal to wildlife, i.e, that it will lead to more killing of wildlife. This may not be the case if the program is well planned and properly managed. First, the wildlife is often killed by local people in retaliation. From the survey, it was found that the Maasai will always try to kill the problem wild animal following attacks.

In the process, many local people get killed or injured. It appears that human injuries and deaths occur during the fight to drive the predator away from livestock or to kill it after it had killed stock. In some cases they may kill another animal in pursuit of the culprit. To reduce the possibility of killing the predator in the process of its attack, it is recommended that the predators be stunned and immobilized by darts shot from a gun. This is a common practice used to immobilize the rhinos. After the animal has been immobilized it will be trapped and translocated to the protected area. If the predator is on the kill, it could be scared and distracted from its prey and then immobilized.

This will directly reduce the conflict, but only with regard to livestock predation. By introducing such a strategy, the night-time killing of livestock may be reduced by over 50%. This may help change the attitudes of the local people from that of hostility to appreciation of wildlife conservation. The local people should be trained how to avoid and survive wildlife attacks. According to the survey, the species that attacks people most often is the buffalo, which often attacks on first sight. One traditional way of surviving such attacks is by climbing trees (although women and old people really cannot climb trees). Often the people killed are those of working age who, for example, go out to let the livestock graze.

Whatever the conflict control strategy considered, the cost must be assessed and the local people must be consulted. For instance, the construction of a fence may interfere with the local people's regular day-to-day activities and/or may require their input. If people are not consulted, they may break or damage a fence. The choice of an appropriate form of wildlife control must be made in relation to the overall land use plan for the region depending on the patterns of human use of the area.

5.2:2.2 Compensation for Losses

The current compensation programs must be streamlined. From the survey, many residents of Masai Mara region were dissatisfied with the government's compensation

system for wildlife damage. Compensation in general is considered successful and well worth its cost in some areas because it involves instant financial incentive. As a result it may help change local people's attitudes towards wildlife and improve communication with wildlife conservation authorities. A combination of a carefully designed compensation program, improved wildlife damage prevention techniques, and an educational program may provide a satisfactory solution to the wildlife-human conflict. In the end, compensation would be reduced if there is effective game control. Compensation programs for losses must be promptly provided and grazing fees paid for. These programs could be supported by revenue raised through ecotourism, gate receipts from the reserve, and future wildlife utilization programs. A simpler and fairer system for compensating the local people is required. It would be necessary to consider other forms of compensation programs as, for instance, an insurance program. However, it would be unfair to expect the local people whose crops are ravaged by marauding elephants to pay the premium. Here again, tourism revenue may be used to pay at least the initial premium. Details of what is to be insured (human life only or livestock predation) should be worked out by a special compensation review committee.

5.2:2.3 Tourism: Economic Benefits and Local development

An important way of involving local people in wildlife management and reducing their antagonistic attitudes is the improvement of the flow of benefits to them. This could be stimulated by a range of projects funded by tourism revenue including (1) favoured opportunities for employment in the reserve and tourism lodges, (2) boosting cottage industries such as handcrafts or grain store construction, (3) provision of communal infrastructure (e.g., schools, health centres) to show the local people that they can benefit from wildlife conservation. However, the local people do not directly link communal infrastructure with wildlife conservation. Through gate fees into the reserve, money can be

generated for the direct benefits of the local people.

At the moment, revenue generated from Masai Mara National reserve goes almost entirely to the central government and the Narok County Council. Tourism is an important development option for many isolated, scenic, but economically depressed regions (Boo 1990; Nickels et al. 1991). The use of "cultural manyatta" for tourists should be encouraged amongst the group ranches.This involves tourists on the roads to or from the reserve to visit manyattas, to take photographs, and in some cases buy souvenirs. At present, Kenya Government policy is to strongly discourage photographing of Maasai on visits to Maasai manyatta. Nevertheless, patterns occur that make it possible for visitors to see Maasai. This practice may cause abuse and it is necessary that it be formalized with government support and fixed entry charges. A selected and designated settlement could serve as a centre for the sale of crafts and cultural activities.

5.2:2.4 Wildlife Conservation Education and Extension Services

Conservation education should not be confined only to wildlife conservation concerns but should include all aspects of the environment of the region. It also should not only focus on the local people but include the administrators, planners and politicians. These policy-makers must also be made aware of how to integrate wildlife conservation with human needs. The government agencies, NGOs and other agencies interested in the region should be involved in the creation of conservation awareness and the promotion of local participation. There is and there will always be a great need for education and extension services. Various experts should work hand in hand with the local people. Both government officials and local experts have to be trained in sustainable use of resources, emphasising the human dimension. Training should be offered to field officers who could assist a number of the villagers in an advisory capacity, as well as top managers who are policy makers in government ministries.

5.2:2.5 Wildlife Utilization Projects

Recently, a number of reports in Kenya (and elsewhere) have emphasised the need to introduce various wildlife consumptive utilization as a way of making "wildlife to pay for its survival" and controlling the wildlife population (Grootenhus et. al 1991; Swanson 1991). Such programs include hunting, game cropping and game ranching. Game cropping means taking a sustainable yield from completely wild populations, while game ranching (sometimes called game farming) implies control of game animals by managers, including regulating their movement or breeding. Through hunting, local people could be made to benefit. Controlled hunting of certain over-abundant animals and birds, with the understanding that the landowners be the direct beneficiaries, may be an issue worth considering in the region. Linking conservation to the process of rural development and the survival of agrarian/pastoralist societies in Africa must involve some consumptive utilization. It is recommended that pilot wildlife consumptive utilization be initiated in the region. Thorough research, however, will be required before such programs are fully implemented.

5.2:2.6 Local Participation in Wildlife Conservation Policies

Public (community) participation involves groups of people coming together to discuss, make decisions and act on matters which affect their lives and the environment around them (Berger 1989; Cernea 1991; Zube 1986). This local involvement is now seen as fundamental to the long-term conservation of natural resources (Chambers 1983; Clark and Bell 1986; Colchester 1994). It is, however, important to make a distinction between involving the public in the decision making process or simply informing them of the decisions that have been made. At the same time, it is important that government officers also receive proper training and qualification. Contemporary wildlife enforcement officers were trained in the traditional emphasis of preservation of wildlife. The current training of

game officers must therefore take into account the human dimensions. Game laws can no longer be enforced through the barrel of a gun. Conservation must be socially and culturally acceptable.

In Kenya, local participation in conservation activities is embodied in government policy (Sessional Paper No 3, 1975), and also in the World Conservation Strategy (1980), but is still lacking in practice. Decision making processes should not be entirely top-down (Edouard 1980; Hough and Sharpa 1989). Traditionally, top-down philosophy decisions are made nationally and imposed locally, regardless of social and cultural values. Therefore, the program proposed in this thesis emphasises an active decision-oriented approach that is largely dependent upon regulations rather than one that is reactive. In this program, local people will be involved in the policy making of wildlife management, from identifying the problems, and to designing projects and participating in their implementation.

5.3 Conclusions

If nothing is done to resolve the conflict, the Masai Mara region will be taken over by human activities in the near future. As human population increases, cultivation will expand and more and more individual permanent settlements will be constructed in the region. Wildlife will not have any room outside the reserve, the wildlife herds will likely be eliminated, and the migration hindered or stopped. The reserve wildlife will no longer be a viable part of a large, dynamic ecosystem but remnant resident groups. Such a situation will create serious management problems inside the protected reserve area. There will be overgrazing, nutritional deficiencies, or soil contamination by the constant presence of animals, which will allow parasites to build up in number, ending in a disease epidemic.

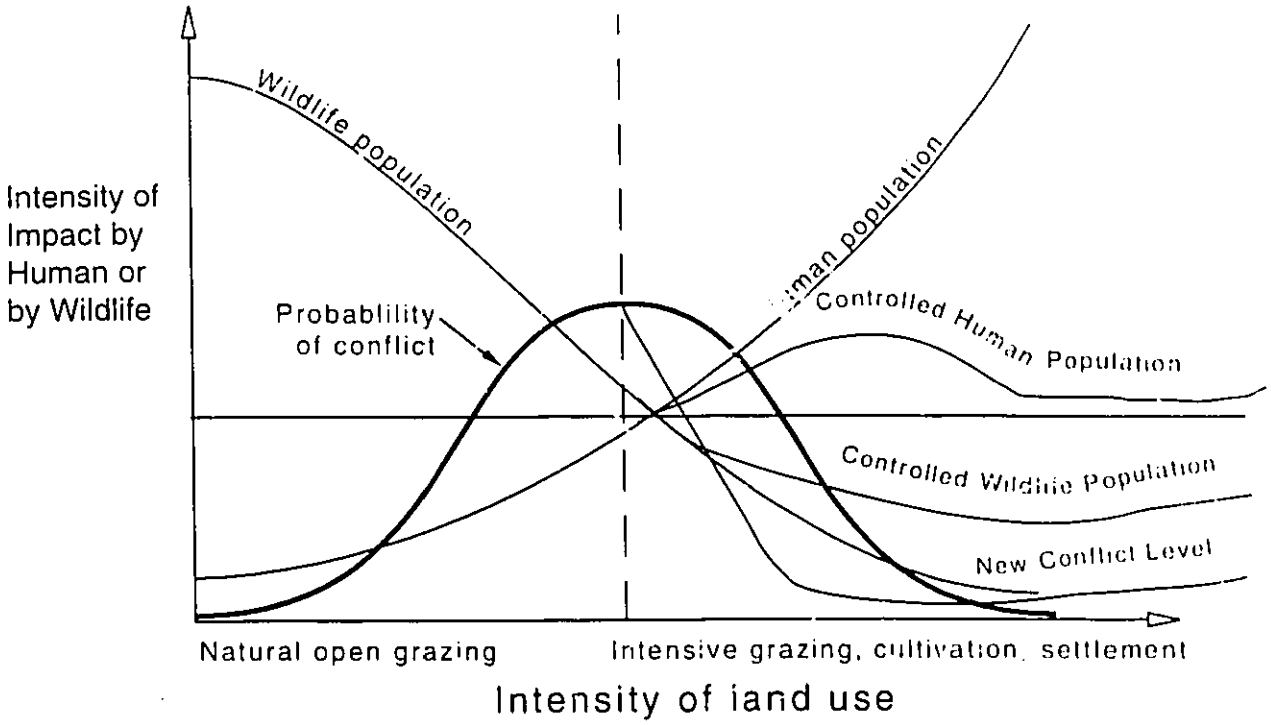
However, wildlife conservation must also be culturally and economically valuable to the local people if it is to be sustained. Denying local people the use of the land either for grazing or other activities will only lead to intensification of the conflict and may be

ecologically counterproductive. Wildlife cannot be tolerated under the current circumstances and will only survive outside the reserve if those people living in close contact to it tolerate the animals. Presently, the human population is unlikely to do so unless they receive some benefits for the damage to crops and livestock caused by the wildlife. Some means must be found to reconcile the needs of the animals with the legitimate needs and aspirations of the local communities. There must be some measures to protect the local people, their livestock, and crops from wildlife depredation.

In addition, there must be genuine involvement and participation of the local population in wildlife conservation. Ways to involve local people in wildlife conservation should be designed. Local people should be employed in wildlife-damage control activities. This will make use of their skills in protecting their property, notably livestock. Resources should be provided to local people so that they can effectively protect their property. The survey revealed that local people build special structures to protect their property. A special committee to be established by KWS should study the animal damage control strategies to recommend the best control methods. An experiment should be started to test alternative methods of livestock enclosures inside or between the "bomas". Extension and education methods should be used to teach people about tactics for preventing wildlife damage including the use of dogs. Local people should be allowed controlled grazing in the reserve. Furthermore, to generate revenue, tourists can be taxed through gate collection.

Integrating wildlife conservation with human needs in the region would require control of the increasing human population and changing land use patterns. If the proposed program is implemented, there would be a number of advantages. Figure 5.2 shows that wildlife-human conflict will not completely be eliminated, but will be drastically reduced. Human population growth within the group ranches might decrease and the current wildlife population outside the reserve could be maintained and will probably increase.

Figure 5.2 Balancing Wildlife-Human Relationships through Integrative Management Strategies



With the implementation of the proposed model, human population increase will be closely monitored and the human influence in the region will be reduced. Wildlife population will be maintained and may even increase in the region. As a result, wildlife-human conflict may still occur but will be drastically reduced through the necessary control mechanism.

5.4 Future Research Directions

Future research which builds on the findings of this study is suggested both by the limitations of this work and the questions it raises. The following are recommended.

1. There is need for more studies on wildlife damage, the predation of livestock, crop destruction, spread of disease to stock, human deaths or bodily injuries, and competition for resources (pasture and water). Comprehensive studies (and periodic assessment) are needed to assess these effects. For example, from the assessment of the amount of livestock taken annually by carnivores and the circumstances under which the animals are

killed, suggestions could be made on how to reduce conflict. Involved species and their stock preferences could be established.

2. There is need to further study the strategies utilized by the local people to control or prevent wildlife problems, especially the construction of special fences in the "bomas". Knowledge of such strategies might be used to reinforce the existing methods of game damage control. There could be need, for instance, to develop harmless chemicals to make crops less attractive to certain wildlife species, or it could be found feasible to grow crops to which wildlife have a natural aversion. It would also be possible to use trees to fence, e.g., to plant trees along the escarpment to separate the lowland from the upland zones. It would also be of interest to study whether conflict can be controlled through habitat manipulation to create habitat unfavourable to wildlife, such as through bush clearing. Assessment of how building fences or moat system could be used to reduce conflict should also be made.

3. It is necessary to establish how much disease is transmitted from wildlife to domestic animals. Many local people and some scientists believe wildlife spread diseases to livestock, but no adequate information is known. There is need to investigate the disease cycle between wildlife and domestic livestock. It could be necessary to develop vaccination against some of the wildlife spread diseases such as tick-borne or malignant catarrhal.

4. Human population and the resulting land use (cultivation and permanent settlements) have increased tremendously in Kenya's rangelands in recent years. There is need to document the trends of the changes. These may reveal forces other than what we are investigating. For instance, land distributions and policy questions may have to be addressed at the national level. Related to these is the need to investigate the trends in land use (conflict) in dispersal areas of the protected areas in the rangelands on a nation-wide scale, and comparing these findings with those in other parts of the World. It would be appropriate to analyze the situation surrounding a number of different protected areas for

comparative analysis.

5. The impact of a protected area in regional development has not been adequately analyzed, especially the positive effects. Establishment of protected area in Masai Mara region plays both positive and negative roles in its development. Some of the positive roles include: security, creation of infrastructure, employment, promotion of business in the area. Some of the negative impacts include: removal of the local people from and denying them access to the reserve area. It would be important to study the impact of Masai Mara National Reserve on the region's development in order to suggest how its contribution can best be managed.

6. There is need to study the methods used to educate local people about wildlife benefits with a view to unearthing what they know and what they do not know. The current educational processes focus on school children, mostly those in the urban areas. In fact, all the school-based wildlife clubs are dominated mostly by youths from wildlife conservation areas. While it is important to inform them of the need to conserve wildlife, their knowledge does not contribute directly to wildlife conservation issues. Secondly, the education centres are located mostly in urban areas and hardly reach the local people where wildlife live. There is also the question of what kind of education local people should be given.

7. There is need for good landscape planning to establish future development in the region. This should include advice on the kind of building structures that should be constructed in the region in the lodges, local centres, and individual homesteads. The buildings should be those that blend with the environment. These will have to take into account the Maasai's interests, their tradition, and the climate of the rangelands.

8. One of the limitations of this research is that it does not establish causation. For example, it can only be said that there is a relationship between direct benefits from wildlife and positive attitudes to wildlife conservation, or conservation education and attitudes

towards wildlife. Consequently, interventions based on the study results require on-going evaluation to determine whether or not they are effective. Prospective research should therefore strive to establish the causal relationships.

9. An issue which continues to surface throughout this and other related studies in wildlife-human relationships is that of compensation. The current compensation system in Kenya is seen as inappropriate; therefore, there is a need to look at the system and ask people in a more elaborate way what would be the best system of compensation. There are also the possibilities of forming insurance firms paid initially by wildlife-based tourism money. Since local people would not have enough money to pay for their insurance against wildlife, some of the money generated from tourism could be diverted to the insurance pool. There can even be a cooperative movement for wildlife area dwellers which earns interest that is paid or used to develop those areas. It would also be necessary to examine the feasibility of some of the consumptive utilization of wildlife in the region including hunting, game cropping and the establishment of an industry to develop various wildlife byproducts such as skins, meat, and bones for export. A system should be developed on how to distribute to local people revenues generated from tourism revenue and other wildlife revenue generating activities in the region. Any game cropping or culling programs must be studied before implementation.

10. This study only reports the attitudes of local people living in the region, and does not look into their dynamism, or how they change. This will be necessary for perpetuating effective and socially acceptable programs for wildlife conservation in the region. In addition, attitudes of urban dwellers and that of school children would be necessary to know. Subsequent studies should focus on all family members, and particularly children. There would also be a need to assess the attitudes of all cohorts of the Kenyan community so that they can understand the situation faced by those in wildlife areas and give support if need be. Understanding their attitudes towards wildlife or conservation in general is also

necessary for adoption of appropriate educational programs and the promotion of domestic tourism.

11. There is need to prepare local people to participate directly or indirectly in the tourism industry. In particular, it should be established how they can exercise more control over the destiny of tourism development in the region. There is need to explore the new direction of joint traditional and modern approaches that will eventually give control to the local people. In this approach, people and their needs are brought back into the equation. It is the local participation that offers the greatest hope to the future of wildlife.

12. A universal and fundamental issue arising from the reserve area concerns the kind and degree of linkage among components of the system. There is need for biological\ecological monitoring to assess changes in the population and movement patterns of wildlife within the ecosystem both inside and outside the reserve. Information on the grassland-herbivore dynamics should be kept up-to-date. Migration and grazing succession, ungulate feeding strategies, and resource partitioning must be assessed. It is important to monitor species extinction to establish the contribution of the conflict to their demise. Monitoring of changes in the biological\ecological aspects of the region is crucial because it is the principal way in which the impact of the conflict can be checked and effective mitigative actions designed. There should also be continuous monitoring of socio-economic parameters such as family income, health, family size, and education. In addition, there should also be monitoring of attitudes of local people towards wildlife, to authorities, to outsiders as well as monitoring of poaching or general hunting activities. Such research should be made available for decision-making.

13. Finally, as a broader component of this study, it is suggested that a comprehensive survey of the range of existing protected areas and their dispersal areas throughout the country be undertaken in order to establish their relationships. This will lead to: (1) precise definition of areas crucial to the protected areas' wildlife, (2) government's

role in regulating the areas and (3) legal restraints on the relationships of the dispersal areas to parks, and to the broader regional land use management efforts.

Human population growth must be controlled. This can be done by reducing immigration into the region and within the Masai population itself. One way of doing this is through education to create opportunities for the Masai to move to cities for work, hence earning a living outside the pastoral system. This would form the first step to revise the current protected areas concept in Kenya to allow integration of local people with wildlife conservation.

5.5 A Global Perspective

Many of the benefits of effective conservation of wildlife, which relate to biodiversity and environmental protection are international in scope, and the loss would have global impact. On the other hand, improving the welfare of the local communities, especially the poor, is an international priority. While implementation of the proposed program will focus on the Masai Mara region, its success will need national and international support. Support in cost and technical\scientific areas is required. Conservation of wildlife promotes tourism, which has proven to be crucial in many developing countries' economies. The world will lose a great deal if the ecological and cultural diversity of the African landscapes cannot be protected. Conventional strategies are failing. An integrated strategy is required.

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APPENDICES

APPENDIX A SCIENTIFIC & COMMON NAMES OF WILDLIFE MENTIONED IN THE TEXT

Common Names	Scientific Name	Maasai Name	Kiswahili
	UNGULATES		
Wildebeest	Connochaaetes taurinus	Oyenkat	Nyumbu
Buffalo	Syncerus caffer	Olarro	Nyati (Mbogo)
Zebra	Equus burchelli	Oloitiko	Punda milia
Elephant	Loxodonta africana	Olkanjaoi	Tembo
Eland	Taurotragus oryx	Osirua	
Rhinoceros	Diceros bicornis	Emony	Kifaru
Hippopotamus	Hippopotamus amphibius	Ol-makau	Kiboko
Giraffe	Giraffa camelopardalis	Olment	Twiga
Kongoni	Alcelaphus buselaphus cokii	Olkonde	
Warthog	Phacochoerus aethiopicus	Olbitirr	Ngiri
Porcupine	Hystrix cristata	Oeyiai	Nungu
	CARNIVORES		
Lion	Panthera leo	ol-ngutuny	Simba
Leopard	Panthera pardus	ol-owuaru	Chui
Cheetah	Acinonyx jubatus	ol-owuaru	
Hyena (spotted)	Crocuta	ol-ngojine	Fisi
Jackal (side-stripped)	Canis adjustus	em-barie	
Wild dog	Lycaon pictus	o-suyiani	
	PRIMATE		
Baboons	Papio anubis	o-ekeny/o-rindo	Nyani
Monkeys	Cercopithecus aethiops	ol-koroi/enarokutuk	

The above list include only some of the common species scientifically established to be in the area and those that the local people mentioned they see in the area of the land they use.

APPENDIX B GLOSSARY

A number of definitions included in this glossary are in the context they are used in this study. They include terms specific to the study area and study problem. The others are concepts generally used in conservation matters but are defined in the context they apply in this study. Some "Kiswahili" (the national language in Kenya, spoken by over 80%) and some "maa" (the language of the Maasai, the community the study was based) are also included.

Agrarian Society: one in which food is produced by farming the land other than pastoralism. Within Masai Mara region, these are mainly the immigrants - non-Maasai societies.

Baraza: (Swahili). Local court. Now commonly applied to meetings called by local government officials for the purpose of passing on information to the people.

Biological Diversity: the variety and variability among living organisms and the ecological complexes in which they occur; often shortened to "biodiversity" (McNeely et al. 1990). "Species diversity" refers to the number of species found within a given area, while "genetic diversity" refers to the variety of genes within a particular species, variety, or breed.

Biosphere People: those who draw upon the resources of the entire biosphere to maintain ways of life that are not necessarily sustainable and may be destructive to any one ecosystem (Dasmann 1984).

Biosphere Reserve: part of a biome protected under the Man and Biosphere Program. Each is large enough to allow its unique biological characteristics to be self-sustaining. They also provide valuable areas for research (Shafer 1990).

Boma(s): (Swahili). Fortification. Now used to describe a homestead, or the collection of huts housing one family unit. Protective enclosures within which livestock are driven at night, often surrounded by thorn-bush fence.

Borehole: a well sunk to the groundwater level to obtain ground water, either by gravity flow (in an artesian basin) or by pumping.

Browsers: animals that eat twigs, shoots and leaves from trees, shrubs and woody vines.

Buffer Zone: an area adjacent to a protected area which has land use controls which allows only activities compatible with the objectives of the protected area; appropriate activities might include tourism, forestry, agroforestry, etc. It is a collar of land designed to filter out harmful influences from surrounding activities. The objectives of such zones is to give added protection to the reserve, and to compensate local people for the loss of access to the park resources.

Bush: in Africa, this commonly refers to a wilderness area of natural vegetation with wildlife, as opposed to settled areas.

Carrying capacity: the number of individuals (human livestock or wildlife) that can be supported by an environment and its resources (Shafer 1990). It is number that an area can support with food, shelter, and water; or the ability of a given area to provide food, water, and shelter for the population of a given species. It is difficult to assess, particularly where climate is variable and the land use system is nomadic.

Commons: resources that belong to everyone but to no one in particular.

Competition: the struggle between individuals of the same or other species for food, space etc where these are inadequate to support all of them.

Conservation: the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generation while maintaining its potential to meet the needs and aspirations of future generations. Thus conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration, and enhancement of natural environment (IUCN 1980: 1991).

Co-management: refers to the substantial sharing of protected-area management responsibilities and authority among government officials and local people

Game cropping: the harvesting of a full spectrum of free-ranging wild animals by shooting what is deemed to be a fair proportion of the animals in an area devoid of any detailed management. Little or no attempt is made to influence breeding by selective cropping since the animals are too wild. It is a combination of game control and their commercial exploitation.

Disincentive: any inducement or mechanism by which discourages local people from engaging in activities that are damaging to wildlife conservation

Dispersal The movement of organism away from a location, such as their point of origin

Ecological Island: habitat cut off from surrounding areas by natural and man-made features such as water, farms, cities, roads etc. It makes protected areas highly vulnerable to species loss.

Ecosystem: the totality of factors of all kinds that make up a particular environment; the complex of biotic communities and its abiotic, physical environment, functioning as an ecological unit in nature. Ecosystems have no fixed boundaries; instead their parameters are set according to the scientific, management, or policy question being examined. Depending upon the purpose of analysis, a single lake, a watershed, or an entire region could be an ecosystem. It is a community of plants and animals and the environment in which they live and react with each other.

Ecosystem People "people who are dependent on and have learned to live in a sustainable manner within a natural ecosystem or a group of closely related ecosystems" (Dasmann 1991)

Emanyatta (manyatta): warrior camp
Enkang - "boma" - semi-permanent settlements, seasonal cattle camps, meat-feasting sites.

Flexibility: the system is complex that it is impossible to account for all contingencies, no matter how much the ecosystem manager applies knowledge and experience. Plan therefore must be flexible.

Game: species of vertebrate wildlife hunted by man for sport also means wildlife

Game Control: is the sum total of measures that must be taken to prevent any animals, which we desire to preserve, from coming into serious conflict with human and his legitimate activities. While game preservation means in effect the shielding of game from man and his instinct to kill, game control means the shielding of hum,an from the depredation of game (Brown 1968).

Game Culling the harvesting of free-ranging wild animals population in excess of the ecosystems (range) carrying capacity or undesirable sexes, age-groups or individuals based on scientific principles of ecosystem management and population dynamics (population

ecology) of the game species in question.

Game farming the semi-domestication of one or more aspects with a view to farming them on a sustained yield basis. Eland seems most suitable for domestication because its ability to adapt to a variety of habitats and plants.

Game ranching the scientific management of species of wildlife in the natural habitat and without any efforts to domesticate them for the purpose of commercial game meat production (eg. wildebeest, generuk, oryx, eland, gazelle). The animals are kept on land with specific boundaries often perimeter-fenced to effectively prevent wildlife from leaving or entering the ranch hence conferring managerial advantage by allowing populations to be spatially defined in relation to their available habitat.

Game Reserve: An area originally set aside for the management and protection of game animals for hunting. They re now usually areas where all wildlife in protected.

Grazers an animal that feeds primarily on grass

Habitat: the sum total of environmental conditions a specific place occupied by a wildlife species.

Herbivore: an animal that eats plants

Home range the area that an animal occupies and patrols regularly but does not necessarily defend. The part of home range that is defended constitutes the territory.

Herbivore: an animal that fields exclusively on living plants.

Household: all people normally resident within or making economic contributions to a household.

Incentives (for conserving wildlife): an incentive is that which incites or motivates desired behaviour; for purposes of this study, an incentive is that which incites or motivates the local people to conserve wildlife or to stop engaging in land uses that are delirious to wildlife use

Interdisciplinary approach: as used in this study has two components. First, it means incorporation of socio-economic and cultural aspects of human populations, the physical and biological characteristics of ecosystems, as well as the dynamics of interactions between development, environment and populations. Second, in approach, it incorporates three main groups of people involved in the complex land use problems: (1) the decision-maker; (2) the local population and (3) the scientists

In Kangitie (Kimaasai): permanent Kraal camps

Imbooitie (Kimaasai): temporary livestock camps

Indigenous or tribal people: original inhabitants of a country who live outside of the market economies of that country with a life-style based on co-existence with the natural environment

Land potential: The economic potential of land, based upon the physical characteristics of the soils, climate and slopes.

Manyatta(Kimaasai): a group of huts traditionally fenced.

Natural areas: areas that remain relatively undisturbed by humans and are close to their natural state. They provide a wide variety of benefits including maintenance of biodiversity and ecological processes as well as other consumptive and non-consumptive benefits.

Nature reserve: an area of land set aside where nature is managed in such a way as to protect its special features.

Nature resources: defined by cultural appraisal in that their exploitation depends on a society's perception of natural resource as a commodity, on the society's ability to discover its whereabouts, and on the society's ability to exploit it. They are the link between a people (or a cultural group) and their environment

Nomadism: refers to a mode of production which requires a population to move regularly, and often, in search of food or resources, and to permit their livestock to breed while moving, so to speak.

Pastoralism: refers to the relatively mobile adaptations concerning regular, frequent movement for pasture use

Poaching: the act of hunting, killing, or taking wildlife illegally

Predator: an animal that hunts another animal for food

Preservation: an attempt to prevent the use of some natural resources or the modification of an environment simply for the sake of keeping it intact

Protected area: any area of land which has legal measures which limit human use of the plants and animals within the area; includes national parks, game reserves, multiple-use areas, biosphere reserves, etc

Rangelands: areas remote, receive comparatively little rains - are becoming increasingly under human activities in both developed and developing countries. Traditionally, they have been inhospitable to people or so remote that opportunities for substantial human use are severely restricted. They include deserts, cold and hot etc. They are becoming victims of success

Restoration: the return of an ecosystem or habitat to its original community structure and natural complement of species

Shambas(Kiswahili): agricultural plots/farms

Shrub: a plant with persistent woody stems and relatively low growth form - usually produces several basal shoots as opposed to single sole

Sustainable Development: a pattern of social and structural economic transformations (i.e., "development") which optimizes the economic and other societal benefits available in the present, without jeopardizing the likely potential for similar benefits in the future (Goodland and Ledec 1988)

Tse tse fly: a carrier of disease believed to emanate from wildlife, specifically buffalo to livestock

Transhumant: people who live in more or less permanent villages but go out on grazing expeditions in the local dry season

Tented Camps: for tourists have similar facilities to lodge, but with more of a wilderness feeling

Wildlife Migration: the periodic movements (normally seasonal dry and wet), of animals from one region to another to feed or to breed. It is a two-way seasonal movement involving a return to the area initially vacated

Wildlife migration routes: paths followed during the seasonal movements.Human activities disrupt the paths and may change the movement patterns of a particular species of the entire wildlife population

Wildlife management: the art of applying scientifically derived ecological principles to achieve habitat and population goals (Anderson 1991). It is the science and art of making decisions and taking actions to change the structure, dynamics and interactions of habitats, wild animal populations and men to achieve specific human goals by means of wildlife resources

Wildlife welfare: those factors contributing to its well-being

Zoning: land-use zoning; the demarcation of a planning area by ordinance into zones and the establishment of regulations to govern their use

APPENDIX C Interviewing Questionnaire for Local Population

Questionnaire NO.

WILDLIFE-HUMAN CONFLICT IN KENYA: Integrating Wildlife Conservation with Human Needs in Masai Mara Region

This interview is being conducted for purposes of research by Paul Omondi of Moi University. The information provided will be used to assess the problems of wildlife and human conflicts in this area, and will be kept strictly confidential, and used solely for the purposes of developing better management strategies that will help in reducing the conflicts in the area. Your cooperation is highly appreciated. Thank you.

PART I

A. RESPONDENT IDENTIFICATION

1. Name of Respondent:
2. Season: Wet [1] Dry[2] Month[ ]
3. Group/Individual Ranch Name:
4. Distance from the park [km]

B. NATURE OF LAND USE CONFLICTS

1. What is wildlife ?.....
2. What would you say about wildlife ?.....
3. What animals do you see in this area of land you use (Answers in Table 1 below)?
4. Which ones are resident and which ones are migratory ?
5. How frequent do you see them ?
6. Are they increasing or decreasing in numbers ?
7. During which periods do they come ?
8. How troublesome are they ?
9. Do you encounter any problems with wildlife ? Yes[1] No[2]
10. If yes, what kind of problems do you encounter [indicate the animal(s)] (Answer in Table 2 below)?

Table 1 Wildlife Characteristics in the Study Area

Animals	Animal seen	Residents or migratory	Frequency very [1] moderate [2] rare [3]	Number up[1] down[2]	Period dry[1] wet[2] both[3]	Troublesome very [1] moderate[2] least [3]
UNGULATES						
Wildebeest						
Elephant						
Zebra						
Eland						
Buffalo						
Rhino						
Warthog						
Giraffe						
Others						
CARNIVORES						
Hyena						
Leopard						
Lion						
Cheetah						
Jackal						
Others						
PRIMATES						
Baboons						
Monkeys						

Table 2 Problems Caused by Wildlife

ANIMALS/ PROBLEMS	Crop destruction	Crop trampling	Livestock depredation	Human death/injury	Disease transmission	Compete for water/graze	Other (specify)
Wildebeest							
Elephant							
Zebra							
Eland							
Buffalo							
Rhinoceros							
Warthog							
Giraffe							
Hyena							
Leopard							
Lion							
Cheetah							
Jackal							
Baboons							
Monkeys							

11. Which three animals cause maximum damage in order of importance to :

crops.....
livestock.....
Human.....
pasture + water resources.....
other, specify.....

12. How often do you encounter wildlife problems (Answer in Table 3 below)?

Table 3. Frequency of Wildlife-Human Conflict

PROBLEMS	FREQUENCY IN A MONTH				
	MONTH	1yr	2-5yrs	5-10yrs	>10yrs
Crop destruction					
Crop trampling					
Livestock depredation					
Human deaths					
Bodily Injuries					
Disease transmission					
Competing for water and grazing					
Others					

C. CAUSES OF CONFLICTS

13. What in your opinion are causing the wildlife/human conflicts in Mara area (Answer in table 4 below?)

Table 4 Cause of Conflict

CAUSAL FACTORS	1960		1991		2021	
	Yes No Dont Know	Degree of causation (1,2,3,4)	Yes No Dont Know	Degree of causation (1,2,3,4)	Yes No Dont Know	Degree of causation (1,2,3,4)
Increasing human population						
Individualization of land						
Changing land use patterns						
expanding cultivation						
Increasing no. of livestock						
Changing livestock grazing systems						
increasing no. of wildlife						
Lack of incentives to landowners						
Poaching/ hunting						
Others						

KEY:

Yes =1
No =2
Dont know =3

Degree of causation: 1=Insignificant
2=Less significant
3=Significant
4=Very significant

14. What is the single most important cause of wildlife/human conflicts ?
.....

D. EXTENT OF LAND USE CONFLICTS

1. In Masai Mara area, which specific areas and under what circumstances/conditions is the wildlife/human conflict more severely manifested (Answer in Table 5 below)?

Table 5 Spatial Patterns of Conflict

PROBLEM/SPECIFIC AREA AND CONDITIONS	Areas close to park	Wildlife migratory routes	Water resource areas	Forested lands	Pastoral lands	Season: dry or wet or both	Night or day
Crop destruction							
Crop Trampling							
Livestock predation							
Competition for grazing and water							
Human deaths							
Bodily injuries							
Transmision of diseases							
Any others							

2. Are the problems with wildlife getting more serious ? Yes[1] No[2]

3. If yes, do you think the situation will improve or get worse over the next 10 years
.....

E. EFFECTS OF CONFLICTS ON WILDLIFE

1. What have you done to control or prevent wildlife problems (Answer in Table 6 below)?

Table 6 Effects of Conflict

ACTIONS/ PROBLEMS	DEGREE OF EFFECTIVENESS (1,2,3,4)					
	Crop destruction	Crop trampling	Livestock depredation	Human deaths/ injuries	Disease transmission	Competition for grazing
Fencing of farms or bomas						
Scaring wildlife						
Kill wildlife						
Report to wildlife authorities						
OTHERS						
Separation/ avoiding						
Scaring objects						
Self-arm against animals						
Home structure						
Homestead sites						

KEY: 1=Not effective 2=Less effective 3=Effective 4=Very effective

2. Have the control measures helped ? Yes[1] No[2]

3. If No, what do you intend to do to the animals problems ?
   .Increase fencing [ ]
   .Continue scaring them away [ ]
   .Continue reporting to the wildlife authority [ ]
   .Kill the wild animals [ ]
   .I do not know [ ]
   .Any other.....

4. What does the wildlife authority do ?.....

5. What would you like to see the authorities do ?.....

F. EFFECTS OF CONFLICTS ON HUMANS

1. How much damage/loss is incurred in this area and to you by wildlife per year (Answer in Table 7 below)?

Table 7 Loss of Property

PROBLEMS/ LOSS	MARA AREA LOSS				PERSONAL LOSS			
	Area	No.	Qty	Value	Area	No.	Qty	Value
Crop destruction								
Crop trampling								
Livestock predation								
Competition for grazing and water								
Human deaths								
Bodily injuries								
Disease transmission								
Any other								

2. How much time do you spend scaring wildlife ?.....

3. Do you employ someone to safeguard your property from wildlife ?
   Yes [ ] No [ ]

4. If yes, what property does he safeguard ?.....

5. How much do you pay him per month ? [Kshs]

6. What periods/time do you engage him ?.....

G. RESOLVING CONFLICTS

1. What would you recommend to be done in this area to resolve the wildlife/human conflicts in order of importance ?
   (1) Open-up park area for farming and grazing [ ]
   (2) Landowners to protect wildlife [ ]
   (3) Fence the park completely [ ]
   (4) Shoot the animals that are causing damage [ ]
   (5) Institute more effective game control methods [ ]
   (6) Fence all farms and homes to protect us from game [ ]
   (7) Restrict land uses in the area to allow wildlife [ ]
   (8) Give local residents economic benefits from tourism as an incentive to allow wildlife on their lands [ ]
   (9) Any other, specify.....

2. Who Should do it ?
   (1) The Government [ ]
   (2) Local communities [ ]
   (3) Government and the people [ ]
   (4) County Council [ ]
   (5) I don't know [ ]
   (6) Any other, specify .....

3. What do you think will happen in the Mara area if the wildlife/human conflicts are not resolved ?
   (1) Wildlife will be displaced [ ]
   (2) People will loose more lives, crops and stock [ ]
   (3) I don't know [ ]
   (4) Any other, specify.....

4. Does park tourism revenue benefit the local people ?
   Yes[ ] No[ ] Dont know[ ]

5. If yes, how ?
   (1) Provides social infrastructure [ ]
   (2) Provides employment opportunities [ ]
   (3) Direct payment to the farmers [ ]
   (4) Any other, specify .....

H. COMPENSATION SCHEME

1. Have you heard of wildlife compensation scheme ? Yes[ ] No[ ]

2. Have you made any claim(s) for wildlife damage ? Yes[ ] No[ ]

3. If yes, have you received any compensation ? Yes[ ] No[ ]

4. If yes, how long did it take to get compensated ?
   0 - 1 year [ ] 1 - 3 years [ ] 3 years > [ ]

5. Do you think you got adequate compensation for the loss you incurred?
   Yes [ ] No [ ]

6. If No, how would you have liked it ?.....

7. Do you think compensation scheme is a good idea ? Yes[ ] No[ ]
   Please give your reasons.....

8. Have you experienced wildlife damage but not forwarded claim for compensation?
   Yes[ ] No[ ]

9. If yes, why ?.....

10. If No, what would you suggest should be done about it ?.....

11. Have you heard of wildlife conservation education ? Yes[ ] No[ ]

12. If yes, source of your information ?

    (1) Chief's Baraza [ ]
    (2) KWS extension services [ ]
    (3) Teachers [ ]
    (4) Radio/TV [ ]
    (5) Newspapers [ ]
    (6) Others, specify .. ..

13. Is there any member of your family working with wildlife/park ?
    Yes[ ] No[ ]

J. PERCEPTION AND ATTITUDES

1. Why should wildlife be protected ?
   (1) Ethical values - natural heritage [ ]
   (2) Tourism revenue- foreign exchange [ ]
   (3) Material benefits - animal products [ ]
   (4) Any other, specify.....

2. Do you consider wildlife conservation a necessary cause to:
   Mankind ? Yes[1] No[2]
   Kenya ? Yes[1] No[2]
   People in Mara area ? Yes[1] No[2]
   You ? Yes[1] No[2]

3. Do you consider National parks/reserves as being of any value to:
   Mankind ? Yes[1] No[2]
   Kenya ? Yes[1] No[2]
   People in Mara area ? Yes[1] No[2]
   You ? Yes[1] No[2]

4. Have you benefited from the presence of rangers ? Yes[ ] No[ ]

5. Have you benefitted from wildlife/National parks protection ?
   Yes[ ] No[ ]

6. If yes, how ?.....

7. Have you benefited from park/tourism? Yes[ ] No[ ]

8. If yes, how? .....

K. HOUSEHOLD CHARACTERISTICS

Table 8 Household Characteristics

						EDUCATION			OCCUP		LANGUAGES								
	HH comp	Sex	Age	Mar Sta	Mar Arr	At Sch	H Grade	Yr left	Main	Other	Speak			Read			Write		
											E	K	O	E	K	O	E	K	O
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
House hold size																			

L. LAND USE/ENVIRONMENTAL CHANGES

1. Discuss the land use/environment of this place 30 years ago (1960), as you see it today(1991), and as you expect it to be 30 years (2021) from today (Answer in Table 9 below)?

Table 9 Land/Environmental Changes

ENVIRONMENT/LAND USE CONDITIONS	LAND USE CHANGES					
	1960		1991		2021	
	AREA (HA)	%	AREA (HA)	%	AREA (HA)	%
Forests/Trees						
Bushland/Tall trees						
Sparsely treed						
Ownership(s) -Government -Rental/Lease -Group -Private						
Virgin land						
Grazing/ Pasture						
Cultivated Crops: 1. 2. 3.						
Human settlemants with buildings						
Fenced (area)						
Others						

2. Are there more people living in this area today(1991) than when you came ?
   Yes [1] No [2]

3. Are there more homesteads in this area today(1991) than when you came?
   Yes [1] No [2]

4. What are your main land use activities in order of importance ?
   .....
   .....

Table 10 Livestock Grazing and Watering

LIVESTOCK TYPE	1960							1991							2021						
	NO	Graze			Water			NO	Graze			Water			NO	Graze			Water		
		W	D	D2	W	D	D2		W	D	D2	W	D	D2		W	D	D2	W	D	D2
Grade Cattle																					
Native Cattle																					
Goats																					
Sheep																					
Donkey																					
Others																					

KEY:

SEASONS:

Wet =W
Dry =D

GRAZE:

Homestead =1
Park =2
Others =3

WATER:

River =1
Ponds =2
Others =3

DISTANCE TO THE RESOURCES =D2
D2=Distance from homestead

5. Why are you engaged in these land uses?

.....

6. Do you keep livestock ?

Yes [1] No [2]

7 . If yes where do you graze and water them ?

8. Is the land available for grazing adequate ?

Yes[1] No[2]

9. If no, what are your constraints ?

.....

.....

10. What do you intend to do ?

.....

11. What are the major problems facing people in this area ?

Land shortage
Water scarcity
Health
Food Supply
Wildlife menace
others, specify .....