EVALUATION OF LAND-USE PLANS IN PROTECTED AREA BIO-NETWORKS IN NORTHEASTERN TANZANIA

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EVALUATION OF RURAL LAND-USE PLANS IN PROTECTED AREA BIO-NETWORKS IN NORTHEASTERN TANZANIA

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ABSTRACT

The application of rural land-use planning is seen by many in developing countries as a panacea for minimising land-use conflicts and for increasing the productivity of natural resources in African rangelands. However, this assumption has not been thoroughly tested in the context of wildlife corridors in African rangelands. The focus of the research work for this thesis was to evaluate both "conventional" and "participatory" approaches to land-use planning in an African rangeland setting, and to assess the impact of these land-use plans in mitigating conflict and enhancing conservation of important wildlife migratory routes. Nine villages were selected for study in Northeastern Tanzanian rangelands, within the Tarangire-Manyara, Greater Serengeti and Mkomazi-Tsavo ecosystems.

Several methods were used to provide an indication of the performance of the plans, against their stated objectives of minimising land-use conflict and conserving wildlife migratory routes. Eight hundred and fifty two households, 13 "expert witnesses" and 4 representatives of planning agencies were interviewed. Several field assessment visits and focus group discussions were also carried out. Review and analysis was conducted on archive data, land-use plans technical reports and general management plans for neighbouring Parks.

The results of the research presented in this thesis revealed five major findings: (1) involvement of land-use stakeholders in land use preparation was low; (2) different types of conflicts and encroachments increased after the plans were implemented; (3) Park management failed to involve adjacent villages in the preparation and implementation of Park GMPs; (4) the amount of conflict around villages where plans were in place was comparable to that around villages with no plans, suggesting that the plans made no difference to conflict; (5) overall, both participatory and conventional plans failed to achieve their objectives of mitigating conflicts and enhancing conservation of wildlife corridors and dispersal areas.

The major causes of weakness and failure of the plans to achieve their desired objectives were: (1) insufficient participation of local communities in the planning process; (2) lack of robust of robust, transparent and accountable implementation strategies for the plans; (3) inadequately qualified rural planners; (4) lack of a comprehensive vision - "holistic approach" - to the planning process. Taking these findings into account, the author has made recommendations for an improved Buffer Zone Land-use Planning framework (BUZLUP) that could contribute to progress in mitigating conflicts and enhancing both conservation and development in Northeastern Tanzania.

It is concluded, however, that high quality plans in themselves cannot ensure the successful establishment and maintenance of effective wildlife corridors. In addition to improved planning strategies such as the proposed BUZLUP framework, other broader socio-economic issues need to be addressed, including strengthened conservation education, better protection for rural people's natural resources and support for their livelihoods, equitable benefit sharing from conservation and tourism activities, and more devolution of decision-making powers to the grass-roots level in communities neighbouring conservation areas.

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DEDICATION

This work is dedicated to my parents. Omukwekulu Nyamambara Songorwa and the late Omukaruka Bwire (Bagore) Mugeta Kaswamila

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LIST OF ABBREVIATIONS AND ACRONYMS

ADEMADE	Administrative Design Programme for Game Management Areas
AFO	Agricultural Field Officer
AGL	Land and Water Development Division of FAO
asl	Above sea level
AWF	African Wildlife Foundation
B.C.	Before Christ
BDC	Babati District Council
BUZLUP	Buffer Zone Land-Use Planning
C	Centigrade
CAMPFIRE	Community Area Management Programme for Indigenous Resources
Cap	Caption
CBC	Community Based Conservation
CBNRM	Community Based Natural Resource Management
CBO	Community Based Organisation
CCS	Community Conservation Service
CG	Comparison Group villages
CLUP	Conventional Land-use Plan
CP	Collaborative Planning
CVs	Control Villages (villages without land-use plans)
DALDO	District Agricultural and Livestock Development Officer
DC	District Council
DFO	District Forest Officer
DG	Director General
DGO	District Game Officer
DLAC	District Land Advisory Committee
DPT	District Planning Team
DSE	German Foundation for International Development
E	East
EIA	Environmental Impact Assessment
et al.	and others
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations

GCA	Game Controlled Area
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GMP	General Management Plan
GPS	Global Positioning System
GR	Game Reserve
GSME	Greater Serengeti Mara Ecosystem
ILO	International Labour Organisation
IUCN	International Union for Conservation of Nature
JPT	Joint Planning Team
km	Kilometre
LAMP	Land Management Programme
LE	Land Evaluation
LGA	Local Government Act
LMNP	Lake Manyara National Park
LRMP	Land and Resource Management Planning
LU	Livestock Unit
LUP	Rural Land-use Planning
m	Metre
MBOMIPA	Matumizi Bora ya Malihai Idodi na Pawaga
MGR	Mkomazi Game Reserve
MIGA	Multilateral Investment Guarantee Agency
MKUKUTA	Mkakati wa Kuondoa Umaskini na Kukuza Uchumi Tanzania
MLHSD	Ministry of Lands and Human Settlement Development
mm	Millimetre
MNRT	Ministry of Natural Resources and Tourism
MoA	Memorandum of Understanding
MRPFC	Minjingu Rock Phosphate Fertiliser Company
MTE	Mkomazi Tsavo Ecosystem
MZP	Management Zonal Plan
N	North
n	Respondents
NAP	National Agricultural Policy
NARCO	National Ranching Company

NCAA	Ngorongoro Conservation Area Authority
NEA	National Environmental Act
NEP	National Environmental Policy
NGO	Non Governmental Organisation
NHC	Northern Hunting Company
NLP	National Land Policy
NLUPC	National Land-use Planning Commission
n.r.	Not relevant
n.s.	Not significant
NS	Not Suitable
NSS	National Soil Service-Mlingano
NTP	National Tourism Policy
OBC	Ortello Business Company
PAs	Protected Areas
PLUP	Participatory Land-use Plan
PORI	Partnership Options for Resource Use Innovations
PRA	Participatory Rural Appraisal
PT	Planning Team
PUA	Participatory Urban Appraisal
REM	Resource and Environment Management
RRA	Rapid Rural Appraisal
RWEP	Rural Women Empowerment Project
S	South
S1	Highly suitable
S2	Moderately suitable
S3	Marginally suitable
SCIP	Support for Community Initiated Project
SEMP	Serengeti Ecological Monitoring Project
SNP	Serengeti National Park
SPP	Strategic Planning Process
SPSS	Statistical Package for Social Science
Sq.	Square
SRCS	Serengeti Region Conservation Strategy
SUA	Sokoine University of Agriculture

SVPT	Sub-Village Planning Team
TANAPA	Tanzania National Parks
TAWIRI	Tanzania Wildlife Research Institute
THR	Tanzania Hunting Regulations
TLCT	Tanzania Lands Conservation Trust
TMBE	Tarangire Manyara Basin Ecosystem
TMCP	Tarangire Manyara Conservation Programme
TNP	Tarangire National Park
ToR	Terms of Reference
TPO	Tarangire Programme
Tshs	Tanzanian Shilling (currency)
UAE	United Arab Emirates
UK	United Kingdom
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
URT	United Republic of Tanzania
US $	United States dollar (currency)
USA	United States of America
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VA	Village Assembly
VC	Village Council
VGS	Village Game Scout
W	West
WCMC	World Conservation Monitoring Centre
WCU	World Conservation Union
WD	Wildlife Division
WEO	Ward Executive Officer
WMAs	Wildlife Management Areas
WPT	Wildlife Policy of Tanzania
WWF	World Wildlife Fund for Nature(USA)
www	World Wide Web
Z $	Zimbabwean dollar (currency)

%	Percentage
°	Degrees
'	Minutes
"	Seconds
>	More than

CHAPTER 1

1.0. INTRODUCTION

1.1. General introduction and rationale of the study

Protected areas are areas of land and/or sea especially dedicated to the protection of biodiversity and cultural resources and which are managed through legal and other means (IUCN, 1994). Historically, protected areas have played a key role in global conservation and today there are some 102,000 of them, covering approximately 11.5% of the world's land area (UNEP-WCMC, 2003: p.98). Many protected areas are based on a model (fences and fines) exported by the USA in the late 19th and 20th centuries that excludes human settlement and consumptive use. This model is now recognised by the International Union for Conservation of Nature (IUCN) (now the World Conservation Union (WCU)) as Category II in its classification of protected areas.

The National Parks in Africa, based on the IUCN model, have played a major role in conserving the continent's charismatic species and raising revenue through safari tourism. However, these protected areas and others like them around the world are facing a number of threats that are seriously undermining their management effectiveness. A particularly significant threat is that of growing population and development pressures at and beyond the protected area boundary. These pressures are manifest not only in problems such as encroachment, poaching, pollution and degradation of resources, but also in the phenomenon known as "islandisation". (August *et al.*, 2002; Gutzwiller, 2002; Moulton & Sanderson, 2002; Yahner & Mahan, 2002).

Many National Parks throughout Africa are becoming increasingly surrounded by intensively modified environments and, in the long term, appear destined to function as isolated natural ecosystems, or islands of conservation in a sea of development (Bennett, 2003). Many species that the parks seek to protect are migratory and their isolation results in the decline or loss of species (*ibid.*). Moreover, protected areas often rely heavily on the existence of migratory corridors and dispersal areas beyond their boundaries that enable wildlife to move freely according to their daily and seasonal needs (*ibid*).

In recent decades in developing countries, habitats outside the protected areas have been degraded at unprecedented rates as increasing human populations continue to convert them to agriculture, forestry and urban centres (Kamenya, 2000; Sarunday & Muheto, 2000). Expansion of human settlements and agricultural croplands across migratory pathways, together with hunting and destruction of wild animals that feed in croplands, increasingly pose barriers to migration and wildlife dispersal, leaving species unable to thrive. The term wildlife in the context of this study is used to refer to large mammals. According to Sarunday & Muheto (2000), the long-term viability of protected areas can only be ensured through effective management of wildlife outside the boundary, in the dispersal areas and wildlife corridors that connect a coherent pattern of well managed protected areas at national and regional levels.

In order to preserve and sustain these critical protected area bio-networks, it is essential that a system of Land-Use Planning (LUP) is implemented, which supports the very special role of these areas. In this study the concept 'LUP' is used to refer to rural Land-Use Planning. Land-Use Planning approaches in developing countries differ

significantly from those used in more developed parts of the world such as Western Europe and the USA, where LUP is inclined towards a landscape planning approach (Selman, 1999; Kidd, 2000; Roe & Rowe, 2000; Corkindale, 2004; Tress *et al.*, 2005). The term land-use planning in the context of developing countries is used to refer to a "systematic and iterative procedure carried out in order to create an enabling environment for sustainable development of land resources, which meets people's needs and demands" (FAO/UNEP, 1999: p.40). It assesses the physical, socio-economic, institutional and legal potentials and constraints with respect to an optimal and sustainable use of land resources, and empowers people to make decisions about how to allocate those resources (FAO/UNEP, 1999). More simply, a land-use plan is an overall plan showing how land resources, located within a defined area, should be used in order to meet the declared objectives.

In developing countries, both "conventional" (top-down), and "participatory" (bottom-up) qualitative approaches to rural Land-Use Planning (LUP) are in widespread use in protected area bio-networks and elsewhere yet many other areas have no land-use plans at all. Despite their common usage, however, the two approaches are increasingly being criticised for their weak methodological procedures and lack of effectiveness, particularly in protected area bio-networks (Dent, 1991; Kauzeni *et al.*, 1993; Mwale, 1998; Sarunday & Muheto, 2000). Land degradation in these bio-networks continues unabated and agricultural yields continue to decline at an increasing rate, while both land-use and human-wildlife conflicts are continuing to intensify (Kauzeni *et al.*, 1993; Nethononda, 1995; Archer, 2006; Baldi & Navaro, 2006; Du Toit, 2006; Homewood, 2006; Isack, 2006; Madhusudan, 2006; Mcabe, 2006; Mishra & Bhatnagar, 2006;

Norton-Griffiths, 2006; Robinson, 2006; Walker, 2006; Zimmermann & Marchini, 2006).

The "conventional" LUP approach uses the Food and Agriculture Organisation (FAO) framework for Land Evaluation or Land Capability Classification which is based on expert - professional inputs (Klingebiel & Montgomery, 1961; FAO, 1976). The planning process is normally planned, executed and reports and maps produced by experts themselves without involving other land-use plan stakeholders (Klingebiel & Montgomery, 1961; FAO, 1976), such as farmers, pastoralists, village "experts", non-governmental/community-based organisations working in the project areas etc. Details for the procedures are described in subsection 2.3.4. This approach is criticised for a number of reasons:

- Its ineffectiveness in achieving plan objectives;
- The fact that the involvement of community in the planning process is merely theoretical;
- The disregard of traditional environmental knowledge;
- The complexity of the whole planning process;
- The inclusion of inappropriate evaluation parameters;
- That the process relies on 'expert' intervention; and
- That the process is very costly (Kauzeni *et al.*, 1993; Nethononda, 1995; Mwale, 1998; Brown and Hutchinson, 2000; Soule, 2000; Killen & Rahman, 2002).

On the other hand, participatory planning approach (bottom-up) which, emerged in the early 1980s (Chambers, 1992a & b) is being thought as an alternative approach to the conventional land-use planning approaches (Chambers, 93a & b; Cernea, 1995; Tan-

Kim, 1995; NLUPC, 1998). However, the so-called "panacea" to the conventional LUP approach lacks streamlined procedures with each country or regions within a given country having different procedures (Robertsson *et al.*, 1990; Tan-Kim, 1995; NLUPC, 1998; Christ, 1999; Hue, 1999; Puginier, 2001; WWF/TPO, 2002; BDC, 2004 & 2005). Like the conventional approach, participatory LUP – has also been challenged:

- For its disregard of biophysical factors during the planning process;
- For the rudimentary methods and tools it uses;
- For its disregard of Environmental Impact Assessment; and
- For its lack of any multi-disciplinary approach

(Richards, 1995; Mohan & Stokke, 2000; Kapoor, 2001).

Both approaches appear to be failing to meet the conservation aspects of the LUP, the *raison'd'être* when it comes to protected area bio-networks.

1.2. Development of LUP in Tanzania

In Tanzania from the 1920s to the early 1990s, four approaches to LUP have been attempted: the land-use schemes approach; village settlement schemes; layout plans; and land-use plans using a "conventional" approach (Lerise, 1998). Recently, the Participatory Land-Use Planning (PLUP) approach has been recognised by law (URT, 1999a & b; WMA, 2002; URT, 2005), despite a lack of rural land-use planning legislation. The current status of LUP in Tanzania can be summed up by the remark of the President of the United Republic of Tanzania:

> *"At the moment LUP has hardly lived up to the expectations of the Tanzanian's. This workshop...should critically review the institutional set-up and functions at every level with a view to clearly delineating the functions of the national, regional, district and village organs as well as indicating the level at which national priorities overrule local interests" (President Benjamin William Mkapa inaugural speech during a workshop on land-use planning and land tenure system in Tanzania held at the Sokoine University of Agriculture, Morogoro on 12th-14th March 1996; pp.*1-6).

Despite the above criticisms of LUP in developing countries and the prevailing LUP status in Tanzania as embodied in the president's speech, no studies have been carried out to evaluate the impacts of land-use plans in areas where humans co-exist with wildlife. Most land-use planning evaluation research has followed urban strategic plans (McLaughlin, 1975; Margerum, 1999a; Karin *et al.*, 2002; 2004; Calbick *et al.*, 2003; 2004; Sterner, 2003; Joseph, 2004) and land and/or social policies (Ingram & Mann, 1980; Nakamura & Smallwood, 1980; Hogwood & Gunn, 1984; Mazmanian & Sabatier, 1989; Hill, 1997; Vedung, 1997; O'Faircheallaigh, 2002). Lack of research on this topic in developing countries and in Northeastern Tanzania in particular, has left LUP a "grey area" leaving protected area bio-networks under increasing threat as wildlife corridors become restricted or blocked (pers. obs.).

The protected area bio-network of Northeastern Tanzania, where this study was conducted, includes the Serengeti, Tarangire, Lake Manyara National Parks and Mkomazi game reserve (see Fig. 1.1) and comprises: the country's major tourist attractions; trans-border wildlife migratory routes i.e. Serengeti-Maasai Mara National reserve (Kenya) and Mkomazi-Tsavo (Kenya); and are the lifeline of the Northeastern Tanzania interlinked protected area networks (NLUPC, 1994; Kauzeni, 1995; SNP, 1996; Severre, 2000; Sechambo, 2001; Yanda *et al.*, 2001; LMNP, 2002; TNP, 2002; Kideghesho & Mokiti, 2003; Rodgers *et al.*, 2003; Nelson, 2004; Poole, 2006). Despite the presence of operational land-use plans in these areas of conservation importance, land-use conflicts are still mounting as a result of changing land-use practices and demographic pressure, symptomatic of the plans' failure e.g. Burungi, Mto wa Mbu and Loliondo game controlled areas (NLUPC, 1993; WWF, 2002; AWF, 2005a & b).

The current research, therefore, attempts to make four types of contribution: First, to fill a gap in the conceptual framework of LUP as it pertains to balancing protected area bio-networks and residents' livelihood strategies in Northeastern Tanzania wildlife corridors; second, to enhance the performance of the newly created community conservation reserves known as Wildlife Management Areas (WMAs) (Severre, 2000; WMA, 2002); third, to strengthen Tanzania's land, tourism, and environment policies (NEP, 1997; NLP, 1997; WPT, 1998; NTP, 1999) by advocating the need to prepare and implement land-use plans which can be easily used in conservation sensitive areas (rangelands, wetlands, wildlife migratory routes and game controlled areas); and fourth to propose a new LUP framework for use in the area and to other parts of the country and/or other areas in developing countries with modifications to suit the areas socio-economic and environmental settings.

1.3. Aims and objectives of the study

The overall aim of the study is to evaluate both the process and impact of qualitative LUP in six villages in Northeastern Tanzania (see Fig. 1.1) with specific objectives to: (i) assess the impacts of plans in minimising land-use conflicts and conserving wildlife migratory routes and dispersal areas (ii) compare intensity of land-use conflicts between villages with plans and those without (iii) identify the strengths and weaknesses of the two planning approaches and (iv) develop an improved approach to the LUP methodological framework that would enhance connectivity, wildlife habitat conservation and development objectives and which could be applied in other similar situations. The following general and specific research questions will be addressed:

1.3.1. General research question

To what extent has LUP been effective or ineffective in the study area in relation to the land-use plans objectives?

1.3.2. Specific research questions

(i) To what extent have local residents and other local stakeholders been actively involved in the LUP process?

(ii) Have the plans helped in minimizing land-use/human-wildlife conflicts and conserving wildlife migratory routes and dispersal areas in the protected area bio-networks?

(iii) What are the major practical strengths and weaknesses of these plans?

(iv) Is there any difference in amount of land-use conflicts and/or encroachment into wildlife habitats between villages with and without plans?

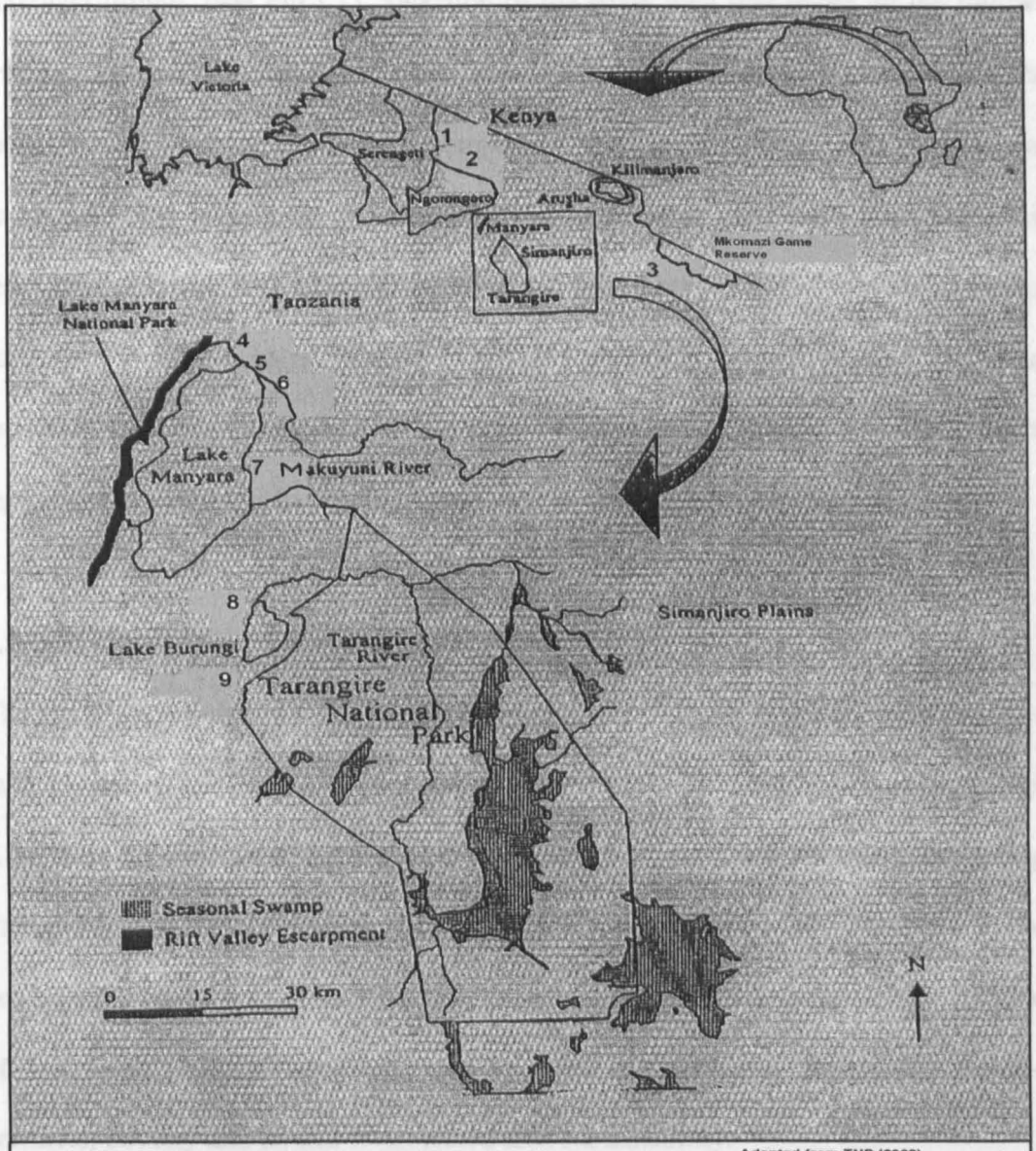

FIGURE 1.1 LOCATION OF THE STUDY SITES

1.4. Selection of the study areas

The study was carried out in nine villages' adjacent to four major protected areas in Northeastern Tanzania (see Chapter 3, Section 3.2). The protected areas with corresponding villages in brackets were: Tarangire National Park (Sangaiwe, Vilima Vitatu); Lake Manyara National Park (Esilalei, Barabarani, Migombani, Chemchem); Serengeti National Park (Soitsambu, Ololosokwan) and Mkomazi game reserve

(Mkonga-Ijinyu). (see Fig.1.1). Selection of the study area was based on the following criteria: the need for villages to have operational land-use plans of not less than three years duration; the need to include comparison villages, that is, villages with no plans; and the need to cover different ecosystems. A wide range of villages were chosen with regard to factors such as ethnicity, ecosystems, nearness to reserves and socio-economic bases (see Chapter 3, section 3.2 for details) mainly because this research aimed to be as broad-based and representative of Northeastern Tanzania rangelands as possible, so that the proposed new LUP framework could then be tested and implemented.

1.5. The conceptual framework of the research study

The main environmental, policy and legislative concepts pertinent to the research and their perceived relationship to one another are represented diagrammatically in Figure. 1.2. These concepts have been used in formulating the research questions. According to Figure 1.2, the lack of potential stakeholder involvement in LUP, ineffective policies and legislation and lack of LUP sectoral coordination are to a larger extent the root cause of the plans' failure, which in turn triggers environmental degradation, land-use conflicts, poverty and threats to protected area sustainability.

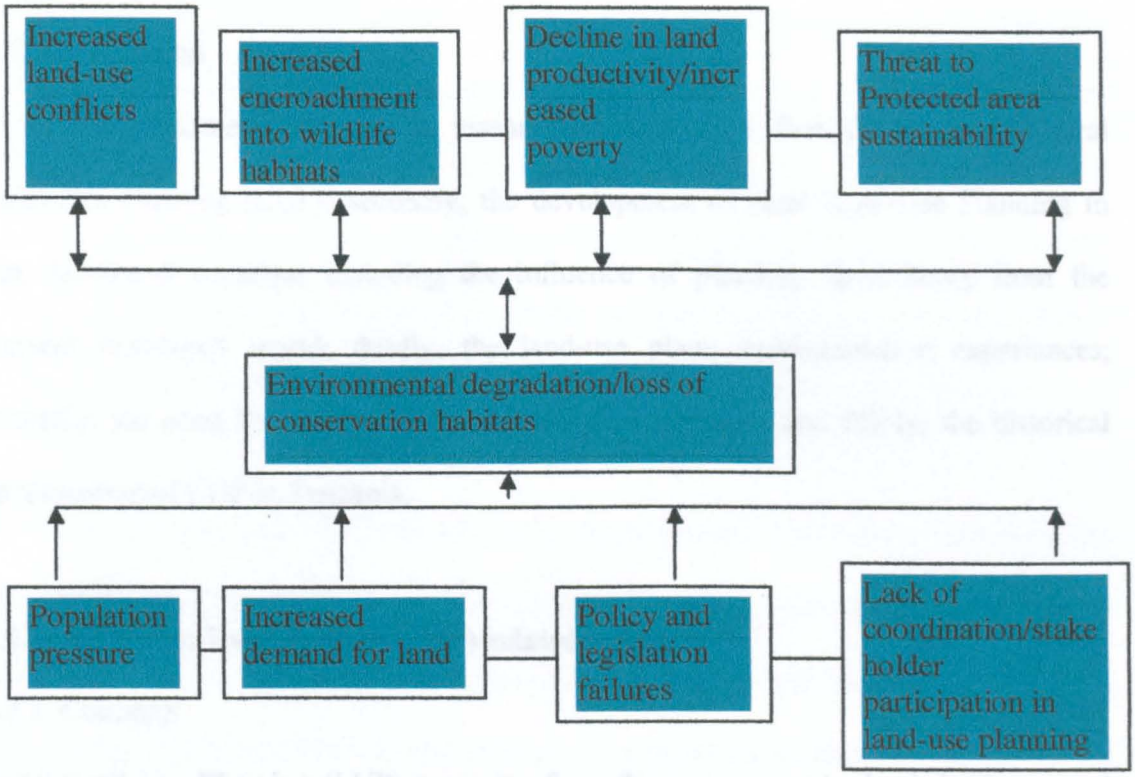

Fig. 1:2:The conceptual framework of this research

1.6. Structural outline of the thesis

Following this introduction, the body of the thesis consists of nine Chapters. Chapter Two provides a review of relevant literature pertinent to rural land-use planning (LUP). Chapter Three outlines the research methodologies applied in the study. Chapter Four describes the background of the study area. In Chapters Five through Seven the research results are presented and, Chapter Eight discusses the main findings from the study and proposes an improved LUP framework. Chapter Nine is a concluding Chapter which comprises answers to the research questions, statement about the aim of the research being achieved, conclusions about the methodology, policy implications and suggestions for further research.

CHAPTER 2

2.0. LITERATURE REVIEW

2.1. Introduction

Five areas of interest underpin the research for this thesis: first, the concept of rural Land-Use Planning (LUP); secondly, the development of rural Land-Use Planning in less developed countries including the influence of planning ideas/theory from the western developed world; thirdly, the land-use plans implementation experiences; Fourthly, the need for LUP in protected area bio-networks; and fifthly, the historical development of LUP in Tanzania.

2.2. Rural Land-Use Planning (LUP) related concepts

2.2.1. Concepts

Rural Land-Use Planning (LUP) emanates from three components: land; land-use; and planning. To understand LUP, it is necessary to define these terms. According to FAO/UNEP (1999), land/land resources refers to a delineable area of the earth's terrestrial surface, encompassing all attributes of the biosphere immediately above or below the surface. In simple terms, land comprises the physical environment, including climate, relief, soils, hydrology and vegetation (FAO, 1984).

Land-use is characterized as the arrangements, activities and inputs of people to produce change or maintain a certain land cover type (Di Gregorio & Jansen, 1998). Land-use defined in this way establishes a direct link between land cover and the actions of people in their environment. Land cover is the observed (bio) physical cover of the earth's surface (Di Gregorio & Jansen, 1998).

Planning is normally described as a decision-making process, which follows a sequence of six steps (Hall, 2002). These are: initiation of the planning process; goal, objective and target development; development of alternative courses of action; evaluation of alternatives; plan and develop alternative chosen; and plan review. The last two steps are considered as implementation. According to Van Lier (1998), planning consists of the subdivisions of social, public policy, economic and land-use planning. This approach is similar to the conventional planning approach the "top-down" planning approach.

Brown (1996) on the other hand identifies seven phases, which are required in the planning process. These are: preparation, process design, goal development, information and tools, scenario development, agreement to a plan and plan implementation. According to Brown (1996), in the first phase a government agency responsible for planning undertakes the necessary preparations. Following this, a planning team contacts participants to form a discussion forum, identifies planning boundaries, assesses policy and information frameworks, assembles and organises preliminary information, assembles orientation materials, and drafts a planning team's terms of reference.

In phase two, discussion forum members are convened to define their mode of operation. A table defines its purpose and process, and representatives are oriented to their roles and responsibilities and are trained in interest-based negotiation. In addition, a table clarifies process mechanics, finalises terms of reference, and commits to a process. Plan goals are developed in the third phase. The table documents issues, identifies interests, and assesses opportunities. As part of this phase a table develops a vision of the future of a planning area to guide the process.

During the next phase, a table collects information and develops analytical tools. Utilising the help of experts, government agencies, and technologies such as geographic information systems, a table gathers and transforms information into a usable form. To identify and demarcate where land-use practices will be suitable, a table generates a land-use designation system together with an evaluation system to aid land-use decision-making.

In the fifth phase, a table develops land-use plan alternatives. Once guiding principles are adopted to determine land allocation, a table assesses parcels of land within its sub-region in terms of land-use suitability for alternative resource uses. The land-use designation system developed in phase four is applied to the land base to develop alternative scenarios for each parcel within a sub-region. A table then evaluates each alternative against planning objectives using appropriate evaluation techniques. This process continues until a table reaches consensus on a preferred scenario.

In phase six, a table finalises a preferred land-use scenario. Based on projected implications of a scenario, more specific plan details are developed and the public reviews the plan. Following further modification of the plan details through iteration, a table agrees to the final land-use plan. In the last step in this phase, a table submits its recommended plan to the government for approval. Plan implementation begins in phase seven.

Relevant government agencies and personnel receive a plan and incorporate it into policy and their work agendas. Non-governmental stakeholders may also be compelled to modify their practices and agendas consistent with plan objectives and requirements.

This phase may involve legislative designation, investment, more detailed planning, institutional reform, use of mitigation and transition strategies, and dispute resolution. In addition, a monitoring process is established to periodically review plan progress and guide plan amendment over time.

Brown's planning sequence can rightly be described as participatory in nature as it attempts to integrate stakeholders' in the planning process. The approach also seems to be logical at each planning level, be it national, regional, district or local/village level. However, in the developing countries' context, and Tanzania in particular, this approach is likely to fail due to a number of factors such as resource constraints (financial and human), lack of availability of data needed, institutional/policy weaknesses and lack of political will to undertake the planning process (pers. obs.).

Apart from the approach being best suited to urban environments of the developed world, two weaknesses are observed in Brown's approach. This is the absence of identification of priority problems to precede the preparation stage. Participatory Rural Appraisal (PRA) or Urban Appraisal (PUA) is suggested. Both PRA and PUA have an advantage of providing base-line information, which could be instrumental in the whole planning process. Where the identified priority problems through PRA or PUA are not related to development of a land-use plan; it will be waste of resources to develop and implement one. The other weakness in the Brown's model is the disregard for the Environmental Impact Assessment component (EIA) as an important component in ensuring social and environmental sustainability. This component is essential in the preparation of land-use plans in both urban and rural environments.

2.2.2. Rural Land-Use Planning (LUP)

There is no universal definition of LUP as both developed and developing worlds and even different scholars (Lipscombe, 1992; Kaoneka, 1993; Nnkya, 1999; Fallding, 2000) tend to define them for their own purposes. Moreover, the approaches used in LUP also vary. Lipscombe (1992), argues that LUP is essentially a process of deciding on a desired future and making it happen, while Fallding (2000) likens LUP to "on-ground" documents outlining actions proposed by land and resource managers for a clearly defined natural resource, issue or activity, ecosystem or area of land. The documents are normally in the form of a written document and may be used in a wide variety of ways depending on their purpose and legal status.

Kaoneka (1993) defines LUP as a process of systematic classification of land into management units under specific land-use patterns, which will ensure the use of land-based resources on a sustainable basis for present and future generations. He emphasises that LUP requires the application and integration of various disciplines such as sociology, economics, politics and hydrology. Nnkya (1999), describes LUP as a programme of state intervention in land-use and environmental change to mediate conflicts of interests over how land should be used and developed. The land-use programme is realised through a planning system, constituted by institutional arrangements, instruments and tools (*ibid*).

From the above summary, the appropriate definition of LUP vary depending on the nature of the study. However, the definition adopted in this study is the one used by FAO/UNEP (see Section 1.1) mainly due to two reasons. First, is its wide use by different international organisations involved in LUP such as FAO, UNEP and national

Land-Use Planning departments in most developing countries (NLUPC, 1998). Secondly, the definition encompasses essential aspects (sustainability and empowerment), which are important to be considered in developing countries' rural planning environment.

Rural Land-Use Planning (LUP) can be implemented at national, regional, district and local or village scales. In this study the LUP context is at the level of the village, where plans are intended to show how land resources, located within the village boundaries, should be used in order to meet intended objectives (NLUPC, 1998). In Northeastern Tanzania, and Tanzania in general, LUP is aimed at facilitating and coordinating sectoral development efforts dealing with natural resource use, such as agriculture, livestock, settlements, water, forestry, wildlife and community development.

2.2.3. Land evaluation (LE)

Land evaluation (LE) is the assessment of land performance or potential with respect to a particular purpose, and is a tool which is designed to assist Land-Use Planning and management whether at the local or strategic levels (Rossiter, 1996; FAO/UNEP, 1999; Steudler, 2004). Land evaluation (LE) should comprise both bio-physical and socio-economic evaluations.

Physical LE involves the interpretation of data concerning the physical environment, and past and present land-use in terms of its resource potential (FAO/UNEP, 1999). It is thus concerned with seeking solutions to problems such as long-term degradation of land quality as a result of present use, the viability of alternative land-uses, the extent to

which the management of existing land-use can be improved, and the impact of inputs on productivity and land quality (*ibid.*).

Land evaluation (LE) can be classified into two main categories: qualitative LE, which depends largely on experience and intuitive judgments (see details in subsection 2.3.4); and, system models such as expert systems, fuzzy set theory, neural networks, dynamic simulation and hybrid models (Rossiter, 1996; De la Rosa, 2002). This study emphasises qualitative LE for LUP for the purposes of its practical relevance to field-based LUP in the rural Tanzania context.

2.3. Development of LUP

In this section, the evolution of land evaluation for LUP is examined first. This is then followed by an account of the development of LUP in developed countries and how it influenced LUP in less developed countries. Third, the development of LUP in tropical Africa is examined; and lastly, a detailed account of the two popular LUP approaches in developing countries, the "conventional" and "participatory" approaches are described.

2.3.1. Evolution of LUP

Rural Land-Use Planning (LUP) is as old as the first man, *Homo sapiens,* who lived 200,000 years ago (Mango, 1996). Early mankind practised LUP by solving three key problems of food, shelter and clothing through walking around to satisfy his or her needs (Rugumamu, 1988). Systematic classification of land was first recorded in China about 40 centuries ago where soils were graded into nine classes on the bases of their productivity (*ibid*). The user was the Emperor who taxed landowners on the basis of land productivity. The higher the productivity the higher the taxes charged (*ibid*).

Archaeological evidence suggests that the earliest Neolithic farmers made land-use decisions in terms of selection of the best areas for cultivation, and ever since then farm management strategies have been influenced to varying extents by the nature of the land (Dudal, 1986). Conscious LUP originated during the Greek empire when philosophers like Socrates, Plato and Aristotle encouraged reasoning, logic, invention and scientific ways of solving problems (Mango, 1996).

Hippodamus is sometimes cited as the first land-use planner (architect), with his advanced positive theories on city-state planning around the time of 500 BC (*ibid*). He considered building orientation, functional uses of buildings, public spaces and street arrangements (*ibid.*). The main problem in his planning process was that it centred around one man thinking for the city-state mass. He never thought that some of the planning thinking could be improved by involving the masses (*ibid.*). However, this was the origin of the LUP profession.

Patrick Geddes in 1892 combined the concepts of town planning and socio-economic planning to form what is called regional planning or physical planning. In 1910 he prepared the first regional plans for Indian towns and villages such as Greater Calcutta and Bombay (Mango, 1996). He developed a single planning process of survey – analysis - plan.

2.3.2. Development of Land-Use Planning in the developed world

Although land evaluation (LE) has been practised for millennia, it was only in the early 1960s that it began to appear as a distinct discipline (Dudal, 1986; De la Rosa, 2002). Forces behind this emergence include the increasing availability of soil, geological, and climatic maps and the need to present this information in a more comprehensive form;

the adoption of land planning policies in most countries; the ever-increasing concern about population growth and global land resources; and technological developments in computing, which permitted the much easier handling and processing of quantitative data (Dudal, 1986). This led to the emergence of different land evaluation systems such as "land capability" in the USA, and the Canadian, British and Russian soil classification systems (*ibid.*).

The origins of land capability can be traced back to the reasons for the formation of the United States Soil Conservation Service (Klingebiel & Montgomery, 1961). The impetus was massive soil erosion, especially in the American Midwest, and the acute need to identify types of land-use that would not lead to environmental degradation. The United States Department of Agriculture (USDA) scheme had as its focus the interpretation of soil mapping units according to degree of constraint imposed upon land-use (*ibid.*).

The Canada Land Inventory, was a body charged with surveying and land capability, developed separate classifications for agriculture, forestry, recreation, and wildlife (Environment Canada, 1970). The strength of the Canadian program was that, within a few years, land capability maps were available for the whole of the settled area of Canada and became instrumental in land-use management.

The British experience in modifying the USDA scheme is also of interest. The soil surveys of England and Wales and Scotland evolved a Land-use Capability Classification, very similar to the American scheme but with seven classes and many more quantitative guidelines (Bibby & Mackney, 1969). Since 1969 the British surveys have been publishing land-use capability maps at scales of 1:63,000 (now 1:50,000) and

a few at 1:25,000). In Scotland this land classification has been officially accepted for grading agricultural land, a decision also made possible by the availability of full map cover (Bibby & Mackney, 1969).

In recent years (1990s) the developed countries' approaches to LUP have been leaned towards the landscape planning approach (Kidd, 2000; Roe and Rowe, 2000; Selman, 2000; Tress *et al.*, 2005). For instance, UK planning operates at two main scales, the site level concerned with the design and construction of relatively small developments (buildings for example) and the landscape scale covering tracts of countryside at least several kilometres wide (Selman, 1999).

Planning activity at the landscape scale is principally concerned with environmental protection and enhancement and/or resource management and is often expressed in the form of extensive area plans (Kidd, 2000). These plans may promote preferred patterns of resource use, provide a framework for more effective coordination and collaboration between agencies working in an area, and/or set out detailed action plans related to management of specific sites and areas (*ibid.*). There is however, a growing trend for landscape planners in the UK to look beyond the site and landscape scales to engage in planning activity at higher strategic levels i.e. strategic plan and local (site) plans (*ibid.*).

The LUP approaches of developed countries discussed above, have contributed to the promotion of environmental awareness among developing country professionals, planners and policy makers over the past four decades. This is because many developing country professionals received their training overseas in countries with developed planning systems (developed), or from planners of western origin working in developing

countries. The fact that the planning literature was and is dominated by experience from developed countries also influenced this scenario. However, situations in the two worlds differ, and the extrapolation/transfer of techniques/approaches from one area to the other may not be appropriate and certainly cannot be achieved without particular attention being paid to adaptation and modification to local conditions (De Pauw, 1996).

2.3.3. Development of LUP in tropical Africa

Two major trends characterize the adoption of soil classification systems for land-use capability in tropical Africa: first, those systems that were developed in Europe and North America; and, secondly those systems, which originated in the tropics but were initially designed to cover small areas for particular purposes (Rugumamu, 1988). An in-depth analysis of the two trends reveals that many systems of soil classification in the tropics originated from the philosophies and principles developed by soil surveyors from temperate parts of the world (*ibid.*), and were espoused without adaptation.

Although soil survey for Land-Use Planning in the tropics gained momentum after World War II, soil studies in East Africa had already begun in 1935 (Northcote, 1962; Albert, 1963; Young, 1976). The approaches were stimulated by the failure of some capital-intensive agricultural schemes such as the Kongwa groundnut scheme in Tanzania (Rugumamu, 1988).

For almost four decades "conventional" LUP approaches i.e. land suitability/capability (see 2.3.4.1 & 2.3.4.2) have been in use in tropical Africa; however, in the early 1980s a new approach, the participatory planning approach was advocated as a result of criticism that conventional plans were ineffective because local residents were not involved at all in their production (Chambers, 1992, Chambers 1994a & b; NLUPC, 1998). The next

subsection, gives an account of two LUP approaches, the "conventional" and the contemporary "participatory" LUP planning approaches.

2.3.4. Major LUP approach

Modern land evaluation for LUP practice grew out of agricultural land capability classification (e.g. Klingebiel & Montgomery, 1961; Stewart, 1968; Olson, 1974; Beek, 1978; McRae, 1981). The FAO's Land and Water Development Division (AGL), in the early 1970s, sponsored working groups, leading to publication of the "framework for land evaluation" in 1976 (FAO, 1976). The aim of developing of a framework was to achieve some form of international standardisation of LE procedures (FAO, 1976).

2.3.4.1. The USDA classification system

The "USDA Land Capability System" evolved by the Soil Conservation Service of the US Department of Agriculture (1961) provide conceptual definitions of capability classes according to the degree of limitation to land-use imposed by land characteristics on the basis of permanent properties e.g. run-off, stoniness, drainage, tillage limitations etc. The USDA, the British Land-use Capability Classification of 1969, the Canadian Land Capability Scheme of 1970 and the Dutch system of 1975, have been widely used around the world (Stewart, 1968; Olson, 1974; De la Rosa & Van Diepen, 2002).

The primary function of the USDA system (Klingebiel and Montgomery, 1961) is the classification of soil mapping units, but other attributes of land (slope, climate and flooding) are also taken into account and the underlying focus of the system is on those "limitation factors" which restrict land-uses. Limitations are grouped into permanent or temporary limitations. The classification is hierarchical. At the highest-level, eight classes (I-VIII) are distinguished on the basis of alternative uses, with priority for arable

cropping. The basic land capability classification allocates land suited to cultivation to classes 1 to IV, followed by land suited to grazing, classes V to VI, forestry to VII and VIII for wildlife and recreation (Klingebiel and Montgomery, 1961).

At the second level, subclasses are defined in terms of four soil conservation problems, that is, (a) runoff and erosion (b) wetness and drainage, (c) rooting and tillage limitations resulting from shallowness, drought risk, stoniness or salinity and (d) climatic limitations. At the third level land capability units are formed by grouping soils with similar potential for plant growth, response to management and soil conservation needs (*ibid.*). The classification system was mainly for soil erosion controls but was imported to developing countries and used without any modifications (Rugumamu, 1988). The results became catastrophic in many developing countries (*ibid*). Examples include the Mlalo soil conservation and Kongwa groundnuts projects in Tanzania in the early 1960s where the use of the model resulted in total failures of these projects (*ibid*).

A key flaw in the USDA system is that it takes into account only four land-uses: agriculture, forestry, grazing and cultivation disregarding other equally important land-uses such as settlement, wildlife conservation, recreation and social infrastructure developments. Recreation and wildlife conservation according to the system is highly suitable in marginal areas with very steep slopes and poor drainage, which in practice is not always the case. Recreation areas and wildlife conservation reserves can be assigned to any slope range. The land-use allocation system also lacks socio-economic factors; instead emphasis is on relief and topography. The lower the slope percentage and well drained a land unit is, determine the land quality.

2.3.4.2. Land suitability classification (FAO framework).

By the 1970s many countries had developed their own independent systems of land evaluation (FAO, 1976). This made exchange of information difficult, and there was a clear need for international discussion to achieve some form of standardisation of the methodological framework (*ibid*). Subsequently, the FAO organised workshops leading to publication of guidelines for land evaluation in dry land agriculture (FAO, 1983), irrigated agriculture (FAO, 1985), forestry (FAO, 1984), extensive grazing (FAO, 1991); steep lands (Siderius, 1986); guidelines for LUP (FAO, 1993) and towards a new approach in LUP (FAO/UNEP, 1997). Despite the achievements in producing LE guidelines, there have been increasing criticisms and calls from planners and land-users for development of a practical and cost-effective land evaluation framework (Bouma, 1996; Bouma & Hoosbeek, 1996; Burrough, 1996; De Gruijter, 1996; Steudler, 2004).

The FAO framework sets out basic concepts, principles, and procedures for land evaluations that are universally valid, applicable in any part of the world and at any level, from global to single farm (FAO, 1976) and defines six principles that are fundamental to land evaluation:

- Land suitability is assessed and classified with respect to specific kinds of use
- The suitability classes: highly suitable (S1); moderately suitable (S2); marginally suitable (S3) and not suitable (NS) are defined by land quality/characteristics and economic criteria.
- A multi-disciplinary approach is required.
- Evaluation should take into account the physical, economic, social and political context of the area concerned.
- Suitability refers to land-use on a sustained basis and
- Evaluation involves comparison of two or more alternative kinds of use.

To date, LE has been largely "pedocentric", i.e. emphasising the soil resource and carried out by soil scientists, mainly because the FAO land evaluation methodology was developed by soil scientists whose experience has been in agricultural land suitability classification (Rossiter, 1996). The soil resource is just one among many natural, economic and human resources that affect land suitability. However, as Bouma & Hoosbeek (1996) point out, soil scientists are not usually qualified to cover all specialities that are necessary for a useful land evaluation. The ideal situation is a specialist in land evaluation methods working with a team of specialists in land resources and land-use that would normally include a soil scientist (Bouma & Hoosbeek, 1996). A common theoretical framework should ease communication between team members.

A fundamental challenge-facing LE for LUP is to show its relevance to the many pressing land-use problems. Predictions of land performance, no matter how soundly based, are only useful if decision makers, including individual land-users, wider groups, or governments will use them to make better land-use decisions (Rossiter, 1996). Land evaluators should also accept that not only professional land-use planners have relevant questions, and that not only soil scientists and agronomists have relevant knowledge (*ibid*).

According to Bouma (1996) there is an increasing number of users who are not primarily interested in our judgement about suitabilities of a piece of land for a given land-use system. Rather, they want us to give them different realistic options for land-use for a given piece of land, with proper technical coefficients. They are increasingly inclined to

make selections themselves whether they are farmers or planners. Rossiter (1996) argues that a "conventional" approach is not the only way to conduct land evaluation.

Land evaluation (LE) needs to change from being "pedocentric" and should also take into account social habits and prejudices (Burrough, 1996). He argues that the pastoral industry in Australia persists because of historical factors - the production of cattle and sheep is only economic because huge areas of land can be devoted to their husbandry. In Mexico, almost all peasant farmers grow maize, not because the FAO land evaluation system says that their lands are good for the crop, but because their culture requires it - any maize is better than none (Corbett, 1995).

Burrough (1996) argues that there is no unified theoretical framework or at least, it has not yet reached a time for a unified theoretical land evaluation (LE). In order to achieve better unification we need to look more at the interactions between how the various tools for LE can be used in different circumstances, and how physical, economic and social factors must be combined, for example analysis as done by marketing analysts on where best to locate a superstore or fast-food outlet. Each of the approaches has different data needs and different qualities of prediction (Burrough, 1996). De Gruijter (1996) and Rossiter (1996) on the other hand state that there is an urgent need to develop a theoretical framework to replace the FAO framework.

Descriptive classification to facilitate communication is often a necessary first step in science. Land evaluators are likely to be more directly concerned with the question of how to design a cost-effective and demand driven approach (De Gruijter, 1996; Rossiter, 1996) rather than using the current FAO framework. The current challenge to land

evaluators as stated earlier, is to write a practical framework for land evaluation to replace the 1976 FAO framework (De Gruijter, 1996; Rossiter, 1996). A land evaluation framework must respond to the needs of clients by accepting a demand-driven approach to practice and to provide clients with clear indications of the precision and accuracy of predictions made.

This change will by necessity require that the traditional pedocentric view of land evaluation be augmented by expertise from a range of other disciplines i.e. geography, sociology, land surveying, economics etc. Hence to arrive at a theoretical framework for land evaluation (LE) will require more holistic view of the land evaluation process. Recent developments in landscape ecology and spatial analysis (at scales larger than a field) have much to offer to rural planning yet have received little attention in the LE literature (Johnson, 1996). These issues must be addressed comprehensively in any development of theoretical framework for LE (Johnson 1996).

According to Rossiter (1996), practising land evaluators in many countries are usually not even practising the FAO framework or similar concepts correctly, and indeed they often persist in so-called land capability approaches. Land indices, despite their obvious problems such as not accounting for interactions and unjustifiable methods of combining factors, are still in wide use by national soil survey organisations and taxation departments (Rossiter, 1996). When a resource-poor or knowledge-poor institution is called on to evaluate the relative fitness of land, especially for strategic planning, perhaps a simple method is always not bad (*ibid.*).

Land-users and planners are inclined to ignore land evaluators (Bouma, 1996; McBratney, 1996). This generally reflects the poor quality and limited relevance of

many actual land evaluations, as well as poor communication with clients (McBratney, 1996). It is not sufficient to deliver a report and map; there must be continuous follow-up by the land evaluator as plans are implemented, not least to monitor if the recommendations were correct. In addition, too many land evaluators do not select an appropriate approach, they just follow whichever one they happen to have learned, often even without the necessary local modifications (*ibid*). There is a need to develop an objective procedure for selecting a LE approach and justifying its cost-effectiveness in each situation. We also need to consider the human resources and institutional framework available to carry out land evaluation in such a procedure, and include the necessary training and institutional strengthening.

In summary a new LE framework for LUP is required. Such an approach needs to have the following characteristics:

- A practical framework;
- A demand-driven cost-benefit approach to selected land evaluation methods; a systematic approach to measuring and presenting uncertainty;
- Development of new measures of costs and benefits to include environmental and human health and their integration with existing measures of suitability;
- Continued emphasis on multidisciplinary approaches to land resources assessment evaluation, including the difficult question of how to best integrate disparate ways of thinking about land suitability; and
- To strive to improve land evaluation practice, which often lags well behind existing available best practices (Bouma, 1996; Burrough, 1996; De Gruijter 1996; Johnson, 1996; McBratney, 1996; Van Ranst, 1996).

From the foregoing discussion on "conventional" land evaluation for LUP, it is clear that the framework which is in use in most developing countries and has been in place for three decades, does need improvement. In tandem with calls for developing a new LE framework, in the early 1980s the participatory planning concept emerged (Chambers, 1992a), as an alternative approach after the 1992 Rio De Janeiro conference (FAO/UNEP, 1999).

2.3.4.3. Participatory Land-Use Planning (PLUP)

A participatory approach refers to the direct involvement of the stakeholders in various steps of the development activities with the intention of learning from the poor, decentralizing decision-making, encouraging local initiatives, promoting empowerment and diversity so as to meet the needs of the resource-poor rural population (Chambers, 1992a; Chambers, 1993; Cernea, 1995; Tan-Kim, 1995; NLUPC, 1998).

These participatory principles became embodied in the philosophy, approaches and methods known as Rapid Rural Appraisal (RRA), which began to emerge in the late 1970s (Chambers, 1992b). Rapid rural appraisal can be seen to have had three origins: First, dissatisfaction with biases, especially the anti-poverty bias of rural development and tourism; secondly, disillusion with the normal processes of questionnaire surveys; and thirdly, the need to look for cost-effective methods (*ibid.*).

In the 1980s, the words "participation" and "participatory" entered the RRA vocabulary, especially at the Khon Kaen conference in Thailand in 1985 (Chambers & Guijit, 1995). During this meeting seven typologies of RRA were generated of which Participatory Rural Appraisal (PRA) was one (Chambers, 1993b). Other PRA synonymous vocabulary

include: activist participatory approach, agro-ecosystem analysis, applied anthropology, field research on farming systems and rapid rural appraisal *(ibid.)*. The challenge presented was for outsider professionals to further develop and disseminate approaches and methods to help farmers do their own analysis and make their own needs and priorities known to scientists (Chambers, 1993a).

Different authors (Tan-Kim, 1995; Christ, 1999; DSE, 1999) have defined Participatory Land-Use Planning (PLUP) in a variety of ways. It is an operational tool which creates conditions of frequent communication and analytical discussions, hence strengthening local organizations by generating common understanding and shared rights and responsibilities (Tan-Kim, 1995). Participatory Land-Use Planning (PLUP) is a process for deciding the best use of scarce land resources through negotiation between different stakeholders (interests) aimed at equity, viability, conservation, sustainability, and effective implementation (DSE, 1999).

A review of PLUP approaches in less developed countries reveals generic weaknesses and strengths. Notable weaknesses include: un-streamlined methodological frameworks; lack of monitoring and evaluation; staff lacking experiences of participatory planning and disregard of land capability/Environmental Impact Assessments (EIA) and donor funded projects unable to gather enough local experience to be able to carry out land-use programs without external support (FAO, 1990; Mutelo, 1990; Negesh, 1990; Robertson *et al.*, 1990; Tan-Kim, 1992; Christ, 1999; Hue, 1999; Puginier, 2001).

The notable strengths of PLUP have been the attempt to involve potential natural resource users in planning hence minimizing land-use conflicts; exchange of experiences between experts and land-users; cost effectiveness and the encouragement of multi-

disciplinary planning among professionals (FAO/UNEP, 1999). The failures of Land-Use Planning (LUP) in developing countries have prompted FAO/UNEP to issue guidelines for integrated planning for sustainable management of land resources (*ibid.*).

2.3.4.4. Integrated LUP approach

The guidelines for integrated LUP were a result of Chapter 10 of Agenda 21 of the Rio environmental meeting (FAO/UNEP, 1999). The guidelines are targeted primarily at professional and technical staff engaged in LUP and resource management at national, sub-national and community level who want to implement an integrated approach to land resource management (*ibid.*). The guidelines call for the need to test and validate the ten sequential planning method procedures that start with identifying problems and end up with monitoring and evaluation (Fig. 2.1), in several pilot areas so that lessons learned can be used to adapt integrated Land-Use Planning to particular conditions of the country, and to promote and guide its widespread adoption.

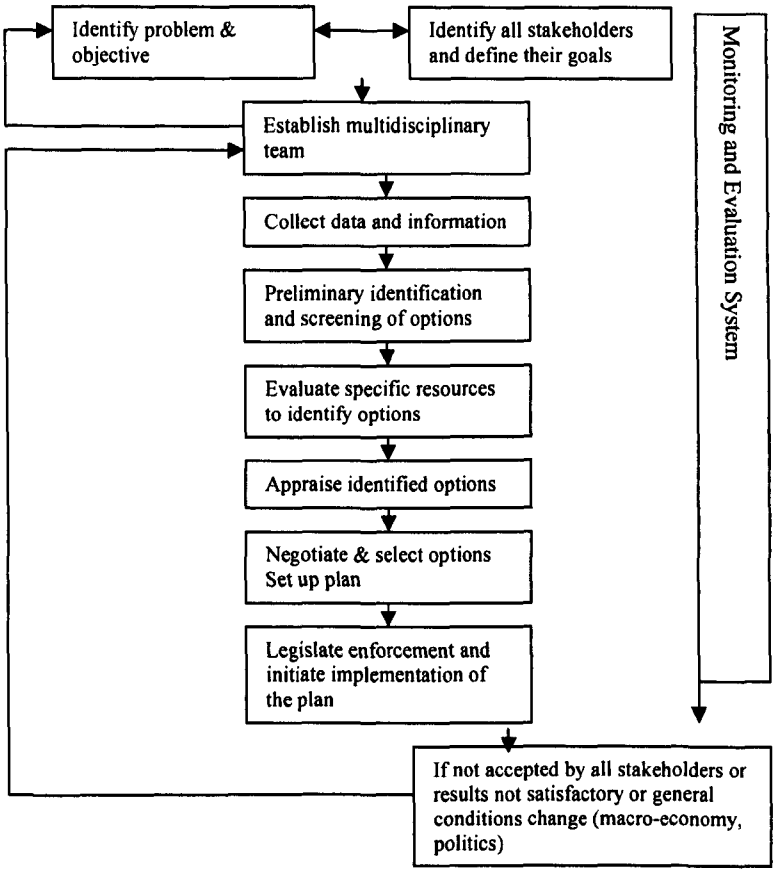

Fig. 2.1 The planning method Adapted from: FAO/UNEP (1999).

The FAO/UNEP guidelines identifies seven key factors for integrated planning: First, the need to have a clearly formulated objective; secondly, recognition of stakeholders and their differing objectives; thirdly, an enabling environment and regulatory policy; fourthly, effective institutions; fifthly, a platform for negotiation; sixthly, an efficient, and accessible knowledge base; and lastly, a set of planning procedures (FAO/UNEP, 1999).

The proposed guidelines combines some approaches from conventional and participatory land-use approaches with more tasks being carried out by multidisciplinary task forces, which are concerned not only with the establishment of the plan but also with its implementation. Emphasis is placed on negotiations between stakeholders until a

consensus is reached. Some new features included in the FAO framework are the need for Environmental Impact Assessment (EIA), legislation and enforcement and monitoring and evaluation to be carried during the whole plan implementation process.

Despite this positive development, the guidelines have notable weaknesses particularly when applied in developing countries. Some of the recommendations are more theoretical than practical. For example, failure to take into account both the economic and technical constraints faced by developing countries and more emphasis being placed on crop production. Recommendations such as the need to have neutral national institutions composed of relevant related ministries and representatives including civil society, are unlikely in most developing countries. Taking the example of Tanzania, the National Land-Use Planning Commission (NLUPC) under the Ministry of Lands and Human Settlements has failed to achieve its set objectives due to a lack of qualified personnel, funds, coordination and unwillingness to integrate other ministries or civil societies (pers. obs.).

According to FAO/UNEP (1999), the guidelines have tried to produce an approach, which can be used in both developing and developed countries. This is not easy to achieve as these countries differ significantly in socio-economic and political setting. Proposals such as stakeholders formulating plan objectives, use of land evaluation models in matching land-use and land qualities, use of courts to resolve conflicts cannot easily be achieved in most developing countries due to high the level of poverty, corruption and high illiteracy levels among the local residents.

2.4. Land-use plans: implementation experiences

Successful plan implementation depends on meeting many conditions. While a number of authors conceptualise successful policy implementation systems and categorised factors (Mazmanian & Sabatier, 1989; Goggin *et al.*, 1990; Morah, 1990; Vedung, 1997), none has been developed with the unique characteristics of land-use plan implementation specifically in mind. The majority of investigators define successful implementation systems based upon their judgement and observations rather than using empirical evidences.

However, two studies conducted in the school of Resource and Environmental Management (REM) at University of British Columbia surveyed implementation stakeholders to determine their perceptions of the most important criteria for implementation. Karin *et al.*, (2002; 2004) developed a set of criteria from the literature and tested them in the context of British Columbia's (BC) Land and Resource Management Planning (LRMP) implementation. They assessed the land-use planning implementation system by asking stakeholders involved in it to rate its success and also the importance of various factors to implementation. Calbick *et al.*, (2003; 2004) examined six land management agencies in western North America and identified their most important implementation practices. Thus, both studies identified key criteria defining successful implementation systems for land-use plans.

These two studies have advantages in comparison to other policy implementation research (Goggin *et al.*, 1990; Hill, 1997; Hill & Hupe, 2002) for three reasons. These studies specifically investigated land and resource policy implementation. Secondly, the studies used implementation practitioners to identify and rate the importance of

implementation factors instead of relying on investigators' perceptions of importance. Thirdly, these two studies are complementary because while their target sample populations are engaged in similar activities - they investigate implementation in different geographic and institutional environments. The diversity of experiences examined in these two case studies provides a solid empirical foundation. The two results taken together identified four key criteria for successful plan implementation.

(i) Solid stakeholder support

Stakeholders are all individuals, groups and institutions who will potentially be affected (either positively or negatively) by a particular event, change or process (Biggs & Sumberg, 1994; Borrini-Feyerabend & Brown, 1997). Stakeholders can be direct stakeholders i.e. those who use the land targeted in the plan; indirect stakeholders– affected by the actions of the land-users; or interest group concerned with conservation or scientific use of land (FAO/UNEP, 1999). Stakeholders generally possess different interests, different ways of perceiving problems and different opportunities for utilization of natural resources (Borrini-Feyerabend & Brown, 1997).

Implementation success depends on the level of stakeholder support. Stakeholders normally support implementation if a number of conditions are satisfied. While these conditions are not necessarily dependent upon one another, some are interrelated. These conditions are: stakeholder receptivity, consistent policy environment, stakeholder characteristics, comprehensive stakeholder support and adequate resource support. Stakeholder support is most likely when the "receptivity climate" in a planning region is supportive - that is, when external conditions are receptive to a land-use plan (Calbick *et al.*, 2003; 2004; Karin *et al.*, 2002; 2004).

The receptivity climate has political, social, economic, historic, and other dimensions that all affect the response that stakeholders have to a plan (Gray, 1989; Mazmanian & Sabatier, 1989; Goggin *et al.*, 1990; Sterner, 2003). For example, a community that has historically been concerned about water quality issues may be supportive of a land-use plan that places high priority on resolving such issues. In contrast, during downturns in the forest industry, rural communities may not be supportive of a plan that reduces timber production if the economy is weak.

The receptivity climate can also be considered in terms of stakeholder imperatives (Rein & Rabinovitz, 1978). When imperatives such as legal obligations are consistent with plan implementation, then stakeholder support is greater. Conversely, there may be disincentives or constraints that weaken stakeholder support e.g. when the implemented project is not a priority to local communities. The media can play an influential role in building, maintaining, or reducing support for implementation (Goggin *et al.*, 1990). Karin *et al.*, (2002; 2004) reported that supportive political and socio-economic conditions were instrumental to successful implementation of the Land and Resource Management Plan (LRMP) in British Columbia.

A policy environment consistent with the plan is another critical condition influencing the implementation success. When the policy environment is inconsistent with the plan, implementation may be stalled, modified, or subverted (Goggin *et al.*, 1990). Consequently, conflicting policies and objectives can undermine the implementation process (Rein & Rabinovitz, 1978; Ingram & Mann, 1980; Gray, 1989; Goggin *et al.*, 1990; Vedung, 1997; Karin *et al.*, 2002; 2004). Conversely, when the policy

environment is consistent with implementation directives, a plan's objectives are legitimised and the implementation process is facilitated.

The character of stakeholders is another criterion shaping stakeholder support. As land-use issues are comprised of "people problems" (Allen & Gould, 1986; Wang, 2002), Mazmanian & Sabatier (1989) identified three human factors that decrease the probability of implementation success i.e. implementation is less likely to be successful the larger the behavioural change required for compliance with the plan, the larger the target population affected by the plan, and the greater the diversity in values of the target population affected by the plan (*ibid.*). They indicated that these relationships are not linear. For instance, they observed that if little change in behaviour were required of target groups, those groups would make little effort to change; if great change were required, momentum may build to bring about those large transformations. The Mazmanian and Sabatier hypothesis was not supported, however, by Karin *et al.*, (2002; 2004), who found that diversity of values, the relative size of target groups, or the extent of behavioural change required were not important in determining plan implementation success.

Stakeholders are more likely to support plan implementation when there are leaders or "champions" involved. Leaders can help resolve conflicts between parties that impede implementation (Namakura & Smallwood, 1980; Gray, 1989). Further, leaders who are exceptionally committed to a policy can help overcome any implementation difficulties that present themselves (Goggin *et al.*, 1990). These so-called "fixers" can be extremely helpful at ensuring that policy implementation remains high on a government's agenda (Bardach, 1977; Vedung, 1997). Margerum suggested that the most important quality of

leaders is their facilitation skills, as leaders must depend upon power of consensus rather the power of hierarchical authority (Margerum, 2002). Consequently, implementing officials should be skilled in working collaboratively with other stakeholders (Margerum, 2002; Karin *et al.*, 2004).

Comprehensive stakeholder support is another factor for plan implementation success. Implementation success is most likely when all stakeholders are supportive (Karin *et al.*, 2002; 2004; Margerum, 2002). The plan has the greatest chance for success when all actors within government, industry, and the public are supportive. Stakeholders must be satisfied that plan recommendations and strategies make sense in the face of the challenges that the plan confronts (Ingram & Mann, 1980; Booth *et al.*, 2001; Hill & Hupe, 2002; Calbick *et al.*, 2003; 2004; Sterner, 2003).

A final criterion for solid stakeholder support concerns resources. In Land-Use Planning, high-quality information, money, staff, time, technical expertise, and other resources are critical ingredients that enable stakeholders to fulfil their implementation responsibilities (Rein & Rabinovitz, 1978; Ingram & Mann, 1980; Hogwood & Gunn, 1984; Mazmanian & Sabatier, 1989; Goggin *et al.*, 1990; Vedung, 1997; Margerum, 1999; Sterner, 2003). As might be expected, Karin *et al.*, 2002; 2004) found that information, financing, and staff were critical resources in plan implementation. Stable funding is key for implementation strategies and programs (Karin *et al.*, 2002; 2004).

Similarly, Calbick *et al.*, (2003; 2004) reported that financial support constituted one of the most critical factors to success in the minds of implementation officials. They argue that implementation is more likely to be successful when agencies have the capacity to

fund external projects that are congruent and complimentary with policy projects. Thus, successful implementation demands that stakeholders 'buy in' to policy actions, but also commit their own resources to the process. While land and resource management are generally a government responsibility, the support of other stakeholders remains important as they often control many reserves and assets that can aid implementation and, in turn, provide many services that are components of implementation (*ibid.*).

(ii) Sound plan characteristics

The sound plan characteristics include three main aspects: accurate conception of why a problem exists, a collaboratively developed plan, and a clear and consistent plan. Successful plan implementation depends on the quality of the plan. Mazmanian & Sabatier (1989) argued that good plans are built upon sound causal theories such that the principal causal linkages between intervention and attainment of program objectives are understood. Karin *et al.*, (2002; 2004) reported that a sound causal theory was important to implementation personnel in the British Columbia (BC) Land Resource Management Plan (LRMP). As such, plans must be built upon an accurate conception of why the problem exists, and much adequately explain how intervention can address and solve a problem. Given adequate understanding of stakeholders, implementation is more likely to be successful because stakeholders understand what a plan proposes to do and they are more likely to support its implementation (Hogwood & Gunn, 1984; Mazmanian, & Sabatier, 1989; Goggin *et al.*, 1990; Vedung, 1997).

A collaboratively developed plan is another criterion for successful implementation of plans. The best plans with the most stakeholder support come from planning processes that utilise collaborative planning (CP) techniques (Karin *et al.*, 2002; 2004; Burby,

2003; Calbick *et al.*, 2003; 2004; Gunton & Day, 2003; Frame *et al.*, 2004). Through CP, more alternatives are generated through interaction of all affected stakeholders. Also, because of a consensus-rule, the interests of all stakeholders are at least partially met. Thus, plans developed through CP are better because they represent a resolution of conflict among stakeholders.

Indeed, Karin *et al.*, (2002; 2004) concluded that when stakeholders influence policy development, implementation is not constrained by the relative size and diversity of target populations. Furthermore, since stakeholders must devote significant time to develop a plan, and knowing that they have a stake in its outcome, they work harder to ensure successful implementation. Thus, the collaborative process (CP) creates a commitment to a plan and its successful implementation by stakeholders (Gray, 1989; Goggin *et al.*, 1990; Knopman *et al.*, 1999; Hall, 2002; Karin *et al.*, 2002; 2004; Burby, 2003; Calbick *et al.*, 2003; 2004; Gunton & Day, 2003). Furthermore, plans developed through CP have a greater chance of overcoming the detrimental effects of changing conditions, or time, than those developed in "top-down" planning process. Plans developed through CP are often the highest quality, have the highest levels of stakeholder commitment, and thus are the most adept at countering changing conditions (Ingram & Mann, 1980; Hagrove, 1983; Mazmanian & Sabatier, 1989).

While high-quality plans are based upon solid understandings of a problem and have been developed through successful CP processes, they must also clearly communicate their purpose and intent to implementers. Plan objectives and its strategies must be stated clearly and consistently for those who will be interpreting them (Mazmanian & Sabatier, 1989; Goggin *et al.*, 1990; Jackson & Curry, 2002; Karin *et al.*, 2002; 2004; Margerum,

2002). It is critical that objectives are clear because while a discussion forum designed them collectively, table members inevitably have different perceptions of what each objective entails. In turn, many more people will be interpreting them at the implementation stage (Margerum, 2002).

(iii) Supportive institutional structure

A supportive institutional structure includes a strategic implementation plan; clear delineation of stakeholder roles and responsibilities; supportive decision-making authority; adequate regulatory system; effective mitigation strategies; sound monitoring and information flow; sufficient flexibility and solid legislative basis (Karin *et al.*, 2002; 2004) as described below.

Strategic implementation plan

Implementation should be guided by a plan that outlines details of activities needed to implement it as well as the sequence in which each is performed (Margerum, 1999b). Each activity and objective should be prioritised to facilitate decision-making under uncertainty and constraint (*ibid.*). Karin *et al.*, (2002; 2004) report that lack of prioritisation of strategies weakened implementation of Land Resource Management Programme (LRMP) in BC. Further, an implementation plan should have milestones by which to check progress (Gunton & Day, 2003).

Clear delineation of stakeholder roles and responsibilities

In concert with a strategic implementation plan, stakeholders' roles and responsibilities must be clearly delineated (Hogwood & Gunn, 1984; Karin *et al.*, 2002; 2004; Gunton & Day, 2003). A clear delineation of stakeholders roles and responsibilities helps ensure

that stakeholders understand their roles in implementation and in turn, helps ensure accountability (Hogwood & Gunn, 1984).

Supportive decision-making authority

Any implementation process involves decision-making; thus one more criterion which is essential in a sound implementation framework requires a supportive decision-making structure. Decision makers need to have adequate authority and jurisdiction over mechanisms, resources, and the target group(s) to achieve implementation objectives (Gray, 1989; Mazmanian & Sabatier; 1989; Goggin *et al.*, 1990; Knopman *et al.*, 1999; Margerum, 2002; Calbick *et al.*, 2003; 2004). Similarly, decision makers require sufficient discretion to accommodate unexpected circumstances. Nonetheless, Margerum (1999b) noted that inappropriately broad levels of discretion could undermine the achievement of plan objectives if they go unchecked.

Adequate regulatory system

To ensure that plan objectives are met, an adequate regulatory system must be in place to guide and influence stakeholder behaviour (Goggin *et al.*, 1990; Victor & Skolnikoff, 1999; Calbick *et al.*, 2003; 2004; Sterner, 2003). Such mechanisms can include rules of conduct, enforcement of those rules, penalties for non-compliance, and incentives for stakeholders to behave in prescribed manners. Providing stakeholders with written material to guide them through compliance is helpful (Calbick *et al.*, 2003; 2004).

Effective mitigation strategies

Trade-offs must be made between competing users in Land-Use Planning. A special and significant form of incentive is the provision of transition and mitigation strategies to negatively affected stakeholders (McAllister, 1998; Frame *et al.*, 2004).

Sound monitoring and information flow

A sound monitoring system must be in place to ensure that implementation is progressing satisfactorily, to ensure that plan objectives are being met, and to enable adaptative management (Lessard, 1998; Owen, 1998; Victor & Skolnikoff, 1999; Karin *et al.*, 2002; 2004). As with other aspects of the implementation process, many ingredients are conducive to monitoring success. A sound monitoring system needs to provide accurate and timely information, be accountable to stakeholders, and be appropriately resourced.

Monitoring can be expensive and staff-intensive, and requires sufficient support and commitment from stakeholders. Sound monitoring tracks progress in implementing plan recommendations and initiatives, as well as the achievement of plan objectives (Talen, 1996; Knopman *et al.*, 1999; Victor & Skolnikoff, 1999). To do so, appropriate indicators and targets are necessary (; Mazmanian & Sabatier, 1989; Karin *et al.*, 2002; 2004; Margerum, 2002; Calbick *et al.*, 2003; 2004).

Accountability and transparency of monitoring can be enhanced by a number of mechanisms (Karin *et al.*, 2002; 2004). One of the most effective means of maintaining accountability is to ensure that a committee composed of stakeholders oversees monitoring. A monitoring table should be representative of all stakeholders, including

those involved in the preparation of a plan. Monitoring committees should meet regularly to ensure that implementation is routinely assessed and to facilitate communication and commitment among stakeholders (*ibid.*). In turn, monitoring committees should maintain detailed records (Frame *et al.*, 2004). Accountability can be further improved if an implementation process stipulates mandatory remedial action if plan objectives are not being attained, and if there is an automatic and regular plan review and amendment program. Finally, monitoring should be overseen by external advisory bodies to ensure that broader policy goals are also achieved (Williams *et al.*, 1998; Calbick *et al.*, 2003; 2004).

Timely flow of relevant information among stakeholders is perhaps the most important aspect of effective monitoring (Karin *et al.*, 2002; 2004). As information is dynamic, it is important that stakeholders are all working with common information set, and that the information itself sufficiently informs the management and decision-making structure (Margerum, 1999b; Karin *et al.*, 2002; 2004). Thus, information generated through monitoring must be thoroughly disseminated among stakeholders (Knopman *et al.*, 1999; Calbick *et al.*, 2003; 2004) and should be publicly reported (Karin *et al.*, 2002; 2003; Calbick *et al.*, 2003; 2004; Gunton & Day, 2003). Lessard (1998) suggested interagency committees could be used to manage information. Calbick *et al.*, (2003; 2004) found that structured information dissemination and education programs are important.

Sufficient flexibility

The implementation process should retain certain flexibility in both process and mandate to accommodate new information and changing conditions (Berman, 1980; Margerum, 1999a; 2002; Calbick *et al.*, 2003; 2004). Similarly, level of discretion in decision-making helps implementers achieve plan objectives (Berman, 1980; Margerum, 1999b). In combination with sound monitoring and information flow system; this flexibility contributes significantly to an adaptive management approach to plan implementation.

Solid legislative basis

The implementation structure should also be based in legislation (Mazmanian & Sabatier, 1989; Calbick *et al.*, 2003; 2004). Legislation provides legitimacy and stature, which are conducive to garnering further stakeholder support. Legislation can also help establish a resource base for implementation, define decision-making structures, roles, and responsibilities, implementation procedures, regulatory systems, mitigation strategies, monitoring structures, and specify mechanisms for adaptive management (Mazmanian & Sabatier, 1989).

(iv) Collaborative implementation design

Collaborative implementation design involves two aspects. First, is the comprehensive stakeholders' involvement. Much of the above discussion leads to the conclusion that implementation should be a collaborative effort among stakeholders. The first component of collaboration is ensuring that all stakeholders are involved in all aspects of implementation. In relation to "top-down" theory, Gray (1989) and Hogwood & Gunn (1984) suggested that only one, or a small number of agencies, should implement plans so that the number of 'hands' in the system is minimised. In contrast, others argued that

all stakeholders should be involved throughout all phases of implementation (Gray, 1989; Mazmanian & Sabatier, 1989; Goggin *et al.*, 1990; Lessard, 1998; Margerum, 1999b; Calbick *et al.*, 2003; 2004).

In this latter view, government - including elected officials, and also members at the provincial, regional, and local levels, non-governmental stakeholders, experts and advisory bodies, the public, any other identified stakeholders should be involved in producing outputs, assessing outcomes, and amending policy. Stakeholders at all levels in the process, especially those at "the bottom," require sufficient freedom to explore ideas and change the course of implementation by altering objectives and operations (Berman, 1980; Goggin *et al.*, 1990; Hill, 1997). By involving all stakeholders, and providing them with opportunities for genuine influence, implementation benefits from all the unique abilities and perspectives that each contributes to implementation.

It is also important that those involved in plan development continue to play a role in implementation (Rein & Rabinovitz, 1978; Gray, 1989; Karin *et al.*, 2002; 2004). Gunton & Day (2003) referred to this advantage as "institutional memory" This "memory" can be further maintained when new members to implementation processes are properly oriented to a plan's history, principles, values, ground rules, and decision-making processes to ensure a smooth transition upon their inclusion (Karin *et al.*, 2002; 2004). Indeed, comprehensive opportunities for all stakeholders throughout the many components of implementation leads to better results, helps ensure accountability and legitimacy, and helps build and maintain the support of stakeholders (Karin *et al.*, 2002; 2004).

Second, adequate networking and consensus building during implementation is crucial. Consensus-building techniques should be used throughout implementation to prevent and address conflicts among stakeholders. Relationship building continues to be important to implementation success long after the development of the plan (Gray, 1989; Carr *et al.*, 1998; Margerum, 1999b). When problems are not particularly complex, stakeholders only need to join together to build consensus at key decision points; when problems are complex, independent approaches to implementation should be abandoned in favour of more cooperative strategies (Margerum, 1999b). Both Karin *et al.*, (2002; 2004) and Calbick *et al.*, (2003; 2004) found that cooperation among stakeholders to be very important to plan implementation success.

True collaboration demands that stakeholders are linked together in a cooperative network such that information and ideas flow freely (Rein & Rabinovitz, 1978; Goggin *et al.*, 1990; Margerum, 1999a; Hill & Hupe, 2002; Karin *et al.*, 2002; 2003; Calbick *et al.*, 2003; 2004). Effective networks link actors in two ways: within levels of organisations, such as within "regional" governments; and between levels of organisations, such as between upper and lower levels of government (Margerum, 2002). Ideally, networks should provide constant and effective communication, and regular and constructive interaction (*ibid.*). It is important that interests are pursued through the opportunities provided in planning and evaluation forums, but never behind closed doors; otherwise might a process break down (Karin *et al.*, 2002; 2004). However, to address deficiencies in collaboration, an implementation framework should possess a system for resolving conflicts (Mazmanian & Sabatier, 1989; Calbick *et al.*, 2003; 2004; Margerum, 2003).

In summary, a successful implementation system for land-use plans must address many interrelated factors. The system must be founded upon a solid base of stakeholder support and a sound land-use plan. These components are sustained by supportive institutional structure that relies on a collaborative implementation design. Essentially then, there are four conditions defining a successful land-use plan implementation system: solid stakeholder support; sound plan characteristics; supportive institutional structure, and collaborative implementation design.

Of the many factors that influence implementation success, institutional and social factors are most important (Joseph, 2004). Successful implementation demands that the dominant institution overseeing the process - the government - lays substantial groundwork, and demonstrates a commitment to the process (*ibid.*). When this commitment is demonstrated, successful implementation becomes possible. And when such commitment is demonstrated - particularly through collaboration - other stakeholders get on board. When stakeholders are on board, successful implementation is not just possible, but likely (*ibid.*). The plan development and implementation experiences although from non-conservation areas presents useful planning experiences even in areas where humans co-exist with wildlife.

2.5. The need for LUP in protected area bio-networks in East Africa

The World Conservation Union (IUCN) recognises six major protected area management categories (IUCN, 1994), namely: strict nature reserve/wilderness areas - managed for science and wilderness protection; National Parks - for ecosystem protection and recreation; natural monument/natural landmark - conservation of a specific natural features; habitat and species management area - for conservation through

management intervention; protected landscape/seascape - mainly for landscape/seascape protection; and managed resource protected area - mainly for the sustainable use of natural resources. However, these protected area categories are faced with management problems (*ibid.*).

The common challenges faced in managing protected areas in Eastern Africa are of two types: those emanating from within (internal) and those which come from outside the protected areas (Sarunday & Muheto, 2000). The internal problems usually include insufficient trained manpower, visitor mismanagement, poor infrastructure and limited financial resources available for management (*ibid.*). The external problems are rooted in non-sustainable land-use practices outside protected areas, which eventually lead to habitat destruction and loss (IUCN, 1990; 1999).

Habitat loss rates vary in different parts of the region. By 1986, 43% of its original wildlife habitat in Tanzania has been converted to other uses while the figure for Kenya is 67% (IUCN, 1990 & 92). The situation in Ethiopia is more alarming; at the turn of the century the country was heavily forested with about 40% of its total area covered by dense forests but in contrast at present only 2.7% is forested (Sarunday & Muheto, 2000).

Regional reviews and national planning documents in East Africa such as National Action Plans, National Environment Action Plans and General Management Plans (LMNP, 2002; TNP, 2000) clearly point out that many protected areas in the region are small in size and that most of them are facing intensive land-use pressures from the growing local inhabitants (IUCN, 1990). This last factor has led to habitat isolation,

habitat loss and fragmentation and the adverse influence of surrounding land-use activities on the protected area ecosystems (Sarunday & Muheto, 2000).

In Tanzania, although protected areas are central to the health of wildlife within them, they are being lost or cut off as result of demographic changes and changing land-use practices (*ibid*). The most affected protected areas are in the northern tourist circuit comprising Serengeti, Kilimanjaro, Tarangire, Lake Manyara, Arusha, Mkomazi and Ngorongoro protected areas. In Kenya, human activities at the Narok-Kajiado Region are fragmenting the landscape (*ibid*). The analysis of Maasai Mara, Amboseli, Tsavo and other reserves in the region is also illustrative of how new developments of human settlements, roads or open cast mining and other large commercial enterprises are increasingly intrusive to protected areas in the country (*ibid*).

In Ethiopia the situation is even worse; the most important reserves in the country exist on paper only - paper parks (*ibid*). For example, although important protected areas exist in the Yavello Region of Sidano Province (the highland areas and in the southern lowlands), most of them lack formal legal status and sufficient protection (*ibid*). Unfortunately these are important areas for birds, large mammals and other wildlife resources some of which are rare and endemic to these areas (e.g. a population of endemic Swayne's Hartebeest in the Yavello Region). Sufficient protection is also lacking for Lakes Zwai, Langano, Abijatta, Shalla, Awas and for wetland habitats in general in the Rift Valley.

The above discussion on threats facing wildlife corridors[1] is a challenge for conservationists. This scenario has led to emergence of diverse views from different scholars (Kideghesho *et al.*, 2000; Sarunday & Muheto, 2000; Archer, 2006; Madhusudan, 2006). Sarunday & Muheto (2000) advocate the need for active involvement of local communities in the whole management process and the importance of meeting their interests and needs. They argue that for any conservation strategy to be successful, the socio-economic environment should be conducive to implementation. Therefore, local communities should be given appropriate monetary incentives to support their local development initiatives and tangible compensation for denied access to the protected biological resources.

Archer (2006) advocates intervention based on scale and opportunity cost consideration to local people. He argues that to be successful, interventions should be applied at the spatial scale at which the problem is generated, even if the immediate problem was perceived at a different scale. On local people, he argues that the opportunity cost of imposing a conservation "solution" on local people should be thoroughly evaluated prior to intervention. Madhusudan (2006) underscores an understanding of sociological variables such as culture, attitudes, and beliefs as an essential and often undervalued component in resolving human-wildlife conflicts in rangelands.

On the other hand, Kideghesho *et al.*, (2000) advocate Participatory Land-Use Planning (PLUP) as a way forward. They argue that: "Although it may not be proper to argue that PLUP is a panacea to ecological burdens facing wildlife corridors currently, it is

[1] *A linear two-dimensionl landscape element that connects two or more patches of wildlife habitat that has been connected in historical time; and is meant to function as a conduit to animals (*Soulé & *Terborgh, 1999:p.102). This definition covers natural corridors and remanant strips but do not cover cultural corridors.*

unequivocally true that PLUP is the stepping stone towards any realistic and sustainable solutions to problems facing biodiversity hotspot" (*ibid*: p. 57).

In order to achieve a successful PLUP, Kideghesho *et al.*, (2000) cite several conditions which need to be taken into account during the planning process. These include planning to be seen within the broad regional context - ecosystem holistic planning approach, LUP to be adapted to specific conditions prevailing in the area - take into account the prevailing socio-economic and environmental conditions, presence of policies and enabling legislation, the need to collect sound technical information on resources - socio-economic and biophysical data and collected information to be analysed by a multidisciplinary team and be accessible to all stakeholders.

Other necessary conditions include: guarantee of land security, taping of local knowledge and traditional management strategies, sound criteria in the selection of relevant stakeholders, involvement of pressure groups, commitment by politicians and planning to take into account the interests of the stakeholders, a process that can take a lot of time.

2.6. History of rural land-use planning in Tanzania

In Tanzania where land is public property (URT, 1999), various approaches to land management have been attempted between the 1920s and today (Lerise, 1998). Lerise (1998) argues that at least four methods to LUP can be distinguished. These are: land-use schemes approach (1920s); village settlement schemes (1960s); layout plans (1970s) and land-use plans (from late 1970s to present day). However, LUP in Tanzania is confronted with a number of technical, legislative, institutional and implementation

problems (Lyimo *et al.*, 1993; De Pauw, 1996; Mango, 1996; Stevenson, 1996; Lerise, 2000).

According to De Pauw (1996), the problems of LUP in Tanzania fall into one of the following groups: land-use conflicts between different categories of land-users; lack of progress in implementation of land-use plans at different scales; inappropriate modes of planning for rural settings; institutional inadequacies; insecurity of land tenure and environmental degradation resulting from inappropriate land-use. De Pauw (1996) stresses that lack of clarity about the role, objectives and techniques of LUP in the context of rural development exists not only in Tanzania but in other developing (and developed) countries as well. Land-Use Planning is often used in a way that makes it difficult to assert its own identity in relation to physical planning, environmental management, resource assessment, land classification, land management and zoning regulations (*ibid*). He further argues that, the big problem for LUP even if well implemented is that it cannot prove its cost-effectiveness mainly because of two main reasons. First, very few scientific studies have been undertaken that compare productivity with or without planning. Second, one of the main benefits of sound LUP are conflict prevention and containment. However, such benefits - while likely - are by nature speculative.

Mango (1996) outlines three shortcomings of LUP in Tanzania: First, the planning teams lack enough planning skills to formulate good plans, which can be implemented; Second, people are yet to be approached and encouraged to prepare their plans; and, third, all plans lack a sustainable planning process. The plans, once prepared, are left to the villagers to implement plans they do not normally know (*ibid*). He further argues that

the present planning process depends on the town and country-planning ordinance Cap 378, which was never intended for LUP. Therefore, village LUP is carried out in the same way as town planning. In addition, Mango (1996) observed that land-use plans were being prepared according to the wishes of clients.

Lyimo *et al.*, (1993) on the other hand argue that LUP in Tanzania remains largely sectoral and un-integrated, is usually centralised and mainly top-down, and therefore there remains little effective participation by beneficiaries. Based on the foregoing discussions, LUP in Tanzania as the president of Tanzania put it, has hardly lived-up to the expectations (see Section 1.2).

Lerise (2000) argues that land-use plans produced by experts in the Ministry of Lands have failed to provide the needed guidance to local authorities, villages councils and small holders in the long-term as well as day-to-day decisions and actions in land development. Instead land development takes place outside the existing spatial planning system (*ibid.*). In general centralised spatial planning practice, which has been so much supported by the government, has failed to make justifiable contribution in land development in rural settelements (*ibid.*). Despite the current state of LUP, several scholars have suggested ways to improve the situation.

De Pauw (1996) suggests moving from a purely bureaucratic approach to LUP derived from urban planning procedures, to a less formal one. De Pauw (*ibid.*) argues that the rural environment is more fluid and less controllable than the urban one and this should be reflected in the approach and procedures. Rural Land-Use Planning (LUP) should not be seen as blue print "master plan" to be adhered to in all circumstances, but rather a

framework document and monitoring device that could allow government and villages alike some measure of control over their own development (*ibid*). Approaches to planning should become less formal, more problem solving and action oriented, and leave more room to local initiatives and participation (*ibid*). He argues that LUP, like all other activities paid for by the taxpayers, should seek indicators of success or failure.

Stevenson (1996) suggests that to be successful LUP should generate a pattern of land-use of benefit to society; that they should safeguard women, minorities, the future generations and other species; safeguard cultural aspects; and should be in keeping with the human, technical and financial resources available for their operation. He further stresses that plan should be both flexible and restrictive when they impacts on the majority of stakeholders. A lack of legal back-up should be bridged by using the existing multi-sectoral laws available; planning should be superseded by comprehensive study; and that plans need to have a cost recovery program in order to build a capacity for continuous. Lerise (2000) suggests that combining the villager's perception and efforts in spatial planning with that of central-government planners, land-use conflicts in rural Tanzania could probably have been effectively dealt with and minimised.

As a strategy to harmonise LUP in Tanzania, in 1998 the National Land-Use Planning Commission (NLUPC) issued a Manual for rural Land-Use Planning "Guidelines for participatory land management" (NLUPC, 1998). The manual stresses the need to use participatory approaches in rural planning. The NLUPC, which was established in 1984, is the principal advisory organ of the government on all matters related to land and land-use; and is mandated to coordinate all land related policies and legislation (Land-use

Magazine, 1996). The Commission is under the Ministry of Lands and Human Settlement Development (MLHSD).

The guidelines can be described as a "white elephant" for three reasons. First, the manual lacks legal backing. To date the NLUPC has failed to formulate LUP legislation, which could have made the guidelines effective. The lack of legislation has resulted in un-streamlined planning approaches. The current understanding by most people in Tanzania is that any professional can do rural planning (pers. obs.).

Secondly, the guidelines are inclined towards the use of urban planning concepts and procedures. A review of the "guidelines for participatory land management" report reveals that almost all staff involved in the Dodoma pilot project and those involved in the formulation of the guidelines were staff from the Ministry of Lands and had strong background in urban planning (pers. obs.). Involvement of different ministries and professionals in the Dodoma pilot project and in the development of the guidelines could have enriched the guidelines in terms of approaches to planning in rural settings.

Thirdly, is the Manual's "agro-centric vision". The participatory land management guidelines are aimed at enhancing crop production, thus disregarding other major land-uses in the country such as conservation, livestock production, eco-tourism. The Dodoma pilot project, which led to the formulation of the guidelines, was supposed to be implemented in different parts in the country with a wide range of coverage such as major land-uses and ecosystems. This could have captured diverse socio-cultural experiences in the country.

In summary this Chapter has established the existing state of knowledge in the field of rural Land-Use Planning; has shown the complexity and lack of real consensus in the subject. However, the foregoing discourses in the topic are instrumental in trying to identify an appropriate wildlife corridor land-use planning framework. The subsequent Chapter 3 presents the methods and techniques used in data collection and analyses.

CHAPTER 3

3.0. METHODOLOGY

3.1. Introduction

This study is an exercise in "ex-post" evaluation, that is, an assessment of the process and impacts of plans that came into effect some time ago (McGibbon, 1990). The particular approach adopted in this study has been that of goal attainment, which requires the setting of clearly identifiable plan objectives and the use of appropriate indicators for the lessening of land-use conflicts and human encroachment into wildlife habitats. The questions for this research were: (i) to what extent have residents and other stakeholders been actively involved in the LUP process? (ii) have the plans helped in minimising land-use conflicts and conserving wildlife migratory routes and dispersal areas in the protected area bio-networks? (iii) what are the major technical strengths and weaknesses of the plans? and (iv) is there any difference in amount of land-use conflict and/or encroachment into wildlife habitats in villages with plans compared to those without plans? To answer these questions, a range of research methods were thought by the author to be appropriate in order to capture different views and scenarios (see Fig. 3.1). The selection of evaluation indicators was the basis for the selection of research methods (see details on suggested indicators in Table 3.3).

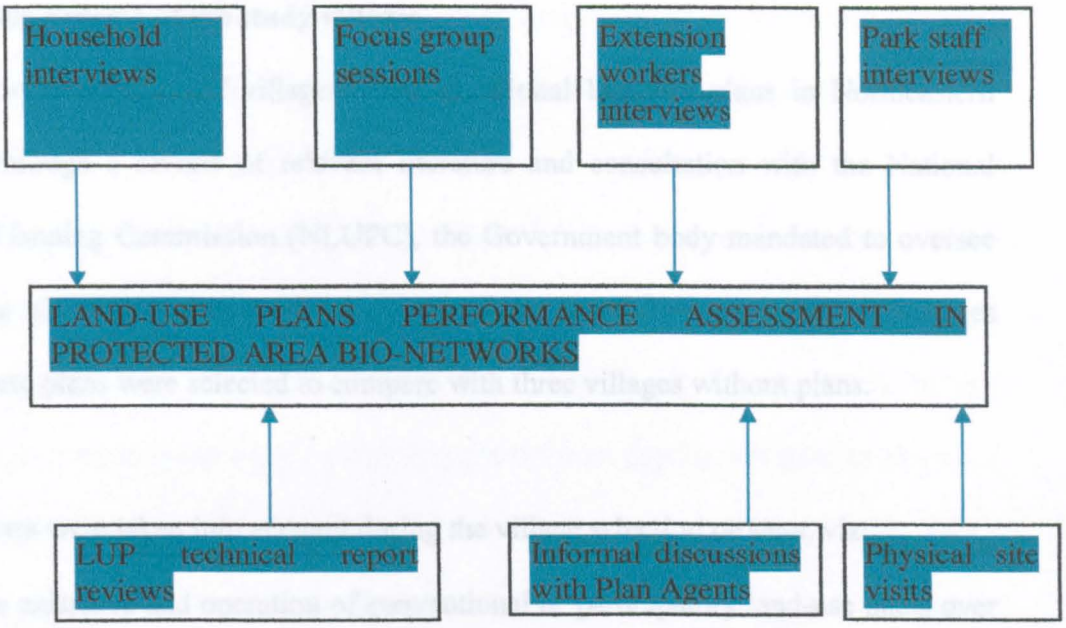

Fig. 3.1: The different methods employed in the research

A combination of techniques and methods were applied as diagrammatically presented in Figure 3.1 above. They include:

(i) Questionnaire surveys,

(ii) Focus group discussion,

(iii) Analysis of land-use plan reports and Parks general management plan reviews, and

(iv) Physical field visits (see Subsection 3.4.4)

The remainder of this Chapter is organised into five major parts. First, a description is given of the study villages and their reasons for selection. Secondly, justifications are given for the different methods used. Thirdly, a description of the application of each method is presented. Fourthly, the data analysis techniques are illustrated. Lastly, an account is given of the challenges and limitations encountered by the study and how these limitations were overcome.

3.2. Selection criteria of the study villages

An inventory was made of villages with operational land-use plans in Northeastern Tanzania through a review of relevant literature and consultation with the National Land-use Planning Commission (NLUPC), the Government body mandated to oversee all land-use planning activities in the country. Based on the resultant list, six villages with land-use plans were selected to compare with three villages without plans.

Seven criteria were taken into account during the village selection process, viz:

- The existence and operation of conventional or participatory land-use plans over at least 3 years, in order for there to have been time for a plan to show its effectiveness (6 villages);
- The desire to cover different ecosystems/habitats in Northeastern Tanzania, in order for the results to be relevant to the broad range of conservation problems and issues at stake in the region;
- Proximity to protected areas in Northeastern Tanzania in order to include the influence of wildlife conservation issues on village development;
- Representativeness of the diversity of socio-economic production systems in the region;
- Accessibility of the villages for study by the research teams (logistical constraints).
- The need to include "Comparison Group" villages (CGs), i.e. villages without land-use plans (3 villages), to act as "controls" and allow comparison with the planned villages, and as a means of addressing the problem of accurate attribution of causes and effects; and

- Examples to reflect the range of different agencies which have carried out land-use planning in the villages (four different agents were identified–see below).

In "ex-post" plan impact evaluation it is emphasised that plans must have been in place long enough for their effects to have become manifest (McGibbon, 1990; Ashley & Karim, 2000; Fallding, 2000; Puhazhendhi & Satyasai, 2000; Joseph, 2004). In this study a three or more years duration was thought to be an appropriate time to allow for impacts to be evaluated. As for the selection of different plan agents, the author considered appropriate to include the National Land-Use Planning Commission (NLUPC), the National Soil Service (NSS), the African Wildlife Foundation (AWF) and the Worldwide Fund for Nature (WWF) because these are the main agents involved in the implementation of rural land-use plans in Tanzania and could therefore be used as benchmarks in the assessment of processes and procedures used in the preparation of the land-use plans. Several authors have highlighted weaknesses in land-use planning, including the absence of systematic procedures for the production of plans (Lipscombe, 1992; Clarke, 1999; Fallding, 2000).

Villages without plans ("the Comparison Group") were included in the study not only to allow direct comparison with planned villages, but also to throw light on other causes and effects (the "attribution problem" referred to above). The main assumption was that "villages with plans are likely to have lower amounts of conflicts/encroachments than those without plans". The "Comparison Group" villages with as near as possible identical influencing factors could have addressed the attribution problem; however, that was not possible due to the fact that such model villages do not exist in the Tanzanian context, as two neighbouring villages though environmentally identical could have

contrasting socio-cultural and economic differences. For example, Barabarani village (CG) which borders Esilalei differs significantly in socio-economic bases. The former is multi-ethnic (more than 20 tribes) and agricultural-based while the latter has only one dominant tribe (Maasai) and depends on a livestock farming system. Using the above criteria, the following villages (see Table 3.1) were chosen.

Table 3.1: List of selected villages with its corresponding administrative boundaries

Village group	Village	District	Region	Ecosystem[2]
Participatory	Sangaiwe	Babati	Manyara	Tarangire-Manyara
	Vilima Vitatu	Babati	Manyara	Tarangire-Manyara
	Esilalei	Monduli	Arusha	Tarangire-Manyara
Conventional	Chemchem	Karatu	Arusha	Tarangire-Manyara
	Soitsambu	Ngorongoro	Arusha	Greater Serengeti Mara
	Ololosokwan	Ngorongoro	Arusha	Greater Serengeti Mara
Comparison group (control)	Barabarani	Monduli	Arusha	Tarangire-Manyara
	Migombani	Monduli	Arusha	Tarangire-Manyara
	Mkonga-Ijinyu	Same	Kilimanjaro	Mkomazi-Tsavo

3. 3. Rationale for the use of a range of methods and techniques

A range of methods and techniques was used in this research in order to evaluate data from different perspectives in order to increase data validity and reliability. Different scholars (Denzin, 1970; Miller & Wilson, 1983; Punch, 2000; Olsen, 2004) have stressed the need to use a combination of methods in order to corroborate and ensure validity. This does not necessarily provide proof, but improves consistency across methods through a process of "triangulation", i.e. looking at the problem from various viewpoints (Denzin, 1970; Flick, 1992; Gilbert, 1993; Bryman, 1996; Bryman, 2003; Tribe & Summer, 2004; Kumar, 2005). Nichols (1991) argues that, even when a survey is useful, it is often best used together with other complementary methodological tools.

[2] *Ecosystem is defined as: an interacting complex of a community, consisting of plants and/or animals, and its environment functioning as an ecological unit (http://glossary.gardenweb.com/glossary/).*

Through a more 'rigorous' methodology, answers that are more valid, reliable and representative or typical are possible (White, 2002; Denscombe, 2003; Tribe & Summer, 2004; Kumar, 2005). Multiple methods are useful as they look at the research from several viewpoints, in the same way that surveyors place their instruments on several hilltops to get an overlapping and mutually corroborative set of data concerning the valleys and plains below (Denzin, 1970; Miller & Wilson, 1983; Punch, 2000; Olsen, 2004). Methodological "triangulation" implies data "triangulation", but not vice versa (Olsen, 2004). Methodological "triangulation" is a means of improving the trustworthiness of qualitative research, and triangulation is widely recognised as a working principle of the participatory and action tradition because of the increased likelihood of non-sampling errors (Chambers, 1994a, b). Single-strand methods are weak and vulnerable; triangulation, representing "robust eclecticism" (Booth *et al.*, 1998), strengthens understanding and increases confidence.

3. 4. Techniques and methods

Data for this study was collected in two phases. The first phase was between March and November 2004 and the second phase between July and August 2005 (see Appendix 1a & 1b). A summary of the different types of data collection, the numbers of respondents/groups/reports in each survey and the period of the year when the surveys were carried out are summarized in Table 3.2, together with a detailed account of each method (see Subsections 3.4.1-3.4.5).

Table 3.2: Summary of different types of data collected and its corresponding period

Type of data collection	Number of respondents/ Groups/reports	Year data collected
Questionnaire surveys • Household • Park staff • Extension staff • Plan agent officials informal interviews	 852 7 6 4	 March-November 2004 March-November 2004 March-November 2004 March-November 2004
Focus group discussion	1	March-November 2004
Technical reports reviewed (LUP/GMP reports)	7	March-November 2004
Site visits and observations	Several	March-November 2004 & June-September 2005
Archive data/secondary data and literature reviews	Several	2003-2006

LUP=Rural Land-Use Planning GMP=General Management Plan

3.4.1. Literature reviews and secondary data collection

Publications relevant to the research topic and to the study area were accessed from libraries, Government offices and Non-Governmental Organisations (NGOs). These included conceptual material on the ideas, debates and issues of relevance for the subject matter. Information on the study area included land resources (climate, landforms and soils, water resources and wildlife); socio-economic characteristics; records of human-wildlife interaction and conflicts; and general data on infrastructure and accessibility. Various maps (topographic, land-use/cover, geological) were used as base maps during and after the fieldwork.

3.4.2. Face- to-face questionnaire survey

Face-to-face "semi-structured" questionnaires (Miller & Wilson, 1983) were administered to the sampled households, and to "experts" that included Parks staff, and village extension workers. A semi-structured questionnaire survey was preferred over a

fully-structured approach, because it has been shown to yield better quality data in many cases. According to Gillham (2005), the semi-structured interview is an effective way of conducting a research interview, because of its balance of structure with flexibility. Although the same questions are asked of all respondents, the kind and form of questions goes through a process of development to ensure relevance and topic focus, and to ensure adequate coverage (with an eye to the subsequent comparative analysis). Interviewees are prompted by supplementary questions if they haven't dealt spontaneously with one of the sub-areas of interest, and approximately equivalent interview times are allowed in each case (Gillham, 2005). Miller & Wilson (1983) argue that semi-structured questionnaires allow the interviewer greater flexibility, as the same questions may be asked in the same order but supplementary questions (probes) are allowed to clarify the responses, although at the expense of potentially incurring greater interviewer bias.

The "semi-structured" questionnaire survey was used first, to get the views of the stakeholders regarding the process of land-use planning, and secondly to provide data (percentages of responses) on whether the plans were successful or not in attaining their objectives. The first phase of the questionnaire survey involved members of village households and the second phase involved the "expert" respondents.

3.4.2.1. Face-to face household questionnaire survey

For the household questionnaire survey, four main steps were followed. First, the selection of the sample design; secondly, training of research assistants; thirdly, questionnaire pre-testing; and fourthly, the administration of the questionnaires as detailed below.

(i) Sample survey selection

The first step in choosing the sample was to choose a target population (at the household level) to be sampled that enables conclusions to be drawn and to select a sample in such a way that the conclusions are valid. The conclusions that can be drawn from the sample depend critically on both the population sampled and the procedures used for generating the sample (Sharp *et al.*, 2004). One hundred local residents were sampled in each village by a simple random sampling method, using the village household register list. One subject only (over 18 years of age) from each household was picked using a table of numbers following the procedures described in Bouma (2000). The selection of any member of the household over 18 years was thought by the author to be appropriate given the nature of the study i.e. so that respondents could provide relevant information regarding the planning process and the plans' impacts on conflicts and encroachments. Research assistants were told in advance by the author not to interview any person under 18 years.

According to Veal (1997) there is a misconception that the size of the sample should be decided on according to its relationship to the size of the population e.g. 5 or 10% of the population. He argues that what is important is the absolute size of the sample, regardless of the size of the population. What needs to be considered is whether proper sampling procedures have been followed and the criteria used in sample size determination i.e. the required level of precision, the level of detail in the proposed analysis, and the resources available (*ibid*). Selection of the sample size was based on budget limitation and the required level of precision of results. The sample size in this study represents 13% of the households and 2.5% of the population (see Table 4.2).

Simple random sampling was chosen over other sampling methods for two reasons. Firstly, the method ensures the likelihood of any individual element in the population having an equal chance of being selected and being representative, hence minimising sampling biases (Bouma, 2000; Burns, 2000; Henn *et al.*, 2006). Secondly, was the homogeneous nature of the population i.e. dependency on natural resources for their livelihood. According to Walliman (2005) simple random sampling is used when the population is uniform or has similar characteristics e.g. main economic activities. Appropriate use of a sampling technique also helps in achieving external validity (Punch, 2000), that is how far the study's findings can be generalised or transferred to other scenarios. Simple random sampling is considered to be simpler and more cost-efficient system than multi-stage, systematic and clustered sampling (Henn *et al.*, 2006).

According to (Hoinville & Jowell, 1978: p.69; Veal, 1997: p.211), the survey findings (sample size=100) in this study are subject to a sampling error of ± 4.4 (at 95% confidence interval). The higher the sampling error recorded, the lower the level of accuracy (Henn *et al.*, 2006). The confidence intervals only measure chance variation from one sample to another, they do not allow for refusals, non-contacts, poor questions and other factors not related to sample size (*ibid*). In practice, this means that allowance for a wider margin of error (*ibid*). In this study a wider margin (> ± 4.4) could be anticipated because of failure of some respondents to answer some of the questions posed.

(ii) Training of research assistants

In collaboration with the village leaders, the Principal Researcher (the author) recruited four local research assistants in each village to undergo three to four days training each (see Appendix 1a & 1b). The training covered basic principles of interview administration, probing techniques, questionnaire pre-testing procedures and how to record responses of interviewees. The use of local research assistants was aimed at reducing the researcher or experimental bias effect (Miller & Wilson, 1983). Most importantly it was designed to exploit residents' willingness to provide information to a person they knew well, rather than to a stranger. It was also appropriate as a means of overcoming the language barrier, particularly in the case of the Maasai people, who were mostly unable to speak *Kiswahili*. This approach helped to uncover more effectively the perceptions and attitudes of the local residents. The use of local research assistants also helped in reducing research costs compared to recruiting research assistants from district or regional headquarters.

(iii) Questionnaire pre-testing

Questionnaire pre-testing aimed to test the questionnaire wording, sequencing and layout; to train and test the fieldworkers; and to estimate response rates and survey time (Veal, 1997; Burns, 2000). Pre-testing also assesses whether the questions are clear, specific, answerable, interconnected and substantially relevant (Punch, 2000). The exercise helped to "fine-tune" the questionnaire. Some ambiguous questions were removed and others were re-phrased. After revision, the questionnaires were duplicated ready for use in the social surveys. The author and research assistants were involved in the pre-testing exercise in each study village. Each researcher interviewed at least three

local residents who were picked randomly and informally. The time spent for pre-testing was about 45 minutes per respondent.

(iv) Administration of the face-to face household questionnaires

Face-to-face household semi-structured questionnaire surveys (see Appendices 2 & 3) were administered by the Principal Researcher and the research assistants to sample local residents in villages with plans and in villages with no plans (see Plates 3.1 & 3.2). The research team visited the selected persons in their residential areas. The questionnaire consisted of both open-ended and closed questions. The open-ended questions were intended to give respondents an opportunity to express their views and to increase the level of interaction between researcher and subject. A total of 852 respondents were interviewed in the nine survey villages. This represented 95% of the anticipated respondents and 12.6% of the target population - the households (see Table 4.2). The research assistants interviewed 68% of the total respondents. On average, 18 days were spent in each village on preparatory logistics (including access negotiations - see appendix 1a & b), reconnaissance surveys (physical visits to field sites for collection of environmental parameters) and the administration of the questionnaires (*ibid.*).

Four ordinal qualitative scales for pre-plan conflicts/encroachments (high, moderate, low and don't know) and for post-plan conflicts/encroachments (increased, decreased, same/no change and don't know) were used in the plan performance assessment (see Appendix 2). Respondents were asked to classify conflicts as low, moderate or high, viz:

- Low – acceptable level of conflict, not causing concern among land-users
- Moderate – acceptable level of conflict, intermediate between "low" and "high"
- High – unacceptable level of conflict, causing tension among land-users.

Plate 3.1: One of the research assistants (right) interviewing a respondent at Vilima Vitatu Village. Photo by: Author. April 2004.

Plate 3.2: One of the research assistants (left) administering a questionnaire to a respondents at Esilalei village. Photo by: Author. May 2004.

3.4.2.2. Questionnaire survey of Extension agents

Six local extension officers (see Table 3.2) with duties related to natural resources management and community development were interviewed as a means of triangulating the collected information obtained from other sources. They were also interviewed in order to capture their views and experience in relation to the development of a new land-use planning framework. These experts were representatives of Government Departments in the fields of wildlife, forestry and agriculture/livestock management. Questionnaires used in villages with land-use plans (see Appendix 4) differed slightly with those administered in villages without plans (see Appendix 5), in regard to the questions about pre-plan and post-plan assessments. The evaluation checklists in both questionnaires included aspects such as socio-economic, nature of conflicts and suggestions to minimise conflicts and/or encroachments. Questionnaires for experts (extension workers/park staff) and plan agent informal interviews were administered by the author.

3.4.2.3. Questionnaire survey of National Parks, and plan agents

The survey of Park staff (see Appendix 6) and plan agents' informal interviews aimed to identify and establish the perspectives of these personnel on the LUP approaches, and also helped to verify the information collected in the village questionnaire survey from the village extension workers.

a) Park staff: Park staff from Serengeti, Tarangire and Lake Manyara National Parks were interviewed on issues related to land-use conflict and encroachments into wildlife migratory routes. Some of the checklist evaluation questions included the local situation before and after the application of a land-use plan, whether the respondents had participated in

preparation of land-use plans, and on the relationships between Park staff and residents. A total of seven Park staff were interviewed (see Table 3.2).

b) Plan agents or organisations: officers representing the planning agencies, i.e. AWF/Babati District Council and WWF/Monduli District Council, were interviewed (informaly) on issues relating to the qualifications of staff involved, their professional backgrounds and experience, the overall costs of the planning process, and general problems encountered during the planning period. A total of four plan agents (officers) were interviewed (see Table 3.2).

3.4.3. Focus group discussion

Initially, a focus group discussion was planned for the pastoral-Maasai, but was found to be unwarranted, as many of the Maasai have now become sedentary and are now accessible in a more conventional "village household" survey setting. Instead, a focus group discussion was organised by the researcher with the minority nomadic-pastoral Barabeig people. The exercise was facilitated by the Barabeig's traditional leaders. This method was applied in the case of the Barabeig because of their high mobility in search of grazing areas for livestock, and the difficulty of sampling a population with non-sedentary households. Focus group discussions have an advantage over interviews, in that people are able to talk in detail about their beliefs and feelings (Charmaz, 2005). The researcher acted as a facilitator in the discussions and ensured that every one present had their say. Three main topics were covered during the session; the people's involvement in preparation of land-use plans, land-use conflicts and the way forward to address these problems. A total of 15 people attended the focus group discussion (see Plate 3.3).

Plate 3.3: The author and Principal Researcher A.L. Kaswamila (third from left) posing with nomadic Barabeig people in the forest after the focus group discussions at Vilima Vitatu village. Photo by: Mombo. April 2004.

Unfortunately only one focus group discussion was held which only included Barabeig males. The group comprised different age categories, i.e. youths (18-34 years old), adults (35-54 years old) and elders (> 54 years old), and the discussion lasted for thirty minutes. Three focus group discussions had been planned, to include females. This turned out not to be possible because of Barabeig cultural norms whereby males are the sole spokespersons and decision-makers for the family (Martin Kalai, pers. comm.- Barabeig elder). During the discussion, the Principal Researcher acted as a facilitator and encouraged lively input and interaction between all subjects. In addition to researcher's notes, a tape-recording was made of the discussions with the permission of the group which was then transcribed.

3.4.4. Physical field visits

Site visits were undertaken in each village with a land-use plan, to identify the impact on the ground of the LUP and its strengths and weaknesses, in order to cross-check the information collected from the interviewees. Land-use planning maps for Sangaiwe, Vilima Vitatu, Esilalei, Chemchem, Soitsambu and Ololosokwan (see Appendices 14-16, 21a and 22) were compared with observations made by the researcher on the ground to reflect the real situation. Other assessments included the level of land degradation and human encroachment on wildlife habitats (applying the Principal Researcher's judgement and knowledge as a trained and experienced agriculture and natural resources survey worker). Site visits were also made to villages without land-use plans, to assess the encroachment and deforestation levels of wildlife habitats in wildlife migratory/dispersal areas. The location of study sites was recorded by hand held Global Positioning Systems (GPS-Garmin 12).

3.4.5. Technical reports review

Reviews were carried out of Park General Management Plans (GMPs)/Management Zonal Plans (MZP) and the LUP Technical Reports prepared by Parks and plan agents respectively. GMPs and MZPs are plans prepared by Parks to guide the use of resources within the protected area and its environs. The GMPs for Tarangire and Lake Manyara National Parks and the MZP for Serengeti National Park were reviewed. Four LUP technical reports prepared by the National Land-Use Commission (NLUPC) - Soitsambu and Ololosokwan, National Soil Service (NSS) - Chemchem, AWF/Babati District Council - Sangaiwe, Vilima Vitatu and WWF/Monduli District Council - Esilalei were also reviewed. The review was aimed at identifying the Report's technical strengths and weaknesses. The pre-determined (by Principal Researcher, based on his

20 year field experience) review checklist included: planning process procedures; report contents; types of data collected and zonation criteria used and appropriateness of map scales (see Appendix 7a).

3 5. Data analysis

3.5.1. Introduction

Data collected using interviews, the focus group discussion, the technical report reviews and the physical field visits were mainly qualitative in nature. The nature of the data therefore necessitated the use of qualitative data analysis techniques, inferential statistics (confidence intervals/margin of error) and descriptive statistics such as frequencies, means, cross-tabulation and Chi-square (non-parametric) tests. Descriptive statistics were derived using the Statistical Package for the Social Sciences (SPSS) for Windows, version 12.0 (Pallant, 2003).

At first, an attempt was made to analyse the combined data from all villages i.e. planned, un-planned and comparison group villages. However, despite some advantages of the approach, it was later decided that this was inappropriate for two reasons. First, the villages had different socio-economic settings and therefore different problems. Secondly, the combination of variables led to a loss of information and poor discrimination of some of the important issues and problems. The advantages of combining the data would have been an increase in the size of the sample and greater likelihood of improved statistical significance in the findings (Veal, 1997). Veal argues that despite the advantage of large samples producing many "statistically significant" findings, that does not make them "significant" in any other way. Therefore, as a result

of the broad range of influencing factors, each village has been analysed separately in this study.

3.5.2. The use of qualitative techniques

As pointed out by several social researchers, qualitative data analysis has no one "right" way to proceed (Hesse-Biber & Leavy, 2004). Some argue that qualitative analysis is "intellectual craftsmanship" (Tesch, 1990), and therefore needs to be done "artificially" (Hesse-Biber & Leavy, 2004), even "playfully" (Goetz & Lecompte, 1984). However, it also requires a great amount of "methodological knowledge and intellectual competence" (Tesch, 1990) and the art of interpretation (Hesse-Biber & Leavy, 2004). In general, the data analysis followed techniques recommended in the qualitative data literature, such as intellectual craftsmanship, intellectual competence, memoing, interpretation and coding (Glaser & Strauss, 1967; Charmaz, 1983; Straus & Corbin, 1990; Charmaz, 1995; 2005; Hesse-Biber, 2004; Walliman, 2005), and a version of triangulation known as "critical multiplism" (Hesse-Biber & Leavy, 2004).

"Critical multiplism" aims at conducting inquiry in more natural settings, collecting more situational information, reintroducing discovery as an element in inquiry, and in the social sciences in particular, soliciting insider views to assist in determining the meanings and purpose that people ascribe to their actions (Hesse-Biber & Leavy, 2004). Coding is reading each line, sentence and paragraph line by line and extracting/indexing the content to describe themes/ideas (Charmaz, 1995; Punch, 2000). According to Walliman (2005) coding is the application of labels or tags to allocate units of meaning to collected data (Walliman, 2005). This is an important aspect of forming typologies and facilitates the organisation of copious data in the form of notes, observations,

transcripts, documents etc. (*ibid.*) Coding of qualitative data can form a part in theory building (*ibid.*).

Memoing (memo writing) on the other hand, is the writing-up of the ideas and theories behind codes, which assist researchers to illuminate these ideas and relationships in the data (Charmaz, 1995; Punch, 2000). Memoing is a short analytical description based on developing ideas of the researcher reacting to the data and development of codes and pattern codes (Walliman, 2005). Compiling memos is a good way to explore links between data and to record and develop intuitions and ideas (*ibid.*). On the other hand, interpretation is an integral part of the analysis of data that requires verification and extrapolation in order to make out or bring out the meaning (*ibid*). These approaches were applied in the analyses carried out for this study (see below). These analytical approaches were chosen mainly because the author thought they are appropriate in achieving the research objectives.

3.5.3. Questionnaire analysis

Before the detailed data analysis, questionnaires were thoroughly examined, variables coded and then imported into the SPSS software package. This process was done to all questionnaires used in the survey, that is the household, Park staff, and extension workers' questionnaires.

3.5.3.1. Questionnaire variables analysis

The open-ended question responses from the households and extension workers were first examined, coded and entered together with closed question responses into the SPSS statistical software package. The procedure for use of the package is as described in

Brayman & Cramer (1999) and Pallant (2003). Before the analysis, screening and cleaning the data were carried out. The exercise involved checking for errors - values that fall outside the range of possible values for variables (categorical and continuous variable); finding and correcting the error in the data file. To ensure error-free data, the process of checking for errors was repeated again. This was then followed by analysis of data using statistical techniques to address research questions. The analysis followed two main stages of reduction and display (Silverman, 1993; Miles & Huberman, 1994; Coffey & Atkinson, 1996). Data reduction involved the editing and summarising of data through coding, and memoing.

The data from the village households' survey was analysed separately due to the diverse socio-economic and environmental conditions in each area, in order to record village-specific issues and problems and for comparison between villages. The data were later combined to form three main groups based on the village selection criteria, that is villages with "participatory" plans, those with "conventional" plans and villages with no plans. This aimed to capture the contrasting characteristics/features between villages, thus allowing comparison of results. Combining village data by merging closely related variables necessitated the re-coding of variables for each village and was aimed at achieving a manageable number of variables. Interview data from Park staff and extension workers were analysed following the same procedures, which is examining, coding and entry into the SPSS package ready for analysis using inferential and descriptive statistics.

These statistics were thought by the author to be appropriate based on the nature of the data i.e. ordinal and nominal. According to Walliman (2005: p. 85), "in order to avoid producing reams of impressive looking, though meaningless, analytical output, it is up to you to ensure that tests are appropriate for the type of data you have". The final selection of descriptive statistics was reached in consultation with a statistician at the Department of Earth and Environmental Sciences of Greenwich University.

Inferential statistics seeks to make probabilistic statements about a population on the basis of information available from a sample drawn from that population (Hoinville & Jowell, 1978; Veal, 1997; Henn *et al.*, 2006). This is because it is not possible to be absolutely sure that any sample is truly representative of the population from which it has been drawn, so we can only estimate the probability that results obtained from a sample are true of a population (Hoinville & Jowell, 1978, p.68). Tables have been drawn up by statisticians, which give the confidence intervals for various statistics for sample sizes ranging from 50 to many thousands (*ibid.*). These confidence intervals apply only for samples which have been drawn using simple random sampling method; other methods, such as multi-stage sampling, tend to produce larger confidence intervals and be less reliable (*ibid*).

In this study, percentage composition, frequencies, means, confidence intervals (margin of error or sampling error), cross-tabulation and Chi-square have been used where appropriate. The use of Chi-square tests allows ascertainment of the probability that the observed relationship between variables may have arisen by chance while the use of cross-tabulation is meant to demonstrate the presence or absence of a relationship and/or

association between independent and dependent variables (Nichols, 1991; Bryman & Cramer, 1999; Pallant, 2003).

On the other hand, sampling error (margin of error), which is the difference between the random sample, and population from which it has been selected (Walliman, 2005) is meant to show the likely accuracy of the finding (Veal, 1997). Statisticians have examined the likely pattern of distribution of all possible samples drawn from populations of various sizes and established that, when a sample is randomly drawn, the sample value of a statistic has a certain probability of being within a certain range either side of the real value of the statistic - two standard error range (*ibid.*). This two standard error range is referred to as the "95 per cent confidence interval" of a statistic i.e. we have a 95% chance of being approximately right and 5% chance of being wrong (*ibid.*). The confidence interval table, its use and interpretation are provided in Appendix 7b.

It is important to comment on the over-interpretation of "statistically significant" results and its concise meaning. According to Walliman (2005), statistically significant does not mean: (i) that the observed difference is large (only that it is probably real) (ii) that the results is important (iii) that the results will generalize. Statistical significance means none of these things. It only tells us that the observed sample result most probably reflected the particular population sampled (*ibid.*). A non-significant result does not establish that the null hypothesis is necessarily true (Cass, 1983; Bryman & Crammer, 1999). Similarly, a non-significant result does not imply that the results are meaningless (Walliman, 2005).

3.5.4. Focus group data analysis

Two main forms of data analysis were employed for the focus group discussion. First, the notes, which were recorded during the meeting, were analysed using the qualitative data analysis techniques described in subsection 3.5.1 above. Secondly, notes were made from listening to the tape-recording of the meeting. The tape was replayed immediately after the discussion and notes made when the discussion was fresh in the researcher's memory as recommended by Charmaz (2005). Later replays were conducted to check for inconsistencies or ambiguities. Care was taken by the researcher to ensure that taping does not nullify the results by informing the respondents in advance that the tape will be strictly confidential and will only be used for the purpose of this study. It is known (pers. obs.) that when people see they are being taped, they become overly cautious with what they say and some will even "perform" to the tape assuming that they will have a later audience.

As previously stated (see Subsection 3.4.3) three themes were used in the focus group discussions i.e. involvement in planning, land-use conflicts and a way forward to mitigate conflicts. In order to arrange the focus group discussion material into key statements, the recorded and taped information related to a particular theme was analysed and aggregated to form subtopics (related statements). Again, as stated earlier (see Subsection 3.5.2) memoing and interpretation were crucial in the analysis of the focus group discussion data.

3.5.5. Plan performance indicators

Visual observation methods, role-play drama, written documents, oral testimony, people's experiences and opinion-based indicators are central to most monitoring and evaluation approaches (Guijt, 1998a, 1998b; NLUPC, 1998; Kessy *et al.*, 2004). An indicator is an aid for communicating complex processes, events or trends to a wide audience and is a quantitative or qualitative characteristic of a process or activity to which changes are to be measured (Guijt, 1998a). Indicators are always only a proxy for a more complex reality, and therefore must be relevant and accurate enough, rather than perfect (*ibid*). By measuring or assessing the same indicator over time and identifying a change in the value of that indicator, progress or deterioration can be measured (*ibid*). Several indicators have been used in evaluating the impacts of land-use plans in this study (see Table 3.3).

Table 3.3: Performance indicators used in the study

Plan measurable objectives	Performance indicators	Source
Protection of wildlife migratory routes/dispersal areas	-Lack of human influences e.g. farms, settlements -Free large mammals movements	Interviews, physical observation and use photographs
Magnitude of encroachment into wildlife corridors	-Number of farms/settlements in wildlife corridors	Village reports, village game scout reports, field surveys
Land-use/human-wildlife conflicts	-Presence, type and severeness of conflicts with neighbouring villages/land-use groups/individuals -Frequency of crop damage -Numbers of livestock killed -Number of human beings killed	Interviews, occurrence of fights or violence's, court cases, village reports, field visits
Conservation of biodiversity/soil erosion	-Frequency of wildfires and extent of fires in wildlife corridors -Rate of clearing of vegetation	Interviews, physical observations and use of photographs

Source: NLUPC, 1998; Kessy *et al.*, 2004

3.6. Delimitations and limitations of the study

According to Creswell (2003) "delimitation" refers to how a study has been narrowed in scope (normally to make it more manageable and achievable) while "limitations" are the weaknesses encountered in the study. This study reflects certain delimitations and limitations. As regards delimitations, this study focussed mainly on protected areas located in the northeastern part of Tanzania, despite there being many other protected areas in the southern and western parts of the country. Coverage of the southern and western parts of Tanzania was not possible due to time and resource constraints placed upon the researchers by work-loads and funding levels. However, an attempt was made to cover the main representative conservation ecosystems in Northeastern Tanzania, which to a greater extent represent the semi-arid rangelands of the wider region. The majority of protected areas in Tanzania on an aerial basis are located within semi-arid rangelands including the nine study sites.

On the other hand, the study encountered several problems during the data collection exercise. There were language barriers in Maasai-dominant villages, where the researcher might not understand the local language and the respondent was not conversant in *Kiswahili.* The failure to hold two pre-planned focus group discussions for youth and elderly women at Vilima Vitatu was due to entrenched Barabeig cultural norms (see Subsection 3.3.3). Some village plans (Chemchem, Soitsambu and Ololosokwan) had been implemented more than ten years i.e. 1993 before the evaluation whereas others were more recent (2000). Lack of high quality maps (land-use plans) was also a constraint and was beyond author's control.

The other limitation was the use of local research assistants (native speakers) in interviewing. It was expected that their use would encourage the local community to air their views freely. However, this could have implications for the accuracy of the results for two reasons. First, the short time period used in the training (3-4 days). Second, their lack of experience in administering interviews. Finally there was the limitation of attributing cause and effect problems (McGibbon, 1990). The attribution problem refers to the difficulty of establishing whether it was the land-use planning program that had brought about particular impacts, or extraneous conditions such as local political issues, socio-economic forces, other policies and programmes, and differences in the degree of community support, stability and implementation effectiveness for the programmes etc.

The language barrier problem was solved by recruiting local research assistants to help in data collection and by extending the training of research assistants from the planned duration of two to three days. The period of ten years since a land-use plan had been implemented might have led to memory lapse in some of the respondents. This was addressed through land-use planning introductory statements aimed to trigger respondents' memories. The attribution problem was addressed by selecting three study villages to act as 'Comparison Group' villages. It was intended that by use of a comparison group, the evaluation might discover whether it was the LUP programme that brought about the changes or not. Weiss (1972) recommends the use of Comparison Groups in designs for non-experimental evaluation research.

On the other hand, the study had some limitations on the analysis. First, are the non-responses to the questionnaire, which made some statistical analysis e.g. parametric analysis inappropriate or give non-significant results. Secondly, is the failure to

investigate the impact of other attributing factors (lack of benefit sharing, lack of LUP legislation, conflicting policies etc.) in the performance of the land-use plans. Such data would have helped to show most limiting factors to plans' successes.

In summary, the foregoing is an account of the data collection methods/techniques employed in this study. The different sources of data meant to increase the validity of data in answering the four research questions described earlier (see Section 1.3). The next Chapter presents the environmental and socio-economic settings of the areas studied.

CHAPTER 4

4.0. BACKGROUND INFORMATION ON THE STUDY AREA

4.1. Introduction

In evaluative and planning research, background information on a study area assists with the understanding of geographical, historical, planning, and socio-cultural contexts, all of which need to be taken into account in the planning and management processes (McGibbon, 1990; Slocombe, 1995). To achieve this, Chapter 4 is split into four parts. First, Tanzania's geographical, socio-economic, land tenure and conservation situation is described and explained. Secondly, the Northeastern Tanzanian ecosystems and their conservation importance are described. Thirdly, the background characteristics of the nine study villages are given. Lastly, the summary of the study area features is presented.

4.2. Tanzania

4.2.1. Geographical setting

The United Republic of Tanzania has a population of 35 million (Tanzania National Census, 2002). It is located between 1° 00' and 12° 00' S and between 30° 00' and 41° 00' E (Kerario, 1996). The country covers an area of about 942,784 km^2 of which 24% is under wildlife protected area categories (Severre, 2000). The protected area categories with percentage coverage in brackets are National Parks (4%), game reserves (13%), game controlled areas (6%) and the Ngorongoro Conservation Area (1%) (Severre, 2000). These categories with an exception of National Parks - category II of IUCN classification (see Section 2.5); fall under local (country's) classification system.

4.2.2. Physiography and climate

Physiographically, most of the country is a plateau, lying between 1,000-1,500 m asl with sloping plains and undulating hills (Kerario, 1996). It experiences a tropical climate of great variability in terms of rainfall intensity and duration (*ibid.*). Most areas receive erratic rainfall ranging between 600 and 1,000 mm/annum; the Lake zone receives between 1,000 and 1,500 mm/annum and a few highland areas receive an average of 1,500 mm/annum (De Pauw, 1996). Most soils are rather poor with low nutrient content and water holding capacities. Well-drained soils of volcanic nature are found within the northern (e.g. Moshi District, Arumeru, Arusha Districts) and southern highlands (*ibid.*).

4.2.3. The socio-economic context

Tanzania depends primarily on crop and livestock production for its socio-economic development (URT, 2002). It is one of the poorest countries in the world with annual per capita income of approximately US $250, with over 90% of those affected being rural households in the arid and semi-arid regions (URT, 2000; URT, 2001; URT, 2002). According to Field (2006), this average income is nearly 100 times lower than that of the UK. There is an important gender dimension to poverty, for example female heads of households (25% of the total) earn 45% less than their male counterparts (URT, 2001). Furthermore, 69% of female heads of households live below the poverty line (*ibid.*).

Tourism has developed rapidly since the early 1990s, and is now an economically significant sector (Ashley *et al.*, 2002). The national tourism earnings has grown over 10% annually and by 2001 tourism comprised 12% of the Gross Domestic Product (GDP) and 52% of export earnings (World Bank/MIGA, 2002; World Bank, 2003). The bulk of tourism investments have been concentrated in a small number of globally famous National Parks and conservation areas in the northeastern part of the country:

Serengeti, Ngorongoro, Tarangire, Lake Manyara and Mount Kilimanjaro National Parks (Nelson, 2004). In 1999, tourism overtook coffee as the country's largest foreign earner (USDC, 1999), and Government reports show that the industry is currently growing at around 30% per annum (World Bank/MIGA, 2002). Tanzania is a leading tourist destination and is now ranked as the 5th top tourism sector income earner in Africa, just ahead of Kenya (World Bank/MIGA, 2002).

4.2.4. The Land tenure system

Tanzania has pursued a public land ownership policy (see also Section 2.6) since the colonial period (URT, 1995; URT, 1999a). Statutory land tenure consists of rights and restrictions documented by the state and laid down in procedures which regulate the relationship between people and the land (Törhönen, 2004). Despite land being a public property and controlled through a statutory system, customary land tenure is also recognised as one of the major land division categories (URT, 1999a; Törhönen, 2004). Customary land tenure consists of societal rights and restrictions that are not documented but based on customs that define the relationships between people and the land (Törhönen, 2004).

Land ownership in Tanzania is vested in the President as Trustee on behalf of all citizens (URT, 1999a) and rural land legislation guides the development of village lands (URT, 1999b). According to the village land legislation (URT, 1999b), village land is divided into three major categories: communal land - open for use by villagers and residents; land occupied by individual/family/groups of persons under the customary land tenure system; and land given to an individual or group of persons through allocation by a village council which can later be formalized on paper. The village council is

responsible on behalf of the president for the management of village land and acts as the Trustee for local residents *(ibid.)*. However, the village council has no power to allocate land or grant a customary right of occupancy without prior approval of the village assembly. The right of occupancy granted by village councils is 999 years *(ibid.)*.

According to the 1992 "Presidential Commission of inquiry into land matters" popularly known as "The Shivji report", identified five areas of concern: pervasive insecurity of tenure; radical title vesting in the presidency (powers of control and administration); overlapping institutional structures over land allocation and administration and dispute adjudication; lack of transparency and popular participation in the administration of land; and poor institutional structure for adjudication of land rights and disputes (Tenga, 1998).

4.2.5. Tanzania's conservation commitment

The 1961 "Arusha Manifesto" is the guide (vision) to both the present and future conservation efforts in the country (WPT, 1998) and the country's conservation policies all hinge on this manifesto. The manifesto statement, released by the then President of Tanganyika (now Tanzania), the late Mwalimu J.K. Nyerere states that:

"The survival of our wildlife is a matter of grave concern to all of us in Africa. These wild creatures amid the wild places they inhabit are not only important as a source of wonder and inspiration, but an integral part of our natural resources and our future livelihood and well-being. In accepting the Trusteeship of our wildlife, we solemnly declare that, we will do everything in our power to make sure that our children's grand children will be able to enjoy this rich and precious inheritance. ...We look to other nations to cooperate with us in this important task, the success or failure of which not only affects the continent of Africa but the rest of the world..." Mwalimu J.K. Nyerere *(WPT, 1998: p.2).*

4.3. Northeastern Tanzania ecosystems and their conservation importance

Northeastern Tanzania covers three administration regions of Arusha, Manyara and Kilimanjaro. Five famous National Parks (see Sub-section 4.2.3; Fig. 1.1.) and several Game Controlled Areas[3] (GCAs) and Game Reserves[4] (GRs) are located mainly in semi-arid rangelands of the sub-region. The Northeastern Tanzania protected networks ecologically fall under three ecosystems: The Tarangire-Manyara Basin (TMBE), Greater Serengeti-Mara (GSME) and Mkomazi-Tsavo (MTE) (Homewood & Brockington, 1999; Sechambo, 2001; Yanda *et al.*, 2001). The nine study villages are located within these ecosystems. The villages (see also Table 3.1) with their respective ecosystems in brackets are: Sangaiwe, Vilima Vitatu, Esilalei, Migombani, Barabarani and Chemchem (TMBE); Soitsambu and Ololosokwan (GSME); and Mkonga-Ijinyu (MTE).

4.3.1. The Tarangire Manyara Basin Ecosystem (TMBE)

The TMBE is located between latitudes 03° 48' 02" and 03° 35' S, longitude 35° 48' and 35° 59' 25" W (Yanda *et al.*, 2001). The Burungi (Kwakuchinja-Mbugwe) and Mto wa Mbu GCAs form part of this ecosystem (*ibid.*). Other GCAs include Monduli, Lolkisale, Longido and Monduli Juu (Ammi, pers. comm.-Hunting guide).

The TMBE, which extends 6,942 km^2 within Mbulu, Monduli, Ngorongoro and Babati Districts, is part of the Maasai Steppe (35,000 km^2) that was formerly occupied by large herds of wild animals and Maasai livestock at the turn of the 19th century (Sechambo,

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[3] *Is one of the protected areas categories in which licensed hunting, non-consumptive tourism, human settlements and other human activities, research and education are permitted (Severre, 2000). The Wildlife Conservation Act No 12 of 1974 administers these areas and are managed by the Wildlife Division in collaboration with District Councils.*

[4] *Is a protected category lower than the National Park where settlements are not allowed. However consumptive and non-consumptive tourism, research and education are permitted (Masuruli, 2004).*

2001) and is now increasingly threatened by anthropogenic activities such as settlements and agriculture. It has been argued that the most suitable and traditional land-use of the area is transhumance livestock husbandry and wildlife conservation (Earth Satellite Corporation, 1977; Ecosystems, 1980; Borner, 1985; Prins, 1987).

The TMBE is one of the richest remaining refuges for wildlife in East Africa (WWF/TPO, 2002). It encompasses seasonal migratory routes of large mammals between Tarangire and Lake Manyara National Parks (*ibid.*). The pathway from Tarangire National Park (TNP) to the northern border of Lake Manyara National Park is one of the major wet-season dispersal routes within the wider Tarangire-Simanjiro ecosystem, for up to 10,000 wildebeest and 100-800 zebra (Borner, 1985; Mwalyosi, 1991). Lake Manyara National Park (LMNP) has been a UNESCO Biosphere Reserve since 1981 (Sechambo, 2001). According to local residents, TMBE has 14 wildlife migratory routes (see Table 4.1). However, these routes are increasingly being blocked by human activities as a result of demographic pressures (pers. obs.).

According to the Serengeti Monitoring Project (SEMP), between 90,000 and 92,000 wild animals were estimated to be in the area during the dry and wet seasons respectively (SEMP, 1988). The wild animals are concentrated in the plains rather than in the highlands where all main agricultural activities and settlements occur (*ibid.*). Despite these large numbers, significant declines in elephant populations were recorded between 1987 and 1990, probably due to illegal hunting (Sechambo, 2001).

Table 4.1: Current wildlife migratory routes in the Tarangire-Manyara ecosystem

From	Through To (destination)	Season	Game species
Lake Manyara National Park (LMNP)	Selela, Ngososi dam, Esilalei (near cultural *boma*), TLCT TNP	Wet (November-March)	Wildebeest
LMNP	Oremit Forest, Lembit, TLCT TNP	Dry (July-October)	Elephant and wildebeest
LMNP	Makuyini Chini, Oltukai, Minjingu TNP	Dry (July-October)	Wildebeest and zebra
LMNP	Barabarani (Jangwani), Esilalei, Kwakuchinja, TNP Simanjiro GCA (for calving)	Not specified	Wildebeest, zebra, eland and oryx
LMNP	Jangwani (Barabarani) Mungere, Selela, Engaruka, Gelai Lake Natron plains (calving)	Not specified	Wildebeest, eland and zebra
LMNP	TLCT, Saburi (Makuyuni) Loosimingori Mts.	Not specified	Not specified
LMNP	Bugeli Forest, Laja Marang Forest	Not specified	As above
LMNP	TLCT, Loosimingori Mts., Oljoro, Laken Dam, Selela, Mbulumbulu, Ngorongoro Loliondo GCA/SNP	Not specified	As above
Tarangire National Park (TNP)	Minjingu, Oltukai, Makuyuni Masaini LMNP	Wet (November-March)	As above
TNP	Mswakini, Manyara Ranch (TLCT), Esilalei, Losirwa, Selela, Mbulumbulu Mts./village, NCAA Loliondo GCA/SNP	Not specified	As above
TNP	TLCT, Olmokotan, Oremit Forest LMNP	Not specified	As above
TNP	Mswakini, TLCT, Olumktani Forest, Oltukai LMNP	Not specified	Lion, elephant, buffalo
TNP	Mswakini, TLCT, Losimingori Mts. Selela	Not specified	Not specified
TNP	Saburi, Oljoro LMNP	Not specified	Not specified

Source: Household interviews GCA=Game Controlled Area SNP=Serengeti National Park NCAA=Ngorongoro Conservation Area Authority TLCT=Tanzania Lands Conservation Trust.

4.3.2. The Greater Serengeti Mara ecosystem (GSME)

The GSME, spanning a total of about 36,817 km^2, is located between 1° and 3° S and longitudes 34° and 36° E (Kideghesho & Mokiti, 2003). It is composed of a network of protected areas: Serengeti National Park (14,763 km^2), Ngorongoro Conservation Area Authority (8, 288 km^2), Maswa (2,200 km^2), Grumeti (1,900 km^2), Ikorongo (1,867 km^2) and Kijereshi (66 km^2) game reserves (*ibid.*). The Maasai-Mara National Reserve (1,500 km^2), which also forms part of the GSME, is in Kenya. Loliondo (6,198 km^2) and Ikoma (35 km^2) game controlled areas are also within the ecosystem (NLUPC, 1994; Kauzeni, 1995).

This ecosystem is of outstanding biological, scientific and economic value (Kauzeni, 1995; Sinclair, 1995). The majority of these values stem not only from the region's prolific wildlife, but also from the importance of sections of the ecosystem as water catchments, archaeological sites and areas of geological and scenic interest (MNRT, 1985). Since the 1980s, Serengeti National Park and NCAA have both been UNESCO Biosphere Reserves and World Heritage Sites (MNRT, 1985; Campbell *et al.*, 1991).

There is a growing concern about long-term viability of the GSME based on the fact that the natural resources of the region's protected areas are extensively utilised by communities within and around these protected areas (Kauzeni, 1995). According to Kauzeni (*ibid.*), cultivation of crops is done on the boundaries of the protected areas thus eroding the buffer zones. In addition, unplanned fires are common in these areas; and the great majority of these activities are carried out in an unsustainable manner (*ibid.*).

4.3.3. The Mkomazi-Tsavo Ecosystem (MTE)

This 3,200 km^2 ecosystem lies between latitudes 3° 45' to 4° 30' S and longitude 37° 45' to 38° 45' E. (Eltringham *et al.*, 1999). It lies within the Somali-Maasai Regional Centre of Endemism, where the dominant vegetation is Acacia-*Commiphora* bush, woodland and wooded grassland (White, 1983). Mkomazi Game Reserve (MGR), which forms part of the ecosystem, is a savannah area stretching from the Kenya/Tanzania border to the northeastern slopes of the Pare and Usambara Mountains. Mkomazi GR forms a wet season (March-May) dispersal area for the much larger MTE.

In the past (1970s) MTE, which extends to the southern part of Kenya, supported a large number of elephants but by 1980s the population was reported to have fallen to about 20,000 through the effects of drought-induced mortality and poaching (Ottochilo, 1986; Olindo *et al.*, 1988). Subsequent poaching had a devastating effect, and by the late 1980s the population crashed to between 5,000 and 6,000 (Ottochilo, 1986; Olindo *et al.*, 1988). In less than 20 years the elephant population declined by 80% (Olindo *et al.*, 1988; Eltringham *et al.*, 1999).

Large numbers of large carnivores are also well represented in MTE and include: lion, leopard, cheetah and two types of hyenas, the spotted and striped (Eltringham *et al.*, 1999). Smaller species comprise wild dog, black-backed jackal, bat-eared fox, aardwolf, ratel, serval, small-spotted genet, civet, mongoose and wildcat. Some of these carnivores are very rare and populations of some may be threatened by extinction (*ibid.*).

4.4. General characteristics of the study villages

In this section, the general features of the nine villages studied are described. The general features include: geographical location, physiography, land-use and climate and drainage. The presentations of villages are arranged based on village selection criteria (see section 3.2) i.e. villages with "participatory" plans, "conventional" plans and "without plans". The detailed descriptions are given below.

4.4.1. Sangaiwe

4.4.1.1. Location and administration

Sangaiwe (92 km^2) lies between 03° 56' S and 35° 19' E at an altitude of between 998 and 1,012 m asl. The village shares a border with Tarangire National Park in the east (see Fig. 1.1) and the Great North Road in the west. In the north it borders Lake Burungi (Ash soda) and in the south it shares border with Sarame village and Sarame Hill. It is administratively in Mwada Ward, Mbugwe Division-Babati District. The village consists of three sub-villages: Osoley (village centre), Gembo and Sangaiwe. Mbugwe is the main tribe in the village. Other minor tribes include the nomadic pastoral Barabeig and Iraqw agropastoralists. The population is estimated at 3,500 people (Tanzania National Census, 2002). The village population density is about 38 people/km^2 (pers. obs.). Sangaiwe is located about 10 km from Magugu Centre and 35 km from Babati Township. Babati Township is both Babati District and Manyara Region headquarters.

4.4.1.2. Climate and drainage

The village like other parts of the Northeastern Tanzania rangelands is in a semi-arid area with average annual precipitation of 750 mm/annum (NLUPC, 1994; Coe, 1999; Yanda *et al.*, 2001). The rainfall pattern is bimodal, with short rains (*vuli*) between May

and June and long rains (*masika*) between November and January (Yanda *et al.*, 2001). Estimate of average annual rainfall in the area between 1994 and 2001 (at Sangaiwe Ranger Post) is estimated at 557 mm (pers. obs.), the highest being recorded in 1997 (808 mm) and lowest in 2001 (293 mm). The months of June through October are normally dry months in the village. The southern part of Lake Burungi forms part of the village.

4.4.1.3. Land-use

Agriculture is the main economic activity and is practised by 94% of the population (see also Table 5.1). Other activities include livestock production, fishing, small business enterprises and weaving. Crops grown in the area are mainly sorghum, maize, cotton, simsim and groundnuts. Cotton used to be the main cash crop in the past (1970s), but has declined mainly due to its price fall in the world market (BDC, 2004). Other reasons for its decline are untimely payments after crop sale (selling on credit), poor extension services and high costs of agricultural inputs (*ibid.*).

The crop production level is low mainly due to climatic limitations (semi-arid) conditions. The views of the Babati District Agricultural and Livestock Development Officer (DLDO) on crop production in the area were as follows: "*Ecologically, the area does not have potential for agriculture except drought tolerant crops such as sorghum, oil crops, cotton, green grams and yellow beans*" (Msoffe, pers. comm.).

Apart from agriculture and livestock production, wildlife related activities have the potential to contribute to household cash income through tourist hunting and ecotourism[5] in the Wildlife Management Areas (WMAs)[6]. The village has rich wildlife (see Plate 4.1) and tourist attractions such as Lake Burungi and several historical sites: *Nsanga ya Iwe and mwawe wa Nnda, Mawe ya nyani (*rock outcrops used by baboons*), mbuyu wa Tembo* and green stones (BDC, 2004).

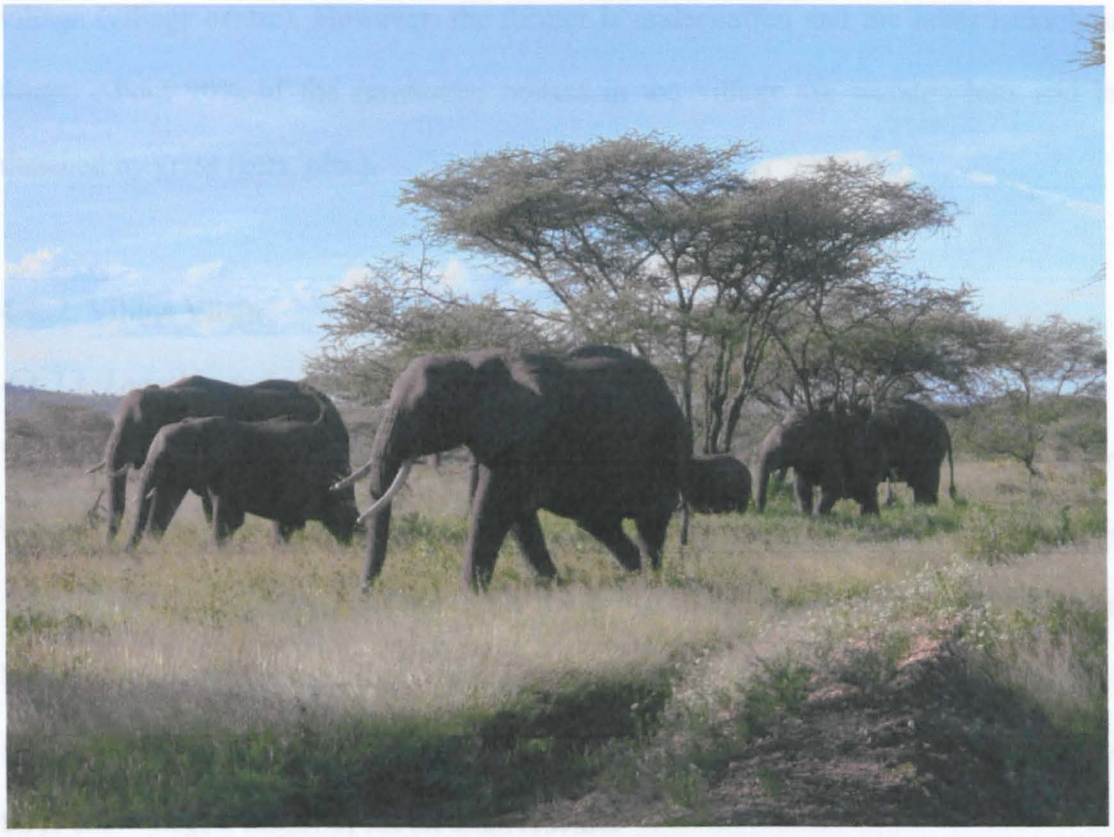


Plate 4.1: Elephants in Sangaiwe Wildlife Management Area (WMA). Photo by: Bakari. April 2004.

[5] *Responsible travel to natural areas that conserves the environment and improves the well being of local people (Nelson, 2004).*

[6] *A new protected area category set aside by village governments (conservation instrument) to provide room for communities to benefit from wildlife resources (Ndziku, 2003; WPT, 1998; WMA, 2002).*

4.4.1.4. Social infrastructure

The social infrastructure is poorly developed. The village lacks basic human needs: clean and safe water, telecommunications, electricity and has insufficient education facilities. Due to the lack of running water, households depend on spring water. As an alternative to electricity or gas, fuel wood is the main source of domestic energy in the village, as in the rest of the rest of the study villages. In terms of education and health care, the village has one primary school and a dispensary, both located at Osoley sub-village (village centre). However, the former is understaffed and the latter lacks basic drugs. About 90% of the residential houses in the village are wooden huts and are thatched by grass (pers. obs.).

4.4. 2. Vilima Vitatu

4.4.2.1. Location and administration

The 198 km^2 Vilima Vitatu lies between 03° 49' S and 35° 51' E at an altitude of between 988 and 1,004 m asl. Vilima Vitatu borders Tarangire National Park to the east (see Fig. 1.1 & Plate 4.2), Minjingu village to the north and Lake Burungi to the south. It shares borders with Magara village and Lake Manyara to the west. The village is administratively in Nkaiti ward, Mbugwe Division in Babati District and consists of three sub-villages: Marewa, Mdori and Nchemu.

Plate 4.2: Concrete beacon (marked X) showing the boundary between Tarangire National Park (left side) and Vilima Vitatu village. Photo by: Author.

Vilima Vitatu, which is situated adjacent to the Great North Road; is about 50 km from. Babati Township. It has several ethnic groups, the Mbugwe being the main one. Other minor tribes include: the nomadic pastoral Barabeig, Pare, Hehe, Nyaturu and Nyiramba. The population is estimated at 4,010 people (Tanzania National Census, 2002). The population density is estimated at 20 people/km^2 (pers. obs.). The diverse ethnic groups in the village are probably due to the village's proximity to Minjingu Rock Phosphate Fertilizer Company (MRPC). Easy access to the area could also be one of the reasons. The two factors have acted as pull-factors (attractions). The MRPC is located about 8 km from the village centre.

4.4.2.2. Climate and drainage

Rainfall data for the year 2001 through 2003 at Vilima Vitatu metrological station indicates that the average annual rainfall is about 730 mm (pers. obs.), relatively higher than Sangaiwe. The average monthly minimum temperatures range between 4.5° C and 16.8° C. The months of June through September are normally dry months in the village.

Tarangire and Oltukai Rivers are the main drainage patterns in the village. Tarangire River (see Plate 4.3), which empties into Lake Burungi, provides water for the Tarangire Manyara Basin Ecosystem (TMBE) wildlife during the dry season (Gamassa, 1989). The river is a lifeline for wildlife within the ecosystem as it provides water at critical periods during the dry season. According to Gamassa (*ibid.*) the river is an Oasis Centre for Maasai Steppe wildlife. Oltukai is a minor river. It starts on the northern tip of Tarangire National Park and becomes sub-terranean before entering Lake Manyara.

Plate 4.3: Tarangire River (dry season) and Kibo Campsite (along the River bank). Photo by: Author. August 2005.

4.4.2.3. Land-use

Agriculture is the main economic activity in the village and is practised by 89% (see also Table 5.1). Other activities include livestock production, fishing, small business enterprises such as weaving and charcoal selling. Crops grown in the area are mainly sorghum, maize, cotton, simsim, sunflower and groundnuts. Like in Sangaiwe, the crop production level is low due to climatic limitations, lack of reliable markets especially for cotton and simsim, poor extension services and high prices for agricultural inputs (Msoffe, pers. comm.-District Agriculture and Livestock Development Officer).

Only a small proportion (1%) of local residents normally practise livestock production (see Table 5.1). However, the nomadic Barabeig have large herds of cattle ranging between 300 and 1000 per household (Manamba Soloji, pers. comm.-Barabeig elder). Nomadic Barabeig are normally resident in Vilima Vitatu and Sangaiwe villages in wet seasons only i.e. November-January (*ibid.*). During this time pastures are available. In dry seasons (July-October), they are forced to move to different parts of the country in search of pastures. Their normal destinations include: Magara/Mayoka wetlands (adjacent to Lake Manyara), Shinyanga, Coastal, Dodoma and Morogoro Regions (*ibid.*).

Apart from agropastoralism, Vilima Vitatu, like Sangaiwe has a potential source of non-farm incomes such as tourist hunting within the WMA and ecotourism. Currently, Northern Hunting Company (NHC) has a hunting concession in the area (Burungi GCA). Potential sources of non-farm income attractions include: handicraft production, Vilima Vitatu or "three overlapping hills", from which the village gets its name; salt

water springs, Lake Burungi, Lake Manyara and huge, and old baobab trees (BDC, 2004).

4.4.2.4. Social infrastructure

As in Sangaiwe, the social infrastructure is poorly developed. Local communities lack basic human needs such as clean and safe water and health care. There are insufficient education facilities, poor quality houses (about 90% are wooden huts-see Plate 4.4) and no electricity or telecommunications. The nearest health centre is at Tarangire National Park, a distance of about 18 km from the village centre. In terms of education, the village has one primary school. According to the Head Teacher John Bura, the school is under-staffed. This has had implications for pupils' performances. For about 10 years (1992-2002), no student was able to go on to secondary school because of poor performance (Godfrey Sailale, pers. comm.-village executive secretary).

Plate 4.4: Typical Barabeig boma in Vilima Vitatu village. Photo by: Author. March 2004.

4.4.3. Esilalei

4.4.3.1. Location and administration

The 300 km^2 Esilalei (WWF/TPO, 2002) lies between 03° 46' E and 35° 55' S at an altitude range of between 997 and 1062 m asl. It is situated on the main road from Arusha to Lake Manyara National Park (LMNP) and Ngorongoro Conservation Area Authority (NCAA). Administratively the village is in Esilalei Ward, Monduli District, Arusha Region. The village has four sub-villages: Endepesi, Kanisani (Esilalei), Makuyuni Masaini and Esimiti. It borders on Losirwa village to the north/north east, Oltukai village to the south, Tanzania Lands Conservation Trust (Manyara Ranch) to the east and Lake Manyara National Park to the west (see Fig. 1.1). The village is sparsely populated, the density being estimated at 11 people/km^2 (pers. obs.). According to the Tanzania National Census (2002) the village has a population of 3,400 people.

4.4.3.2. Climate and drainage

The area receives average rainfall of between 500 and 600 mm/annum (Yanda *et al.*, 2001). The short rains (*vuli*) are experienced between May and June and long rains (*masika*) between November and January (*ibid.*). The village is drained by two minor-seasonal rivers: the Makuyuni and Oltukai. The two rivers drain their water into Lake Manyara. The village has one water reservoir (Esilalei Dam), which is the main source of water for humans, livestock and wildlife. Water from the Loosimingori Mountains drains into the dam.

4.4.3.3. Land-use

The main economic activity in the village is livestock farming which is practised by 97% of the population (see Table 5.1). The livestock density is estimated at between 20 and 40 livestock units/km^2 (Rohde & Hilhorst, 2001; Yanda *et al.*, 2001). However, Mwalyosi (1992) estimates the density to a tune of 215 LU/km^2. Other activities carried out at subsistence level include: crop production (maize and beans), souvenir enterprises and ecotourism enterprises. During this study (2004/05), the village had two cultural sites, the "*Kanjiro*" - cultural group and "*Nsairo*" - traditional cultural *bomas* at Esimiti sub-village. The former is a women's group enterprise. The entry fee into *Nsairo* is equivalent to US $10 per person/day and targets international tourists.

The state of social infrastructure is similar to Vilima Vitatu and Sangaiwe. The village lacks running water, telecommunications, electricity, and health services. Houses are of poor quality (about 95% wooden huts and thatched with grass). Esilalei has one primary school but it is faced with the problem of low pupil enrolment due to a lack of education awareness among parents (pers. obs.). The author witnessed only 12 pupils writing their final standard seven final examinations in 2004. To solve this problem, construction of a boarding school was underway – as a means to control absenteeism.

4.4.4. Chemchem

4.4.4.1. Location and administration

The 59 km^2 Chemchem village is located between 03° 24' S and 35° 48' E at an altitude range between 1,204 and 1,434 m asl. The highest point is at Manyara Hotel. The village is located about 30 km east of Karatu Township the District headquarters.

Administratively the village is in Rhotia Ward, Karatu District-Arusha region. The village consists of three sub-villages of Aslini, Huduma and Mbulumbulu.

The village is bounded by the Manyara escarpment to the east, the Kilima Tembo escarpment to the northwest and connects with the Kilima Nyoka ranges and Endalah village towards the south. It has a population of 3,200 people (Tanzania National Census, 2002). The human population density of the village stands at 54 people/km^2 (pers. obs.). Iraqw is the dominant ethnic group in the village.

4.4.4.2. Climate and drainage

The mean annual rainfall over a period of 7 years at Mto wa Mbu is about 680 mm (Magogo, 1990). Schultz (1967) places the Chemchem area in the class of 700 to 800 mm annual rainfall. The rainfall distribution has a small peak (*vuli*) around December and a main peak (*masika*) in April. The dry season is from June to October. (*ibid.*). The village is drained by the seasonal Marera River.

4.4.4.3. Land-use

Crop production is the main economic activity practised by 96% of the population (see Table 6.1). However, crop production level is low due to unreliable rains and low soil fertility (Magogo, 1990). The main crops grown in the village are maize, beans and finger millet. Onions are grown in depressions. On the alluvial plains of the Marera River supplementary gravity irrigation is practised and additional crops, e.g. bananas, tobacco and vegetables are grown (*ibid.*). Livestock production is also practised but at subsistence level. According to Magogo (1990) the village has large number of livestock relative to the area of land, which is available for grazing.

The village, unlike Sangaiwe and Vilima Vitatu (within TMBE) does not have the potential for wildlife related enterprises due to the insufficient number of wildlife. The numbers of wildlife have declined in the area due to increased settlements and cultivation along the former migratory routes (Hhaway Safari, pers. comm.-sub village chair). According to Hhaway Safari, there used to be two wildlife migratory routes through the village. However, only one has remained open due to increased settlement. The migratory route which has ceased to exist is that of Lake Manyara National Park (LMNP)-Chemchem-Lotia-Mbulumbulu Mountains-Tarangire Forest (see also Table 4.1). This route disappeared in the 1970s. The remaining route is that of LMNP-Bugeli Forest-Laja-Marang Forest. The social infrastructure status is similar to Sangaiwe and Vilima Vitatu.

4.4.5. Soitsambu

4.4.5.1. Location and administration

This village, which is also the Soitsambu Ward headquarters, lies between 01° 57' S and 35° 28' E at an altitude range of between 1,400 m and 2,500 m asl. It is on the eastern part of Serengeti National Park. Administratively, the village is in Loliondo Division, Ngorongoro District. It is approximately 13 km from Wasso Township (District headquarter).

It shares border with Marowa, Sero villages and Mount Kintelo to the north, to the west it borders Serengeti National Park and Oloipiri village. To the south Oloisililwa and Mudosi villages border the village. The Ortello Business Company (OBC), a hunting company is based in this village. The Maasai is the main ethnic group in the village.

Other minor ethnic groups include the Sonjo and Nyiramba. The population of the village is estimated at 4,500 people (Tanzania National Census, 2002).

4.4.5.2. Climate and drainage

Soitsambu experiences short rains (*vuli*) from mid-October to January and long rains (*masika*) from March to May (NLUPC, 1994). The rainfall ranges between 500 and 700 mm/annum with temperatures ranging between 15° C and 21° C (*ibid.*). According to NLUPC (1994), evapotranspiration ratio due to the existing solar radiation is fairly high, averaging between 1,500-2,000 mm/annum. The village is drained by the Olchoro-Onyokie and Poloti Rivers, which are seasonal.

4.4.5.3. Land-use

Livestock production is the main economic activity of 77% of the local residents (see Table 6.2). Other land-uses include subsistence crop production (beans and maize), campsites, photographic safari and game hunting. The South African-based Royal Safaris operates photographic safaris within the village while the United Arab Emirates (UAE) Ortello Business Company (OBC) has a hunting concession in the Loliondo GCA.

4.4.5.4. Social infrastructure

The state of social infrastructure is similar to the previous villages. The village lacks clean and safe water, telecommunications, insufficient education facilities, electricity, and health services. Houses are of poor quality (about 95% wooden huts and thatched with grass-see Plate 4.5). However, the village has a government owned dispensary (though lacks essential drugs) and one primary school (under-staffed). The village used

to have running water at its centre, however failure to maintain the equipment has led to its collapse. Like most rural Tanzania villages, Soitsambu depends on fuel wood as the main source of energy. In terms of transport, there is no reliable public transport to link the village and Wasso or other villages. The situation is worse during wet seasons.

Plate 4.5: Typical Maasai boma in Soitsambu. Photo by: Author. July 2005.

4.4.6. Ololosokwan

4.4.6.1. Location and administration

Ololsokwan is located between 1° 50' S and 35° 48' E at an altitude of 1,500 m asl. The Maasai dominant village, which is within Soitsambu Ward, Loliondo Division- borders Meirowa village to the south, Klein's Camp (now Conservation Corporation Africa) and Kenya's Maasai-Mara Reserve to the northwest, Mount Kitalo and Serengeti National Park to the west and Sero village to the east. The village population is estimated at 3,900 people (Tanzania National Census, 2002).

Ololosokwan has some of the most wildlife-rich village lands in Tanzania (Nelson, 2004). Thousands of wildebeest and zebra (see Plates 4.6 & 4.7) pass through the village lands annually on their migration from the Maasai Mara to the Serengeti plains (November), and move northwards to Maasai-Mara National Reserve and Amboseli National Park between July and October (*ibid.*). The climate is similar to that of Soitsambu and the average altitude is about 1,500 m asl.

Plate 4.6: Wildebeest in the Serengeti plains near Golini area (NCAA/SNP). Photo by: Author. August 2004.

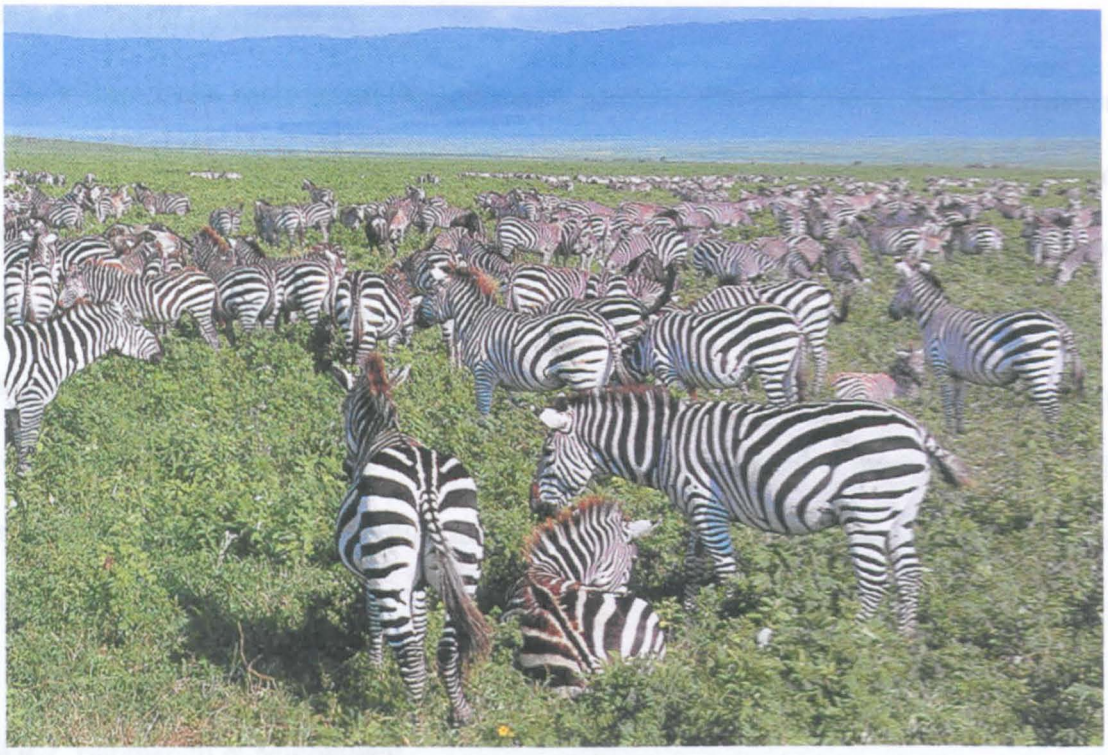


Plate 4.7: Zebra in the NCAA. Photo by: Author. August 2004.

4.4.6.2. Land-use

About 81% of local residents depend on livestock farming and 16% agriculture for their livelihood (see Table 6.1). The crops mainly grown for subsistence use are maize and beans. Due to the village's richness in wildlife, it has witnessed mushrooming of different wildlife related enterprises. Ololosokwan is probably the village with highest number of foreign-based, tourism-related companies in the country (pers. obs.). Private companies currently operating include Nomad Safari (UK based - photographic safari), Sokwe Safaris (USA based - campsites), Royal Safaris (South Africa based - photographic safari), Conservation Corporation Africa (South Africa based - photographic safari & tour-guiding) and Ortello Business Company (United Arab Emirates based - tourist hunting).

4.4.6.3. Social infrastructure

The village lacks basic social facilities such as clean and safe water, reliable transport, electricity and health facilities. There is only one dispensary operated by Conservation Corporation Africa, which provides services to residents at a cost, one primary school and one secondary school, the Emanyata that was built by an Italian Company. Water is a major concern in the area. During the period of data collection a 20-litre bucket of water was being sold at Tshs. 300 (US $ 0.3). Like in Soitsambu, more than 95% of the residential *bomas* are wooden huts thatched with grass. Fuel wood is the main source of domestic energy.

4.4.7. Barabarani & Migombani

4.4.7.1. Location and administration

Barabarani and Migombani form Mto wa Mbu sub-township. They are both in close proximity with LMNP (see Fig. 1.1) and they lie between 03° 38' S and 35° 37' E at an altitude range of between 997 and 1,062 m asl. The villages are administratively in Mto wa Mbu Ward, Monduli District. The 29 km^2 Barabarani consists of eight sub-villages: Kigongoni, Migungani A, Migungani B, Kisutu, National Housing Corporation, Korea, Magadini and Jangwani. It borders Migombani village to the east, Losirwa village to the south, Lake Manyara National Park to the north and Esilalei village to the west.

The 15 km^2 Migombani comprise of Migombani Juu, Migombani Kati, Migombani Chini, Mlimani Park and Kirurumo sub-villages. The village borders Mbulumbulu village/Mountains to the northeast, Barabarani to the west, Majengo village to the south and Kilima Moja village to the north. Both Barabarani and Migombani can be classified as sub-townships due to their diverse cultural background, people's lifestyle and the

socio-economic activities/services in operation. The township characteristics of the villages are reflected in people's lifestyles. There is a diversity of ethnic groups and various enterprises in operation. The villages have electricity and running water. During this study, the villages comprised more than 25 ethnic groups, a quarter of the total tribes in the country. According to Rohde & Hilhorst (2001), the socio-cultural and linguistic congestion of the population living in Barabarani and Migombani villages is probably more complex than in any other part in East Africa.

According to the Tanzania National Census (2002) Barabarani and Migombani have respectively 7,000 and 5,700 people. The population density for Barabarani and Migombani is estimated at 241 and 380 people/km^2 respectively which can be classified as high (Tenge & Kaswamila, 2002; Kaswamila & Masuruli, 2005). The high density is probably due to easy accessibility. The two villages are along the Arusha-NCAA tarmac road. The two villages are also the main stopover for LMNP, NCAA, and Serengeti National Park bound tourists.

The two villages have an irrigation scheme, which was initiated in early 1980s to curb food scarcity, which was being experienced at that time (Mabugo, 1980; Yanda & Mohamed, 1990). The irrigation scheme has affected water flow into Lake Manyara; this has adversely affected the breeding areas of small endemic fish species known as *Oechromis spp* (type of tilapia)-Silkiliwasha (pers. Comm.-former Lake Manyara Chief Park Ecologist). Apart from irrigation impacts on the environment, sewage from lodges (Barabarani) seeps underground to pollute the Nyoka and Simba Rivers (*ibid.*).

4.4.7.2. Climate and drainage

The average annual rainfall is 642 mm/annum and almost half of this falls in March and April (Prins, 1986). The rainfall pattern is bimodal with short rains (*vuli*) from November to January and long rains (*masika*) from January to April (*ibid.*). The mean monthly maximum temperature is more or less uniform throughout the year, ranging from 22° C to 25° C. The mean monthly evapotranspiration rates vary from 150 mm in April to 240 mm in August and September (*ibid.*).

Barabarani and Migombani villages are drained by Kirurumo, Simba, Mto wa Mbu and Njoro ya Gunda Rivers which originate from the Ngorongoro highlands (LMNP, 2002). Other rivers discharging their waters into Lake Manyara include Iyambi from Marang Forest, Mara, Dudumera Rivers from Noi Forest reserve and Kirongozi River from Babati highlands. Seasonal rivers such as Makuyuni, Msasa, Chemchem, Endallah and Bagoyo also drain their waters into Lake Manyara. These rivers are the main sources of water for humans, livestock, wildlife, and irrigation agriculture.

4.4.7.3. Land-use

The major production system in Barabarani and Migombani villages is irrigated farming which was initiated in the 1980s through International Labour Organisation (ILO) in partnership with the Tanzania government (Martens, 1987; Yanda & Mohammed, 1990). In Barabarani about 86% depend on agriculture for their livelihood; while in Migamboni, the proportion is slightly higher at 94% (See Table 7.1). The main crops include bananas, maize, paddy rice, finger millet and vegetables. Bananas, sugar cane and paddy rice are cultivated in well-watered areas. Yield trends are reported to be declining with time (Yanda & Mohammed, 1990).

Conflicts between the three land-users (agriculturalists, pastoralists and wildlife conservation) are becoming increasingly significant in the area (*ibid.*). The high population pressure (see 4.4.7.1) leading to extensive cultivation seems to be one of the contributing factors (Yanda & Mohammed, 1990). However, the magnitudes of such conflicts are not well documented; it is therefore necessary to assess the levels of the conflicts in order to propose means of mitigating them (*ibid.*).

4.4.8. Mkonga-Ijinyu

4.4.8.1. Location and administration

Mkonga-Ijinyu lies between 4° 53' S and 37° 40' E. The village is in Kisiwani Ward, Same District in Kilimanjaro Region. The village consists of five sub-villages: Mkonga Chini, Mkonga Juu, Mzimbo, Ijinyu and Kamorei. Mkonga-Ijinyu borders MGR to the north and east. To the west the village borders Kwizu village, Mount Kwizu and South Pare Mountains. To the south the village borders Kisiwani village. The main tribe in the village is Pare. Other minor tribes include: Sambaa, Kamba, Parakuyo, and the Maasai. The village has a population of about 2,283 people (Tanzania National Census, 2002).

4.4.8.2. Climate and drainage

The village experiences two periods of rainfall each year - the short rains (*vuli*) in December and long rains (*masika*) in March to May (Coe, 1999). The average annual rainfall is about 734 mm (*ibid.*). Mean annual temperature is largely related to altitude, the average altitude is 760 m asl (Brockington & Homewood, 1999). According to Cole (*ibid.*) the mean annual temperature is 23° C, with mean minima of 9° and 17° C and maxima of between 29° C and 38° C. The village is drained by the Nakombo River (permanent), which is also used by Barazani village for irrigated agriculture.

4.4.8.3. Land-use

The main economic activity is agriculture, which is practised by about 89% of the local residents (see Table 7.1). Pastoralism is also practised by a small population especially in Kamorei sub-village and near Kamdufo hill (near village diocese area) inhabited mostly by the Maasai. According to Kiwasila & Homewood (1999), Mkonga-Ijinyu main problems are: grazing area shortage, cattle theft, lack of veterinary and health services, youth unemployment and slump following livestock market collapse. The authors also gave local people's priorities as regaining gazetted land, construction of *Ndiva* (water reservoirs), improvement of livestock services, youth employment from MGR, completion of village projects started by the Wildlife Division (WD) outreach program and World Vision[7].

Mining is also practised in the village. Mount Ngulunga, which is within the MGR, is geologically rich in gemstones. The area contains many gemstones such as silicon, green tourmaline and rhodilite (Ali Pessa, pers. comm.-sub village Chairman). Illegal mining of the gemstones is on the increase particularly by the youth, due to lack of alternative income generating activities. Gemstones are sold illegally to dealers in towns and cities - Same, Moshi, Arusha and Dar es Salaam.

Illegal game hunting is also high. Bush meat is sold in several hotels at Kisiwani (Barazani) village (pers. obs.). Bush meat is preferred to beef due to its low price relative to the latter. Most people can't afford the price of beef meat. The cost of bush meat per kg stands between Tshs 400 and 500 (US $ 0.4 to0.5) and that of cattle is Tshs. 1,500 (US $ 1.5).

[7] *Is a UK based Christian Charity supporting socio-economic development projects in rural areas of Tanzania.*

4.4.8.4. Social infrastructure

As in the rest of the villages in the study area, social services are poorly developed. Basic human needs: clean and safe water, health services, telecommunication and electricity are all unavailable. The village has only one primary school, which does not cater for the local demand, given a population of more than 2,000 people. Health services are provided at Kisiwani village, which is located approximately 5 km from the village. However, the health centre lacks essential basic drugs and people have to travel about 30 km to Same Township for the services.

This Chapter has described the socio-economic and environmental setting of the study area. The study villages depend mainly on agriculture or livestock production. However, the production level is low due to climatic constraints and poor extension services. In addition, the villages' social infrastructure is poorly developed. Local communities lack basic human needs such as clean and safe water, health care, education facilities, and electricity etc. Table 4.2 gives the broad characteristics of the villages, as identified in the Chapter. The subsequent Chapter presents and discusses the impact of participatory land-use plans implemented in Sangaiwe, Vilima Vitatu and Esilalei villages.

4.5. Summary of the main features of the study area

Table 4.2: Main features of nine study villages

Village	Area (km^2)	Population*	Total number of households*	Crops/livestock	Main ethnic groups
Sangaiwe	92	3,500	580	Cotton, sorghum, maize, simsim/cattle, sheep & goats	Mbugwe
Vilima Vitatu	198	4,010	670	As above	Mbugwe
Esilalei	300	3,400	567	Cattle, sheep, goat/ Maize, beans	Maasai
Chemchem	59	3,200	530	Maize, beans, finger millet/cattle, sheep and goats.	Iraqw
Soitsambu	-	4,500	750	Cattle, sheep, goats/Maize, beans	Maasai
Ololosokwan	-	3,900	650	As above	Maasai
Barabarani	29	7,000	1660	Rice, finger millet	More than 25 ethnic groups
Migombani	15	5,700	950	Banana, rice	As above
Mkonga-Ijinyu	-	2,283	397	Maize, cotton, beans, cassava	Pare

-=not available *Tanzania National Census (2002)

CHAPTER 5

5.0. ANALYSIS OF EFFECTIVENESS OF PARTICIPATORY LAND-USE PLANS (PLUPs)

5.1. Introduction

Chapter Five presents the process and impact assessment of "Participatory" land-use plans (PLUPs) prepared and implemented in Sangaiwe, Vilima Vitatu and Esilalei villages (see Fig. 1.1). As stated earlier (see section 3.1), different information sources: household and experts interviews, focus group discussions, field visits and archive data were used in the assessment. In addition, technical reports were reviewed. Analysis of the results was carried out using both qualitative techniques, and non-parametric statistical methods such as the application of inferential and descriptive statistics including frequencies, cross-tabulation and Chi-square tests (see Subsection 3.5). The use of these techniques was deemed necessary as most data collected was of nominal or ordinal type (Veal, 1997; Bryman & Cramer, 1999; Pallant, 2003).

The survey results and analyses presented in the remainder of this Chapter are used to answer three out of the four research questions previously described in subsection 1.3.2. These are: **(i) to what extent have local residents and other stakeholders been actively involved in the land-use planning process? (ii) have the plans helped in minimising conflicts and conserving wildlife migratory routes? and (iii) what are the major technical strengths and weaknesses of these plans?** These three research questions have also been used to assess the effectiveness of "Conventional" land-use plans in the subsequent Chapter Six. Research question **(iv), viz: is there any difference in amount of land-use conflict and/or encroachment between villages with and without plans?** is addressed in Chapter Seven.

Chapter Five is organised in six sections following a research question-evaluation indicator approach, i.e. each research question is independently evaluated using relevant evaluation methods. First, the socio-economic features of the population sample are presented. Second, the participation of stakeholders in the land-use planning process is assessed. Third, the status of conflicts and/or encroachments into wildlife habitats is described. Fourth, a review of land-use plans and GMP technical reports is presented. Fifthly, suggestions given by local residents and experts to mitigate conflicts and encroachments in wildlife habitats are illustrated. Lastly, the summary and research implications for research questions One, Two and Three are given.

5.2. Socio-economic characteristics of villages with participatory land-use plans

The socio-economic characteristics of the population sample for villages with "Participatory" plans are presented in Table 5.1 below. Overall, in the three villages combined, the majority of the respondents were males (63%). The high proportion of males relative to their female counterparts could have happened by chance. The age structure in the three villages suggests that the population is youthful as 40% are in the youth (18-34 years of age) and 39% in the adults' (35-54 years of age) categories.

Table 5.1: Socio-economic characteristics for "Participatory" villages

Village	Sample size	Gender (%)		Age category (%)			Education (%)			Economic activity (%		
		M	F	18-34	35-54	>54	Nf	Pr	Sc	Ag	Lv	ot
Sangaiwe	97	58	42	33	31	36	23	73	4	94	0	6
Vilima Vitatu	101	56	44	37	47	16	10	87	3	89	1	10
Esilalei	61	75	25	49	38	13	53	47	0	3	97	0
Total	259	189	111	119	116	65	86	207	7	186	98	16
Average	86	63	37	40	39	21	29	69	2	62	33	5

M=male F=female Nf=non-formal Pr=primary Sc=secondary Ag=agriculture Lv=livestock Ot=other activities

About 90% of the sample of villagers in Sangaiwe and Vilima Vitatu depend on crop-based agriculture for their socio-economic development while in Esilalei 97% depend on livestock farming. Despite the dominance of the two activities, other minor socio-economic activities such a fishing (for villages near Lake Burungi), industrial employment (Minjingu Fertilizer Company-Vilima Vitatu), weaving, charcoal burning and souvenir selling are also practised. The illiteracy level in these three villages is high. Overall, in the three villages combined, only 2% have attained secondary education, with Esilalei (the Maasai dominant village) being the most affected. In this village there was no one with secondary education (see also Section 4.4).

5.3. Stakeholder's participation in the planning process

In the context of this study, stakeholders in the land-use planning process include: local residents, nomadic Barabaig people, Park management personnel and village extension workers. Stakeholder views and reviews of Tarangire and Lake Manyara National Park GMPs have been used to answer research question One: **"to what extent have local residents and other stakeholders been actively involved in the land-use planning process?"** To answer this question; the following section is organised into five subsections. First, results are presented from those households which were interviewed. Secondly, Park staff and village extension workers ("expert") interview results are illustrated. Thirdly, views of the minority nomadic Barabeig people are given. Fourthly, a review of stakeholder participation in the National Park general management planning process is presented. Lastly, a summary and implications of the results for research question One is presented.

5.3.1. Participation of local households

Respondents were asked whether they actively participated in the preparation of the land-use plan for their village. Responses were restricted to "yes" and "no". Active participation in the context of this study refers to stakeholder involvement in the decision-making process. This might have been through involvement in planning seminars, meetings, workshops and/or participation in the demarcation of land-use boundaries (zonation) in the field. A total of 259 households forming 86% of the intended respondents and 14% of the target population answered this question (see Table 4.2). Overall, in the three villages combined, local residents' participation in the three villages was low. Respondents with "yes" responses were 32% (see Fig. 5.1).

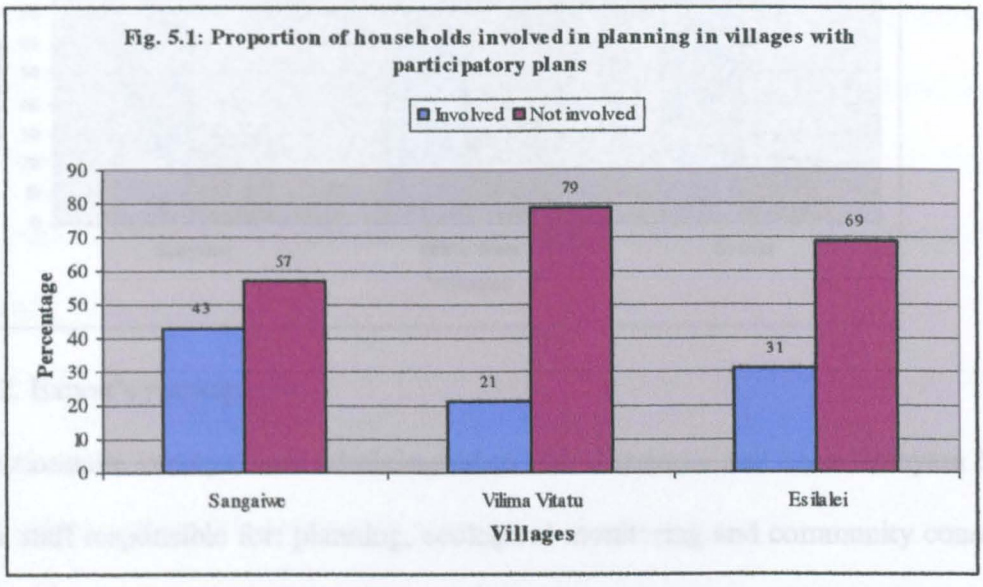


Fig. 5.1: Proportion of households involved in planning in villages with participatory plans

Of the three villages, the lowest level of participation was in Vilima Vitatu (21%; n=101). It is fairly certainly that there was a lack of local residents' involvement in both Vilima Vitatu and Esilalei villages (see Appendix 7b). However, the situation was different in Sangaiwe. In Sangaiwe, we cannot conclude that there is any "significant" difference in local people's participation (see Appendix 7b).

In terms of gender, females were less involved in the plan preparation process than their male counterparts in each village. The lowest participation of females was recorded in Esilalei village with 21% (n=19) having actively participated (see Fig. 5.2). The highest female participation was in Vilima Vitatu, with 38% (n=21). Lack of female participation is probably an illustration of the fact that in these communities females are rarely involved in major decision-making processes. In these villages household decision-making is usually done by men (Quinn *et al.*, 2003).

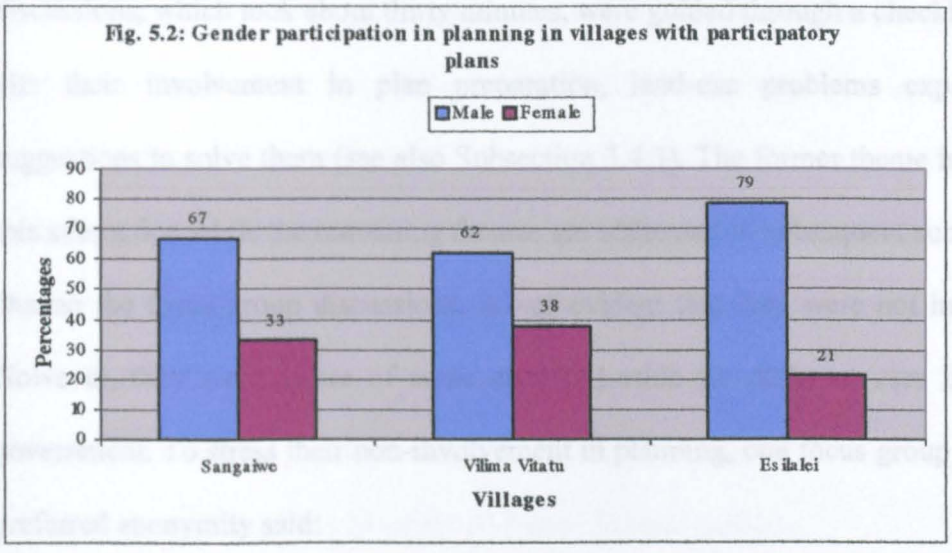


Fig. 5.2: Gender participation in planning in villages with participatory plans

5.3.2. Expert's participation

Questionnaire surveys were administered to four Tarangire and Lake Manyara National Park staff responsible for: planning, ecological monitoring and community conservation (outreach programme). Also, four village extension workers from Vilima Vitatu (agriculture officer), Mwada (agriculture officer), Sangaiwe (agriculture officer) and Mto wa Mbu (game officer) villages were interviewed. Village extension workers are government employees posted in villages as providers of advisory services to farmers. These experts were asked whether they were aware of the existence of the plans and/or about their involvement in the land-use plan preparation processes. As for the existence

of the plans, all experts (Park and village staff) were aware of the existence of land-use plans in their neighbourhood villages. However, they were not involved (active participation) in the planning process at any one stage - involvement in seminars, meetings and/or in demarcation of land-use boundaries. It is probable their non-involvement was due to insufficient planning time (see Subsection 5.5.1.1).

5.3.3. The minority Barabeig participation

Discussion with nomadic Barabeig people was held in Vilima Vitatu village. The discussions, which took about thirty minutes, were guided through a checklist of themes, viz: their involvement in plan preparation, land-use problems experienced and suggestions to solve them (see also Subsection 3.4.3). The former theme is addressed in this subsection while the remaining themes are addressed in subsequent subsection 5.4.3. During the focus group discussions, it was evident that they were not involved at all. However, they were aware of some areas set-aside for different uses by the village government. To stress their non-involvement in planning, one focus group member who preferred anonymity said:

> "*We were not involved in the process of land-use planning and we don't even know what the plan is meant for and its importance.*"

5.3.4. Parks and the involvement of stakeholders in planning

A review of the Park GMPs for Tarangire and Lake Manyara National Parks (LNMP, 2002; TNP, 2002) was carried out to assess whether Park stakeholders such as local residents in villages adjacent to Parks, were integrated into the planning and implementation of the GMPs. General Management Plans are the Park's resource use planning tool for the basic management and development philosophy of the Park which provide the strategies for solving problems and achieving identified management

objectives over a period of years (TANAPA, 1995). The Tanzania National Parks Authority (TANAPA) uses a 10-year planning horizon (*ibid*). The Tarangire and Lake Manyara National Park GMPs were prepared using the Strategic Planning Process (SPP) developed by TANAPA in the early 1990s (*ibid*). One of the important planning aspects of the SPP is the involvement of inter-disciplinary teams and local communities in the preparation and implementation of GMPs.

The review of the two GMPs reveals integration of different professionals and administrators in the GMP preparation processes. However, both Parks failed to involve local communities in the preparation of the GMPs. For example, during the preparation of Lake Manyara National Park GMP, out of the 40 participants who participated in the planning exercise, 60% were TANAPA staff, 25% were district officials from Karatu, Mbulu and Babati Districts, 2% were from Ngorongoro Conservation Area Authority (NCAA) and 7% were representatives of tourist lodges located around Lake Manyara National Park and Serengeti National Park (LMNP, 2002). The remaining proportions (6%) were journalists and University of Dar es Salaam students.

As for Tarangire National Park GMP; out of the 81 planning participants, 42% were TANAPA staff, 16% district officials, 16% ward officials, 17% AWF officials; 3% Tanzania Wildlife Research Institute (TAWIRI) representatives and 8% were representatives for campsites and tourist lodges (TNP, 2002). From the review, it was evident that most planning participants were either district officials or ward/village leaders. The failure to involve members of local communities other than officials implies that their views, interests and aspirations were not taken into account. An interview with TANAPA planners could have given more insight as to why fuller stakeholder

consultation exercise was not carried out. However, due to budget constraints, that exercise was not possible.

5.3.5. Summary and implications for research question One

Interview responses from households/experts, focus group discussions with Barabeig people and Park's GMP have been used to answer research question One: **to what extent have local residents and other stakeholders been actively involved in the land-use planning process?** Evaluation evidence suggests that local residents were less involved in the planning; Park, extension workers and nomadic Barabeig were not consulted and there was a lack of integrated planning between village plan agents and Park management.

5.4. Conflicts and encroachments

In this section, an attempt is made to answer research question Two: **have the land-use plans helped in minimising conflicts and conserving wildlife migratory routes/dispersal areas?** Evaluation indicators obtained from: interviews (households/experts), focus group discussions, archive data and field visits have been used to answer the question. In the context of this study, the term conflicts is used to refer to disputes over the use of land or natural resources in a particular area. For the purposes of the thesis, conflicts are treated as distinct from encroachment into wildlife migratory routes, which is here used to refer to the illegal use of conservation areas (WMAs, TLCT, wildlife corridors) contrary to designated uses in village land-use plans.

5.4.1. Responses supplied by households

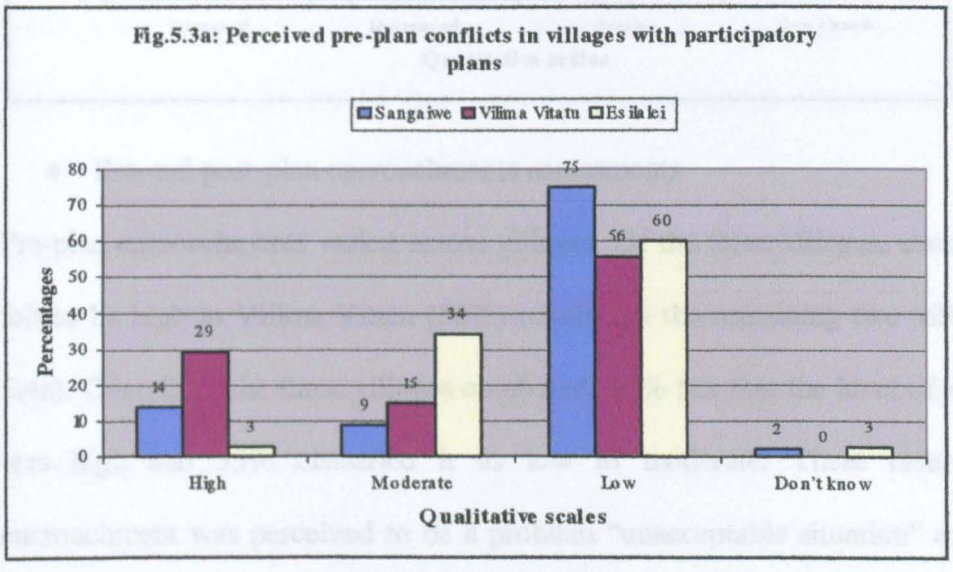
This subsection is divided into two major parts. The first part, presents pre-and post-conflicts and encroachments assessments made by households involved in the planning process. The assumption is made that households involved in planning are likely to give precise judgements on the performance of plans compared to those who were not involved at all. The second part presents the main types of conflicts and encroachments as perceived by the households (all interviewees). The questions on types of conflicts and encroachments were generic to all respondents.

5.4.1.1. Pre-and post-plan assessments

- Pre-and post-plan conflict assessments

Pre-plan conflicts varied across villages. Of the three villages, Vilima Vitatu had the highest level of conflicts (29%; n=21) and Esilalei the least (3%; n=19) (see Fig. 5.3a). Overall, in the three villages combined, 15% perceived there to be a high level of conflicts ("unacceptable situation"). The majority (83%) however, felt the level of conflicts was low to moderate, an "acceptable situation".

Fig.5.3a: Perceived pre-plan conflicts in villages with participatory plans



However, the level of conflicts was seen as having increased in all three villages after the plans were implemented (see Fig. 5.3b). The increase was felt more in Esilalei (67%; n=19) and Sangaiwe (52%; n=42) (see Fig. 5.3b). Overall, in the three villages combined, 56% felt the level of conflicts had increased; 25% felt the level had decreased; and 15% could not see any change. The pre-and post-plan conflicts was not statistically significant in all three villages (see cross-tab results in Appendices 8a-8c). Lack of significance could be attributed with "nil" responses or limited responses to some questions posed. The types of conflicts are described and discussed in the subsequent subsection 5.4.1.2.

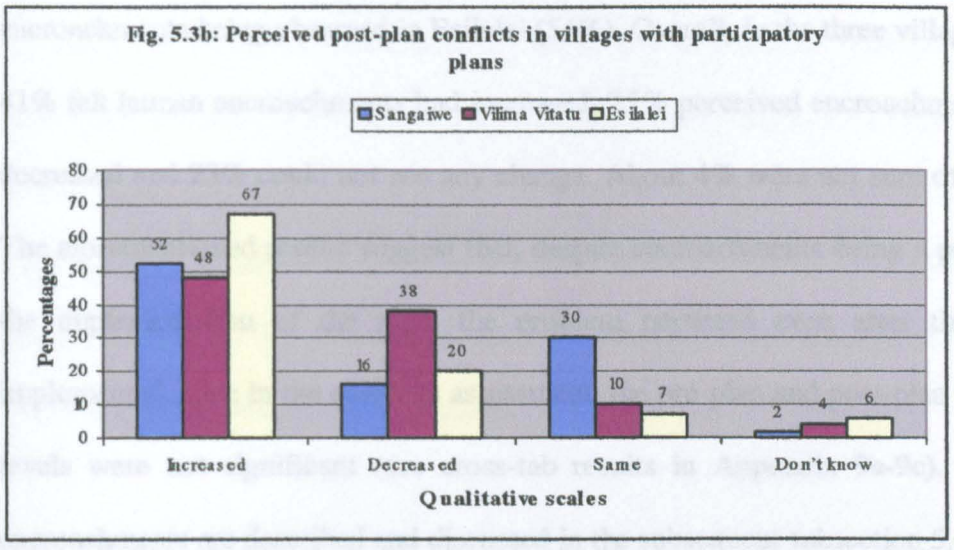
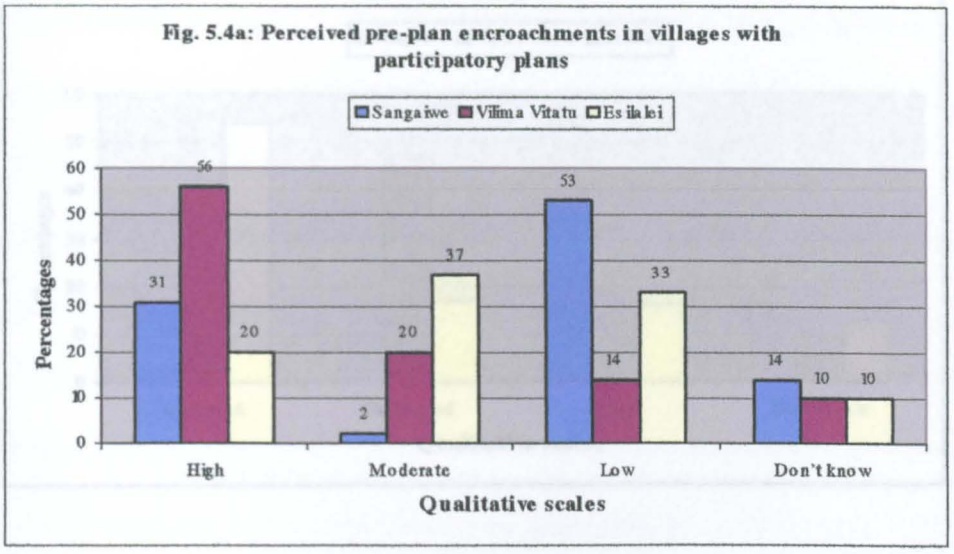


Fig. 5.3b: Perceived post-plan conflicts in villages with participatory plans

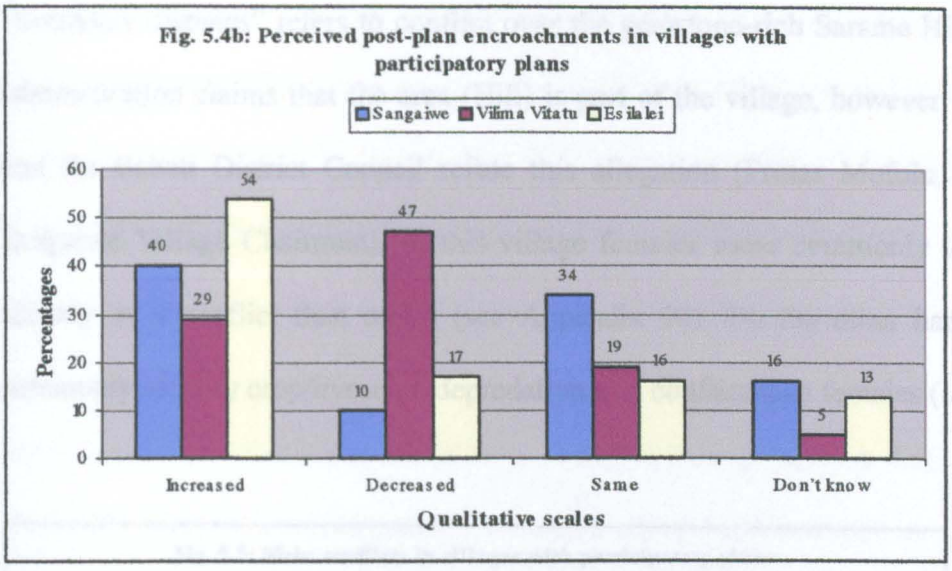
- Pre-and post-plan encroachments assessments

Pre-plan encroachments varied across villages. Of the three villages, encroachment was felt to be high in Vilima Vitatu (56%) relative to the remaining two villages (see Fig. 5.4a). Overall, in the three villages combined, 36% felt that the level of encroachments was high and 53% classified it as low to moderate. These results imply that encroachment was perceived to be a problem "unacceptable situation" even before the plans were implemented.



Encroachments increased after the plans were implemented (see Fig. 5.4b), the highest encroachments being observed in Esilalei (54%). Overall, in the three villages combined, 41% felt human encroachments had increased; 25% perceived encroachments as having decreased and 23% could not see any change. About 4% were not sure of the situation. The aforementioned results suggest that, despite encroachments being a problem before the implementation of the plan, the problem persisted even after the plans were implemented. Like in the conflicts assessment, the pre-plan and post-plan encroachment levels were not significant (see cross-tab results in Appendix 9a-9c). The types of encroachments are described and discussed in the subsequent subsection 5.4.1.2.

Although the villagers themselves are the ones doing the encroachment, probably they presented it as a "problem" to reflect land scarcity constraints they face for different activities such as grazing, agriculture and harvesting of forest products - firewood, poles, timber, herbs, honey etc.



5.4.1.2. Main types of conflicts and encroachments

As stated previously (subsection 5.4.1), all survey respondents were probed about the main types of conflicts and human encroachments prevailing in their respective villages. In this study, the absence or presence of conflicts and/or encroachments perceived by local residents (interviewees) is taken as one of the indicators for a plan's success or failure. This is on the assumption that effective plans are likely to result in reduced levels of conflicts and/or encroachments.

- Main types of conflicts

About 75% (n=259) responded to the question on the main types of conflicts. Figure 5.5 indicates that conflicts varied across villages. In Sangaiwe, the main types of conflicts were: the establishment of the WMA (41%; n=97), crop destruction by wild animals (33%), boundary conflicts with Tarangire National Park (20%) and restrictions (requirement for permits) on harvesting forest products from the WMA, such as game meat, fuel wood, herbs, timber, thatching grass etc. (6%). The establishment of the WMA for example, took about 27% of the Sangaiwe village lands (BDC, 2004).

"Boundary disputes" refers to conflict over the gemstone-rich Sarame Hill. The village administration claims that the area (Hill) is part of the village, however, both the Park and the Babati District Council refute this allegation (Protas Mofulu, pers. comm.- Sangaiwe Village Chairman). In this village females more commonly identified land scarcity as a conflict than males (see Appendix 10). On the other hand, men more commonly identify crop/livestock depredation as a conflict than females (*ibid.*).

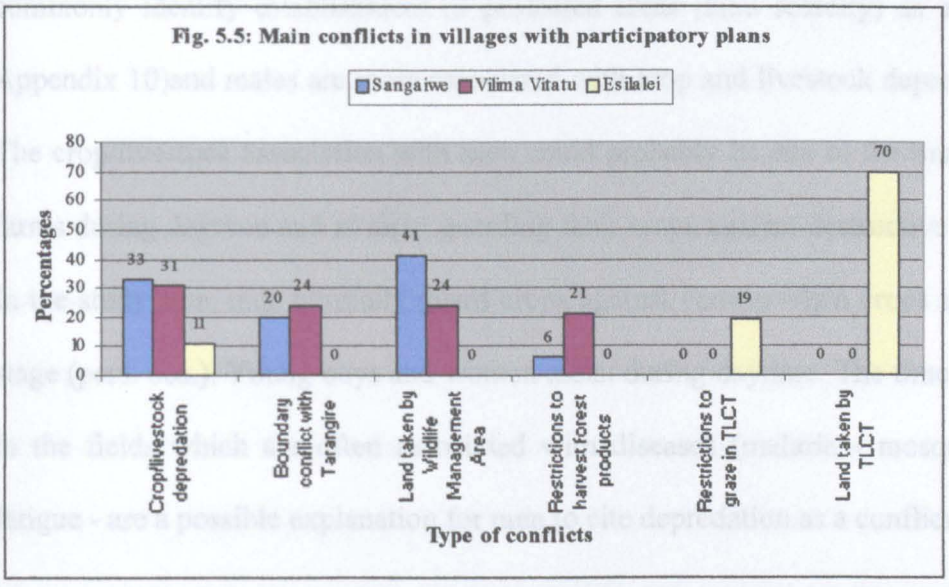


Fig. 5.5: Main conflicts in villages with participatory plans

In Vilima Vitatu, the main conflicts are crop/livestock depredation by wild animals (31%; n=50), boundary conflict with Tarangire National Park over the northwestern part of Lake Burungi (24%), establishment of WMA (24%), and harvesting restrictions on forest products from the WMA (21%). In Vilima Vitatu the establishment of WMA led to a loss of 65% of the total village land (BDC, 2004). Like in Sangaiwe, females and males commonly identify land scarcity and depredation as a conflict respectively (see Appendix 10).

In Esilalei, the main conflicts were loss of land as a result of establishing the TLCT (70%; n=46), restrictions on grazing in the TLCT land (19%), depredation of crops and livestock by wild animals (11%). The TLCT occupies 59% of the total village land (WWF/TPO, 2002). In this village both genders identified land scarcity as conflict (see Appendix 10).

Gender-conflicts association analysis in the three villages shows that females more commonly identify establishment of protected areas (land scarcity) as a conflict (see Appendix 10)and males are more associated with crop and livestock depredation (*ibid.*). The crop/livestock association with men could probably be due to the time spent in the farms during daytime and at night guarding their crops against destructive wild animals. In the study area, men normally guard crops against vermin when crops are at maturity stage (pers. obs.). Young boys and women assist during daytime. The time spent by men in the fields which are often associated with diseases (malaria - mosquito bite) and fatigue - are a possible explanation for men to cite depredation as a conflict.

On the other hand, women's association with the establishment of conservation areas could be explained by the bylaws, which now restrict harvesting of forest products from the conservation areas, particularly firewood which is the main source of domestic energy. Before the establishment of the reserves women were free to harvest forest products such as dead wood, traditional herbs, weaving materials etc. With the restrictions, they cannot easily get firewood from the reserve, which is the sole source. Also, due to the high poverty level women are in most cases involved in selling mats as a means of supplementing the household income. However, the restrictions imply denial of access to the natural resources that provide the materials for this extra source of

household income. With this background, women are likely to have a negative attitude against the establishment of the reserves. What can be deduced from the foregoing discussion is that mitigation of conflicts can only be successful if local communities' property is protected and alternative sources for domestic energy, medical services etc. are in place. A way forward could be to encourage and assist local people to establish community forests and to provide soft loans for initiating non-farm enterprises. Funds can be sought from the government and conservation agencies such as TANAPA and international conservation agencies/non-governmental organisations.

- Types of encroachments

Households were asked if human encroachments were a problem and if so, what types of human encroachment were common in their respective villages (agriculture, grazing, settlements and others). The criteria for the choices took into account the fact that the first three options were thought to be the most likely infringements in wildlife migratory areas. About 92% (n=259) responded to the two questions. Encroachment was perceived as a problem in Vilima Vitatu by 69% (n=93) and Esilalei by 85% (n=60) villages. However, in Sangaiwe, only 43% (n=84) felt encroachments as a problem. In Vilima Vitatu and Esilalei results indicates a fair degree of certainty that encroachments are perceived as a problem in the three villages (see Appendix 7b).

The main encroachments varied across villages (see Fig. 5.6). In Sangaiwe, encroachments were mainly stated as being due to cultivation (50%), settlements (29%) and grazing (19%). Other forms of encroachments (6%) include search for firewood, herbs, house construction poles, bush meat, charcoal making etc. In Vilima Vitatu, encroachment was mainly for grazing (73%), harvesting of different forest products

from the reserve (14%) and for cultivation purposes (10%). in Esilalei encroachments were mainly for grazing (65%) and agriculture (26%). Further qualitative and quantitative evidence on the problem are discussed and illustrated in subsections 5.4.4 and 5.4.5.

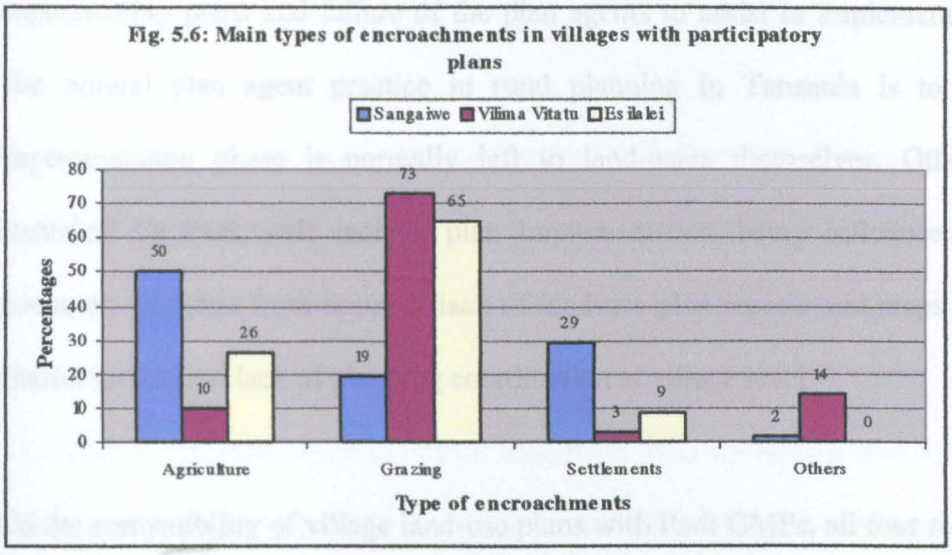


Fig. 5.6: Main types of encroachments in villages with participatory plans

5.4.2. Responses supplied by experts

5.4.2.1. Park's staff assessments

Tarangire and Lake Manyara National Park staff were asked whether they are aware of the existence of land-use plans in villages adjacent to their respective Parks. They were also asked to assess whether the plans have been able to minimise conflicts and encroachments; and if not, to give reasons behind the failure. They were further probed on the compatibility of village plans with their Park's GMPs. Compatibility in this study refers to the ability to use village plans together with GMPs without problems or conflicts. As stated earlier in subsection 5.3.2, four Park staff were involved in the evaluation exercise i.e. two from Tarangire National Park (TNP) and two from Lake Manyara National Park (LMNP).

All four-Park staff were aware of the existence of the land-use plans. On conflicts and human encroachments, three experts felt that the implemented plans have failed to mitigate the two problems. All four Park staff gave several reasons for the failures, such as the lack of adequate conservation education among local communities, failure to engage Park administration in village planning, inadequacy of financial resources in implementing plans and failure of the plan agents to assist in implementing the plans. The normal plan agent practice in rural planning in Tanzania is to prepare. The implementation phase is normally left to land-users themselves. Other constraints identified by Park staff include plan implementation being influenced by political pressures (pressure from donors), lack of land-use plan reports and maps at village and district levels, and lack of planning coordination at village level.

On the compatibility of village land-use plans with Park GMPs, all four respondents felt they were incompatible because both were prepared in isolation. The experts cited numerous problems associated to incompatibility. These included: increased antagonism with local communities; increased poaching; grazing beyond buffer zones; failure of the village plans to take into account annual wildlife movements; hunting operations being conducted close to Park boundaries; and blockage of migratory routes through settlement.

5.4.2.2. Village extension staff assessments

Village extension workers were asked to assess the pre-plan and post-plan conflicts and human encroachments in their respective villages. Four village extension workers were involved in the evaluation exercise i.e. three agricultural officers and one game assistant (see Subsection 5.3.2). On pre-plan conflicts assessment; the experts were divided in

their opinions. One felt the level of conflict was high, one described it as moderate, one could not see any change and the rest (one) was not sure. In their post-plan assessment, each assessed the scenario differently i.e. one, increased, one decreased, one same, and one was not sure. It is evident that the extension workers' pre-plan and post-plan conflict assessment varied and therefore no consistent conclusion can be ascertained from their views.

On human encroachments, two extension workers felt the pre-plan levels of encroachments were high, one assessed it as moderate and the remaining expert was not sure. In their post-plan assessment, one felt encroachments had increased, one perceived it as having decreased, one failed to see any change and the remaining expert was not sure of the situation. Again, village extension workers views were dissimilar. The conclusion is that, "experts" views differ in relation to the pre-plan and post-plan encroachment. Also, their views differ from that of villagers. The reason for the differences could not be established.

5.4.3. The minority Barabeig views on conflicts

As stated earlier in subsection 5.3.3, a checklist of themes guided the focus group discussions. Here, land-use problems (theme) encountered by the Barabeig people and their suggestions to mitigate them are presented. The Barabeig community were aware of the existence of WMAs. On the issue of pertinent land-use problems, they had this to say:

> *"Areas set-aside for grazing are insufficient taking into account that most of us have large herds of cattle. We are also faced with critical water shortages particularly during dry periods. We are forced to move to water logged areas (Maramboi), but in these areas, we face water-use conflicts between farmers and us (pastoralists). Furthermore, the areas set-aside for us as grazing areas (Matindigani) are small and saline."*

They also complained about the inconvenience they are subjected to from village leaders when they are found harvesting forest products in the community reserves. One discussant who preferred anonymity lamented:

> *"If you are caught felling trees in the reserve for subsistence use you are liable for a fine of not less than Tshs. (Tanzanian Shillings) 20,000 (US $ 20). You are also liable for an eviction order. This is a violation of human rights. In some cases Village Game Scouts conspire with Tarangire National Park (TNP) to harass us. We really don't know who owns the WMA. Does it belong to Tarangire National Park or us?" He queried.*

The minority group also complained about the harassment they get from village leaders during the periods of pasture stress, which is normally between September and November each year. They are forced to pay a kickback of up to Tshs (Tanzania Shillings). 50, 000 (US $ 50) to obtain a six-month's temporary permit to re-settle. They encounter a similar problem in the months of September through January (dry periods) in Magara village, about 20 km from Vilima Vitatu. The Barabeig people are forced to move to Magara plains (wetland) in search of grazing areas. Magara wetlands are in the western part of Lake Manyara National Park. Here, they are required to pay between Tshs. 200,000 (US $ 200) and 300,000 (US $ 300) to one agricultural settler (leased) in the area in order to obtain a six months grazing permit. One discussant who preferred anonymity portrayed the scenario as follows:

> "*During critical drought periods we are forced to shift to "Matindigani" in Magara village. This area is leased to one Indian agricultural settler involved in irrigation farming. We are forced to pay certain amount of money in order to be allocated a grazing area. Since 1999, this settler has become a nuisance by confiscating our livestock whenever they are found grazing in his land. You can only get them back after paying a kickback of between Tshs. 200,000 and 300,000 (US $ 200-300). Despite our complaints to relevant government authorities, no steps have been taken against this settler.*"

When the researcher contacted the settler, he denied any wrongdoing in charging them for using his land. He stressed that, so long as the area is under his lease, he has the right to charge any potential land-user. However, he denied confiscating their cattle.

The Barabeig people suggested three measures which could probably mitigate conflicts. First, the village governments should set-aside a large and suitable area (not saline) for grazing. The current area set-aside for their use in Vilima Vitatu is small, saline and lacks necessary livestock production infrastructures such as water and cattle dips (acaricides) (Focus group discussants). Secondly, Babati District Council needs to allocate Urdo Forest, in Mwada village (near Sangaiwe) to them for grazing purposes. The Urdo Forest is currently used as a campsite. Thirdly, the village governments and planners need to engage them in major decisions regarding land-use and socio-economic developments.

> "*Currently, we are treated as illegal immigrants, as we are to apply for permits in order to re-settle*" argued one discussant who didn't want his name to be mentioned.

5.4.4. Physical field visits

The researcher planned for the field visits in collaboration with village leaders. The aim of the field visits as stated earlier in subsection 3.3.4 was twofold. First, it was to cross-check the implementation of the plans on the ground. Secondly, was to assess the level of encroachments. The summary of field findings is presented in Table 5.2. This is followed by a description of some observed aspects: lack of land-use boundary markers (beacons), habitat degradation and blockages of wildlife migratory routes.

Table 5.2: physical observation results in PLUP villages

Village	Observations
Sangaiwe	-Lack of clear land-use boundary markers -Boundaries for different land-uses not known by most residents -Land-use allocations were based on present land-uses (not based on suitability) -Wildfires, deforestation for charcoal, fuel wood and poles for housing were evident (e.g. see plates 5.3 & 5.4) -Lack of natural resource management plan for the WMA
Vilima Vitatu	-Lack of clear land-use boundary markers -Beacon positions not known by most residents -Lack of natural resource management plan for the WMA -Settlements, agriculture, brick making & campsites in migratory routes were evident (e.g. see plates 5.2, 5.6-5.9). -Crop destruction by wild animals
Esilalei	-Clear boundaries between village and TLCT (see plate 5.1) -Insufficient buffer zone between TLCT and village -Grazing in TLCT (see plate. 5.5) -Crop destruction by wild animals (e.g. see plate 5.10)

WMA=Wildlife Management Area TLCT=Tanzania Lands Conservation Trust

5.4.4.1. Lack of clear boundaries

Lack of clear and permanent boundaries for major land-uses within the villages and between Parks and adjacent villages was evident during the field visits. Major land-uses (agriculture, grazing, and settlements) lacked clear boundaries. Lack of permanent markers (beacons) has made trespassing easier, hence a source of conflicts. The only areas with beacons, though widely spaced are WMAs and TLCT land. The latter has signposts for alerting would be trespassers and/or visitors (see Plate 5.1).

Lack of inter-village boundaries was also evident during the field visits. Currently, natural features such as hills, escarpments and rivers are widely used. The use of the latter has been a cause of conflicts due to frequent change of river courses particularly during floods or heavy rains. Beacons and signposts are recommended to be used where appropriate e.g. in WMAs, TLCT and for major land-uses to minimise conflicts and trespassing.

Plate 5.1: Signpost showing boundary demarcation between Makuyuni village and TLCT. Photo by: Author. June 2004.

5.4.4.2. Increased habitat degradation

Deforestation for different purposes: fuel wood, charcoal-making, poles, timber, weaving raw materials and grazing were evident within WMAs and TLCT (see plates 5.2, 5.3, 5.5). Uncontrolled wildfires were observed by the author as a problem (see for example plate 5.4). Further qualitative and quantitative evidence of land degradation is shown in Appendix 12.

Plate 5.2: Photograph showing an illegal charcoal furnace in Vilima Vitatu WMA. Photo by: Author. May 2004.

Plate 5. 3: Photograph of trees cut illegally within Sangaiwe WMA. Photo by: Author. April 2004.

Plate 5.4: Evidence of uncontrolled wildfires within the Sangaiwe WMA. Photo by: Author. June 2005.

Plate 5.5: Cattle grazing in TLCT. Photo by: Author. June 2004.

5.4.4.3. Blockage of wildlife migratory routes

The Wildlife Management Areas (WMAs) guidelines and hunting regulations prohibit permanent structures to be within or in proximity to wildlife migratory routes, Park boundaries or WMAs (THR, 2002; WMA, 2002). The hunting regulations (THR, 2002) and section 64 (4 &5) of WMA guidelines state that:

> *"No person shall conduct tourist hunting, game hunting, photographic safari, walking safari or any wildlife based tourist safari within a hunting block or within any wildlife protected area except by and accordance with the written authority of the Director of Wildlife..." (THR, 2000, p.8).* The WMA guideline on its part states:
>
> *"All prospective development and investment activities within WMA shall be subject to EIA and shall conform to GMP or resource management zone plan" (WMA, 2002, p.29).* Up to the time of this study, community conservation areas (WMAs) had no GMP or resource management zone plans.

Despite the regulations, blockages of wildlife migratory routes for different purposes were evident in Sangaiwe and Vilima Vitatu villages. Blockages for different activities have been there even before these regulations (BDC, 2004). In Esilalei the problem is less pronounced because of daily patrols carried out by the TLCT administration (pers. obs.) and severe penalties for offenders. A fine of Tshs. 60,000 (US $ 60) is set for offenders (Daud Leksiko, pers. comm.-subvillage chairman).

The types of wildlife migratory route blockages varied across villages. In Sangaiwe, it was mainly for cultivation purposes. In Vilima Vitatu, different forms of blockage evident included agriculture, business enterprises (brick industries and charcoal furnaces), campsites and settlements (see plates 5.2, 5.6-5.9). However, agriculture, settlements and erection of residential hunting campsites seem to be the main threats to the conservation of migratory routes (pers. obs.).

Plate 5.6: Dried maize crop within wildlife migratory routes in Vilima Vitatu village. Photo by: Author. June 2005.

Plate 5.7: Brick industry within wildlife migratory routes in Vilima Vitatu village. Photo by: Author. June 2005.

Plate 5.8: Northern Hunting Company camps within Vilima Vitatu WMA. Photo by: Author. May 2004

Plate 5.9: Residential houses in Minjingu-Vilima Vitatu wildlife migratory route. Photo by: Author. June 2005.

Plate 5.10: Evidence of crop destruction by elephants in Esilalei village. Photo by: Author. May 2004.

5.4.5. Archive information (data)

Documented data related to conflicts and human encroachments provides both qualitative and quantitative evaluation indicators (see Appendices 11 & 12). The presence of similar incidences (as in Appendix 12) before the implementation of the plans could have helped in comparing results. However, the pre-plan records could not be accessed.

Appendix 12 gives an overview of prevailing conflicts and encroachments, in some cases monetary values (poaching) and quantitative values (crop destruction, illegal grazers in WMAs, loss of life and incidences of wildfires are given (2001-2005). On the other hand, Appendix 11 gives qualitative indicators of local people and District Game Officer's discontent with an investor (Northern Hunting Company). According to the Sunday Observer newspaper (see Appendix 11), the company is accused of harassing

local people, breaching of contract, use of crude hunting techniques and lack of economic benefits (Ihucha, 2005).

5.4.6. Summary and implications for research question Two

In section 5.4, households and experts interviews, focus group discussions, field visits and archive data have been used to answer research question Two: **Have plans helped in minimising conflicts and conserving wildlife migratory routes?** Converging evidence from evaluation indicators suggests failure of plans to mitigate conflicts and human encroachments in Sangaiwe, Vilima Vitatu and Esilalei villages.

5.5. Technical report reviews

Three technical reports prepared by two plan agents: AWF (BDC, 2004; AWF, 2005a; 2005b) and WWF (WWF/TPO, 2002) were reviewed. In addition, informal interviews with four plan agent officials, three from AWF and one from WWF (see Subsection 5.5.2 & Table 5.5) were held. The aim of reviewing the reports and holding informal interviews was to answer research question Three: **what are the major technical/practical strengths and weaknesses of the plans?** The answers to this question and the answers to questions one and two; will be instrumental in developing a proposed LUP framework. Development of a new framework is one of the research objectives (see Section 1.3).

5.5.1. Land-use plan reports review

As stated previously in subsection 3.4.5, the review of LUP reports was based on a checklist of themes: procedures used in the planning process, report content, user-friendliness, appropriateness of map scales, types of data collected and the land-use

zonation criteria. These pre-determined aspects (see Appendix 7a) were based on the author's 20-year experience in rural land-use planning. The identified plans' strengths and weaknesses are presented in Table 5.3 below. The summary of plans' strengths and weaknesses are followed by a description of some aspects of report quality assessment themes: procedures used in plan preparation, mapping scales and types of data collected and zonation criteria.

Table 5.3: Participatory plan's strengths and weaknesses

Plan Agent	Types of data collected	Map scales used	Strengths	Weaknesses
WWF	-Land cover, pasture, water supply, habitable structures, wildlife migratory routes and distributions, wood and plant collections	1:55,000	-Appropriate scales used -High quality maps-see appendix 16 -An attempt to use participatory planning in rural context	-Report too technical & voluminous -Lack of detailed socio-economic data -Map presented was based on the existing land-uses -LUP report missing both at village and district levels - Evaluation and monitoring components missing -Lack of land zonation criteria -Lack of plan implementation strategies
AWF	-Inventory of existing land-uses	1:25,000	-Simple (compact) and less technical report -An attempt to translate the report in a user-friendly language (Swahili-national language) -Appropriate scale.	-Report/maps lacking at both village and district levels -Poor quality maps (see appendices 14 & 15) -No socio-economic data collected -Report prepared in a rush (sub-standard) -Lack of zonation criteria. -Lack of land-use zones bylaws -Lack of plan implementation strategies

Source: WWF/TPO (2002) & AWF, (BDC, 2004; 2005a; 2005b)
WWF=Worldwide Fund for Nature TPO=Tarangire Programme
LUP= Land-use plan BDC=Babati District Council

5.5.1.1. Procedures used in plan preparation

The planning procedures of the two plan agents i.e. AWF and WWF, though all coined as "Participatory LUP", varied greatly (see Table 5.4). The AWF adopted a seven step procedure which, among other things, included signing a collaboration agreement between the AWF and Babati District Council (BDC) and training of village leaders and councillors on the importance of preparing the land-use plans (see Table 5.4).

According to the reviews, the time used in the preparation of Sangaiwe and Vilima Vitatu land-use plans was about 21 days (BDC, 2004). The planning activities, budget estimates used and proportion of time spent in each activity are shown in Appendix 13. Seven days (17% of total duration) were spent in actual planning in the field; 47% in bylaw formulation; 10% in seminars and workshops; and 10% in purchase of survey equipment and base maps in Arusha and Dar es Salaam (BDC, 2004).

On the other had, WWF adopted a six step planning procedure, which among others things, included planning team training on the use of Global Positioning System (GPS) and administration of questionnaires to Esilalei residents (see Table 5.4). About 14 days were used in data collection and land-use zonation in Esilalei (WWF/TPO, 2002: p.11).

Table 5.4: Planning procedures used in PLUP villages

Plan agent/organisation	Procedures
AWF/BDC	1. Signing of Memorandum of Understanding between BDC and AWF (PORI) project on the need to conserve wildlife corridors in Babati District 2. Formation of the district planning team including: District Game Officer (leader), District Town Planning Officer, District Land-Use Planning Officer (agriculture) and District Forest, Community and Livestock Officers 3. Planning team meeting with village councils/assemblies to brief them the objectives of their mission (preparation of LUP) 4. Training seminars for councillors and village leaders on benefits of plans 5. Demarcation of land-use boundaries and construction of beacons around WMAs 6. Formulation of natural resources bylaws and later sent to BDC for approval 7. Training of village game scouts
WWF/MDC	1. Preparation process: planning team training in use of GPS, data input and map production; preliminary institutional contacts (MDC, TANAPA, AWF, *Inyuat e Maa* - Maasai NGO); collection of existing information through bibliography and meetings with stakeholders in the area 2. Introduction to village: planning team introduce to village council and introduction of LUP concept. Once the village agrees on the need for LUP further meetings aimed involving community members (elders, knowledgeable people) to assist in mapping are held. 3. Base map preparation: drawing of village sketch map (experts and villagers) and village features listed and inserted into the map and mapping using GIS techniques 4. Field data collection: questionnaires used to collect data on pasture areas, cultivated areas, water supply, habitable structures, wildlife migration routes, wildlife distribution, wood and plant species 5. Preliminary mapping: collected information discussed (facilitated by experts) by villages and where necessary corrections made 6. Map and report production

Source: WWF/TPO (2002:pp. 7-9) & AWF (2005a & b)

AWF=African Wildlife Foundation BDC=Babati District Council
MDC=Monduli District Council WWF=World Wildlife Fund for Nature

5.5.1.2. Mapping scales

Map scale is essential with regard to the information base and level at which land-use planning takes place and this aims to create the proper balance between scale and density of information for optimal application and usefulness (FAO/UNEP, 1999). Critical appraisal of land-use maps indicates that map scales for Sangaiwe (1:25,000), Vilima Vitatu (1:25,000) and Esilalei (1:55,000) were within the recommended scale range for village (local) level planning (see Table 5.5 & Appendices 14-16). According to FAO/UNEP (1999) the recommended land-use planning scales at village level need to range between 1: 10,000 and 1: 50,000 i.e. the minimum mappable area is between 0.25 ha and 6.25 ha respectively (Elbersen, 1991).

Table 5.5: Planning levels and recommended map scales

Level	Administrative unit	Map scale
National	Country	Small: 1:250,000 Medium: 1: 1,000,000 Large: 1: 5,000,000
Sub-national (meso)	Region, province, district	Small: 1:100,000 Medium: 1: 250,000 Large: 1: 1,000,000
Local	Sub-district, village, community	Small: 1: 10,000 Medium: 1: 1:25,000 Large: 1: 50,000
Farm	Farm, ranch	Small: 1: 1,000 Medium: 1: 1:5,000 Large: 1: 10,000

Source: Adapted from: FAO/UNEP (1999; p.37)

Despite the appropriateness of the map scales, the overall cartographic quality of Sangaiwe and Vilima Vitatu maps were of poor quality (see appendices 14-15). The intra-map texts are faint and land-use boundaries are not clearly indicated. On the other hand, Esilalei map (using GIS software) was of high cartographic quality (see Appendix 16).

5.5.1.3. Types of data collected and Land-use zonation criteria used

Appropriate land-use planning requires use of appropriate data in recommending a certain mapping unit (land parcel) to a particular use (grazing, agriculture, conservation etc.). Traditional land evaluation systems for LUP: the USDA and the FAO framework (Klingebiel & Montgomery, 1961; FAO, 1976) mainly use biophysical and socio-economic data for zoning land-uses (see Subsection 2.3.4).

Review of reports indicates that WWF collected a large amount of data: land cover, pasture, water supply, habitable structures, plant species, wildlife, tourism, services and facilities (WWF/TPO, 2002). However, socio-economic data was lacking. On the other hand, their counterpart planning agent, AWF, did not collect data at all, be it biophysical or socio-economic (AWF, 2005a, AWF, 2005b). In terms of zoning, both plan agents had no set criteria for zoning. Designation of land-uses were done arbitrarily and in most cases based on the existing land-uses and not on land-use suitability criteria.

5.5.1.4. User-friendly report

A good LUP report needs to be concise; should have clear and quality maps/illustrations and should be user-friendly, viz: is free from technical jargons, it should use a language which is understood by most land-users, shall contain only important and relevant information to the land-user, and should be accessible at local level (De Pauw, 1996; Lerise, 1998).

The review of LUP reports reveals that the two reports lacked most of the good quality characteristics (outlined above). For example, the AWF LUP reports had both positive and negative features of a good report. The positive features observed were that the

reports were compact (25-30 pages) and were written in a language (*Kiswahili*), which is understood by most of the land-users. *Kiswahili* is the Tanzania's National language. However, the report had negative aspects such as poor quality maps (see Appendices 14 & 15), lack of basic land-use zone descriptions (use limits, bylaws, implementation strategies and management options) and inaccessibility (availability). The reports were not available at village and district level. Copies were only available at the AWF Headquarters in Arusha City (about 130 km from Sangaiwe/Vilima Vitatu villages).

The WWF report also had strengths and weaknesses. The positive aspects observed were the use of high quality maps (GIS assisted), translation of map legends into *Kiswahili* (see Appendix 16) and availability of maps at the village level - five years after the plan was prepared. However, several weaknesses (negative aspects) were observed. These include: bulkiness of the report (>500 pages); use of language not understood by most land-users (English); containing some information not important to end-users (e.g. land cover types, distribution of plants, inventory of wildlife, migratory routes etc.); lack of basic land-use descriptions; and inaccessibility of LUP reports at village level.

5.5.2. Informal interviews of Plan agent officials

As previously stated in subsection 3.4.2.3 and section 5.5, the aim of the interview was to ascertain the planning teams' professional and academic backgrounds, field experience, and practical/technical problems they experienced when preparing plans. Suggestions on how they solved the practical and technical problems were also sought. Plan agent officials' informal interview questions hinged on these aspects. Team qualification, field experiences, problems and how to resolve them were thought important for several reasons. First, to provide data which could assist in answering

research question Three i.e. **what are the major practical strengths and weaknesses of the plans implemented**. Secondly, as a means of cross-checking or supplementing information extracted from LUP technical reports. Thirdly, the problems and suggestions encountered could contribute to the proposed new LUP framework. The summary of the results is presented in Table 5.6 below. This is then followed by a description of staff quality, practical/technical problems encountered and suggestions to solve them.

Table 5.6: Qualifications and experiences of plan agent staff interviewed in "participatory" villages

Organisation	Post	Qualification	Experience (yrs)	Training in participatory planning? (Yes or No)	
AWF/Babati District Council	District Game Officer	Diploma in wildlife (Team leader)	15		No
	District Forest Officer	Diploma in forestry	16		No
Oikos	GIS expert	Bsc/wildlife	4		No
WWF/Monduli District Council	District Land-use Planning Officer (Agriculture)	Diploma/LUP	13	Yes	

AWF=African Wildlife Fund WWF=World Wildlife Fund for Nature
GIS=Geographical Information System Oikos=Belgium based NGO

5.5.2.1. Qualifications and experiences of the planning officials

The involvement of different professions in planning and team members field experience (>10 years) were the observed technical strengths of the two planning teams (see Table 5.6). Both district teams (Babati and Monduli) had these qualities. For example, Babati team composed representatives from: agriculture, community development, livestock, forestry, lands and wildlife departments. On the other hand, Monduli, team representatives were from: agriculture, livestock, lands, water, community development and NGOs (WWF/TPO, 2002).

Lack of participatory skills and rural planning background was a major weakness. Of all the officials involved in planning i.e. in Monduli and Babati Districts, only one member had rural planning skills (Monduli Team Leader). Professional qualification of team members was also a weakness. Ordinary diploma qualification (2 year duration) is probably not an appropriate qualification for executing LUP.

5.5.2.2. Planning problems and ways of solving them

As stated previously in subsection 5.5.2, officials were asked about the problems they experienced in the course of preparing the plans, and suggestions on how to solve them in future. The four plan agent officials highlighted seven problems namely: resistance to implement the plans from local residents; lack of clear inter-village boundaries; the concept LUP being new to most people; and problem of reaching a consensus in a multi-disciplinary team. Others were lack of map reading knowledge among the planning team members, land-use planning not being considered a priority problem among local communities and the high costs involved in the preparation of land-use plans.

To solve the above problems, the plan agent officials suggested the need for: educating the residents in the importance of LUP; planning to start at sub-village level as this can help in tapping traditional land management knowledge; residents to formulate their own conservation bylaws aimed at enforcing the implemented plans; regular monitoring and evaluation of the land-use plans; and to raise participatory planning education among the residents.

5.5.3. Summary and implications for research question Three

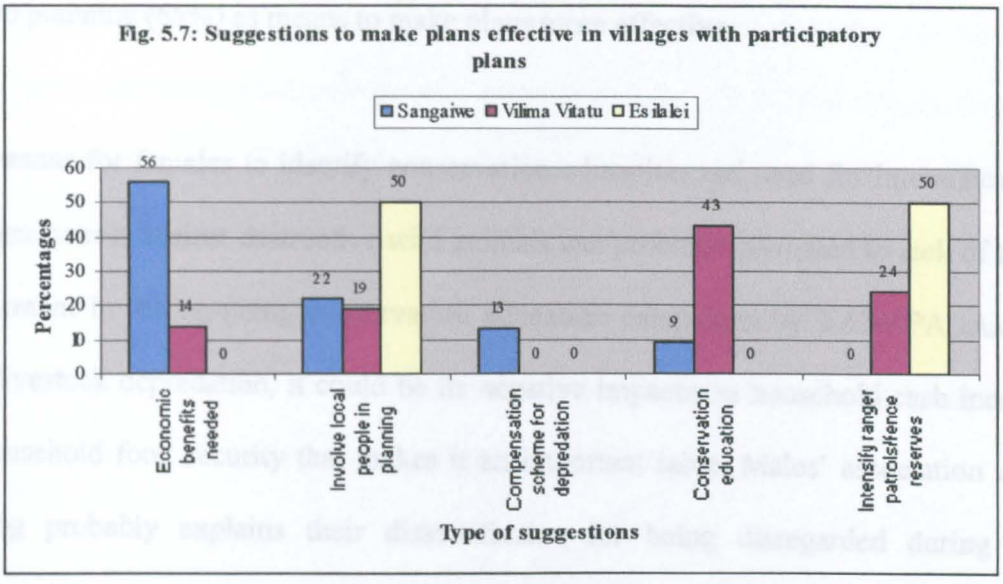
Review of the AWF and WWF land-use reports supplemented with plan officials' informal interviews have attempted to answer research question Three: **what are the major technical/practical strengths and weaknesses of the plans?** Land-use planning report reviews (see Subsection 5.5.1) and Plan agent informal interviews (see Subsection 5.5.2) have revealed practical and technical strengths and weaknesses (see Table 5.3), which need to be considered in developing a new LUP framework. Some of the important aspects to be incorporated are shown in Subsection 5.5.2.2 above.

5.6. Suggestions to mitigate conflicts

In this section, suggestions by households (all interviewees) and experts on how to make plans effective i.e. minimise conflicts and conserve wildlife migratory routes are given. About 84% (n=259) of the local residents and eight experts (Park staff and village extension workers) gave their suggestions as detailed below.

5.6.1. Households' suggestions

Households' (all interviewees) suggestions are presented in Fig. 5.7 below. Suggestions varied across villages. In Sangaiwe, the main suggestions were: economic benefits (56%; n=82), involvement of local communities in planning (22%) and payment of compensation for crops and livestock depredation caused by wild animals (13%). In Vilima Vitatu, the proposals were: emphasis on conservation education (43%; n=83), intensification of ranger patrols against destructive wild animals (24%) and need to involve local communities in planning (19%). In Esilalei, stress was on intensification of patrols/fencing of TLCT/Lake Manyara National Park (50%; n=52) and involvement of local residents in planning (50%).



Overall, in the three villages combined, generic suggestions to mitigate conflicts were: the need to involve local communities in planning (30%; n=217); intensification of ranger patrols and/or fencing of reserves (24%); and strengthening conservation education among local communities adjacent to reserves (17%).

Association between gender and households' suggestions was explored for each village (see Appendix 17). In Sangaiwe, both males (67%; n=82) and females (46%) identified economic benefits as a way making plans effective. In addition, both genders commonly identified need to involve them in planning as a way forward to ensure plans are effective. It is probable that both males and females are concerned to ensure that they benefit from conservation initiatives and are actively involved in the whole planning process. In Vilima Vitatu, females more commonly identified conservation education (60%; n=83) and security against their properties (20%) as a way of mitigating conflicts, implying probably the need to improve its delivery. In Esilalei females commonly

identified intensification of patrols (71%; n=52) while males emphasised need to involve them in planning (65%) as means to make plans more effective.

The reasons for females to identify conservation education and need for intensification of ranger patrols against destructive wild animals can probably be linked to lack of their involvement in the on-going conservation education campaigns by TANAPA. As for crops/livestock depredation, it could be its negative impacts on household cash income and household food security that makes it an important issue. Males' association with planning probably explains their dissatisfaction for being disregarded during the planning period. The above discussion has clearly shown that each village has its priority problems to address i.e. in trying to solve a particular problem it necessary to explore people's priority problems. For example, females in two neighbouring villages (Sangaiwe and Vilima Vitatu) identified different needs for successful implementation of plans implying area specific planning needs/requirements.

5.6.2. Suggestions made by Park staff

Four Park staff gave their suggestions. The suggestions were: the need for integrated planning between villages and Parks, economic benefit from conservation activities and an emphasis on conservation education. Others include: the need for Environmental Impact Assessment (EIA) when preparing land-use plans, integration of traditional and modern science in planning and need for government to take lead in planning instead of leaving it solely to NGOs/CBOs.

5.6.3. Suggestions by village extension workers

Four village extension workers gave their suggestions. These included the need for conservation education, economic benefit, formation of joint Park and village planning teams, study tours and villages to have qualified wildlife managers. Table 5.7 gives a summary of the suggestions (not in any specific order) given by households and experts (Park staff and village extension workers). What can be deduced is that their suggestions to a large degree seem to be similar. Both emphasise conservation education, economic benefits and the need to involve local communities in planning.

Table 5.7: Residents and expert's suggestions to make plans effective in PLUP

Suggestions given by:		
Local residents	Park staff	Village extension workers
- Conservation education - Economic benefits - Involve residents in planning - Incentives to village game scouts - Involve local communities in planning	- Integrated planning - Benefit sharing - Environmental Impact Assessment - Conservation education - Integrate modern and traditional knowledge in planning - Government to take lead in rural planning	- Conservation education - Benefit sharing - Joint planning between Parks and villages - Villages to have qualified wildlife managers - Study tours for villagers

5.7. Summary and implications for research question One, Two and Three

In this chapter, the focus was to answer three research questions: **(i) to what extent have local residents and other local stakeholders been actively involved in the LUP process? (ii) have the plans helped in minimizing land-use conflict and conserving wildlife migratory routes and dispersal areas in the protected area bio-networks? and (iii) what are the major practical strengths and weaknesses of these plans?** Table 5.8 presents the implication of the aforementioned results (see Section 5.3 through 5.5) for the three above research questions and also a conclusive summary from each section is given.

Table 5.8: summary and implications for research questions 1, 2 & 3 in PLUP villages

Research Question	Evaluation indicators used (source of indicators)	Implications for Research Question
1. To what extents have local residents and other local stakeholders been actively involved in the LUP process?	Households, Park management, extension workers, minority groups, Park's general management plan reviews	Little participation observed from household (32%; n=259). High leaders participation (83%; n=30)
2. Have the plans helped in minimizing land-use conflict and conserving wildlife migratory routes and dispersal areas in the protected area bio-networks?	Households, Park management, extension workers, minority groups, physical visits	Plans failed to minimise conflict and enhance conservation
3. What are the major practical strengths and weaknesses of these plans?	Plan technical reports reviews, informal discussion with plan agent officials	Yes, plans have strengths and weaknesses for use in a proposed new land-use planning framework

LUP=Land-use plan n=respondents

In evaluating the process and impact of participatory plans with respect to the three research questions; overall results suggests that:

- There was little active involvement of local communities and other stakeholders in planning (see Section 5.3). Overall, in the three villages combined, local people's participation was 32% (n=259) of the respondents, representing 4.5% of the target population (see Table 4.2). Other primary stakeholders such as village workers, Park staff and the minority Barabeig ethnic group were not involved at all.
- Plans failed to both minimise conflicts and safeguard wildlife habits (see Section 5.4). Perception of local communities, the minority Barabeig views, field and documentary evidence all suggest that levels of conflicts and encroachments increased after the plans were implemented in the three villages. The main forms of conflicts and encroachments were loss of land for establishing reserves, crop/livestock depredation, boundary conflicts with

reserves and restrictions to harvest forest products (see Fig. 5.5). Encroachments were mainly for grazing, agriculture, settlements and harvesting forest products from the reserves e.g. fuel wood, bush meat, poles/timber for housing construction etc. (see Fig. 5.6).

- Plans' had several strengths and weaknesses to be taken into account when developing a new LUP framework (see Section 5.5 & Table 5.3). Some of the strengths were the involvement of multi-disciplinary team in planning, use of an appropriate map (land-use plan) scales, an attempt to involve local people in planning and to translate some of the planning documents in a user-friendly language e.g. maps (WWF) and reports (WWF). On the other hand, several weaknesses such as reports being too technical (WWF), plans based on existing land-uses, inaccessibility of reports and maps at village level were observed. Others include: poor quality maps (AWF), disregard of socio-economic factors in planning and lack of plan implementation strategies.
- Local people and "experts'" suggestions (see Fig. 5.7) to mitigate conflicts and make plans effective in future include: emphasis on conservation education, involvement of local people in planning, equitable benefit sharing, compensation for depredation caused by wildlife, security of property and lives and intensification of patrols.
- There was lack of integrated planning in the study area (PLUP villages) (see Subsection 5.3.4). On one hand, the Tarangire and Lake Manyara National Parks failed to involve local communities in the planning process. On the other hand, planning agents i.e. AWF and WWF worked in isolation (not joining forces) despite the three planned villages being close to each other.

Sangaiwe and/or Vilima Vitatu (AWF - plan agent) are located between 15 and 25 km from Esilalei (WWF - plan agent).

Having presented the process and impact evaluation results and discussions for "Participatory" plans; the subsequent Chapter (Chapter 6), presents evaluation results of three villages with "conventional" land-use plans.

CHAPTER 6

6.0. ANALYSIS OF EFFECTIVENESS OF CONVENTIONAL LAND-USE PLANS (CLUPs)

6.1. Introduction

This Chapter presents an evaluation of the conventional land-use plans prepared and implemented in Soitsambu, Ololosokwan and Chemchem villages (see Fig. 1.1). The evaluation is based on the results of the household and expert interviews, reviews of land-use and general management plans, archive data from village/government offices, and field visits. For this portion of the research focus group discussions and informal interviews with the planning Agencies could not be held because the Maasai in Soitsambu and Ololosokwan, who were thought by the researcher to be nomadic, no longer follow this mobile lifestyle (pers. obs.). The intention was for the focus group discussions to capture views of the non-sedentary ethnic groups, who in most cases tend to be marginalized in decision-making processes. As for the informal interviews, the relevant officials could not be reached in spite of several attempts to arrange meetings. However, some of the information required (e.g. names of team members and their respective departments, professional qualifications and work experience) was accessed in the reports (see subsection 6.5.1.5 & Table 6.5).

The results in this Chapter are used to answer three research questions similar to those used in the evaluation of participatory land-use plans (PLUPs) (see Chapter 5, subsection 5.1). The research questions are: **(i) to what extent have local residents and other stakeholders been actively involved in the land-use planning process? (ii) have the plans helped to minimise land-use conflicts and conserve wildlife**

migratory routes? and (iii) what are the major technical/practical strengths and weaknesses of these plans?

The presentation of results in this Chapter is organised in seven sections. First, the socio-economic features of the population sample are presented. Second, stakeholder participation in the planning process is assessed. Third, the status of land-use conflict and human encroachment into wildlife habitats is described. Fourth, the Plan's technical strengths and weaknesses are reviewed based on information in the land-use plan technical reports. Fifth, a summary is given of the suggestions of residents and experts as to how plans can be made more effective so as to minimise conflict and encroachment in wildlife habitats. Sixth, comparison of levels of conflicts/encroachments between PLUP and CLUP villages are made. Lastly, the summary and research implications for research questions One, Two and Three are given.

6.2. Socio-economic characteristics of villages with conventional land-use plans

The socio-economic characteristics of the population samples for Soitsambu, Ololosokwan and Chemchem villages are presented in Table 6.1 below. The majority of respondents in the total sample were males (71%; n=292). The reasons for higher proportion of men in the sample could not be established. However, it could have arisen by chance. The age structure of the population suggests a youthful population as 40% are within the youth (18-34 years) and 42% are in the adult (35-54 years) categories (see Table 6.1).

Table 6.1: Socio-economic characteristics for CLUP villages

Village	Sample size	Gender (%)		Age category (%)			Education (%)			Economic activity (%		
		M	F	18-34	35-54	>54	Nf	Pr	Sc	Ag	Lv	ot
S/sambu	99	69	31	36	50	14	64	28	8	19	77	4
O/kwan	100	64	36	46	33	21	64	27	9	16	81	3
C/hem	93	79	21	39	43	13	16	80	4	96	3	1
Total	292	212	88	121	126	53	144	135	21	131	161	8
Average	97	71	29	40	42	18	48	45	7	44	54	2

M=male F=female Nf=non-formal Pr=primary Sc=secondary Ag=agriculture Lv=livestock Ot=other activities CLUP=Conventional land-use plans S/Sambu=Soitsambu O/kwan=Ololosokwan C/chem=Chemchem.

The main economic activities in these villages are agriculture and livestock farming. 79% of people sampled in Soitsambu and Ololosokwan (predominantly Maasai -94%) said that they depended on livestock production for their livelihoods. In Chemchem (predominantly Iraqw), 96% of the sample depends on crop production. Despite the dominance of the two livelihood systems, the two societies also practise mixed agro-pastoralism to a limited extent. Soitsambu and Ololosokwan have limited opportunities for other economic activities (apart from wildlife related activities) mainly due to remoteness and lack of road infrastructure (accessibility) (pers. obs.). The two villages do not have reliable road networks to and from the district and regional headquarters (see Subsections 4.4.5.4 & 4.4.6.3). As with the PLUP villages, illiteracy levels are also high in the villages with Conventional Land-Use Plans (CLUPs). Only 7% of people sampled in the CLUP villages have attained secondary education, with Chemchem (predominantly Iaqw people) being the most affected (4%) (see Table 6.1).

6.3. Stakeholders participation in the planning process

The results of interviews with stakeholders in the land-use planning process (local residents, Park staff and village extension workers) and findings from a review of the Serengeti National Park Management Zone Plan (MZP) were used to help answer

research question One: **to what extent have local residents and other stakeholders been actively involved in the land-use planning process?**

6.3.1. Participation of local households

97% of the target figure of 300 interviewees responded to the research questionnaire. A summary of these responses regarding levels of participation is presented in Fig. 6.1 below. In the three villages, only 6% (n=292) of the respondents stated that they actively participated in the planning process i.e. Soitsambu (3 people), Ololosokwan (8 people) and Chemchem (8 people). The low level of participation is not surprising as the system was not set-up for participation. However, for Soitsambu and Ololosokwan, one of the planning team's terms of reference was to involve stakeholders in planning (NLUPC, 1994: p.2).

The proportion of local residents' participation with "yes" and "no" responses indicates fairly clearly that there was lack of people's involvement in planning in the three villages (see Appendix 7b). Out of the total of 19 respondents who stated that they actively participated in the planning process, two had leadership posts in their respective villages. In terms of gender participation, the proportion of females taking part in the planning process was lower than their male counterparts. Of the 19 respondents who stated that they actively participated in planning, only one was female (see Fig. 6.2).

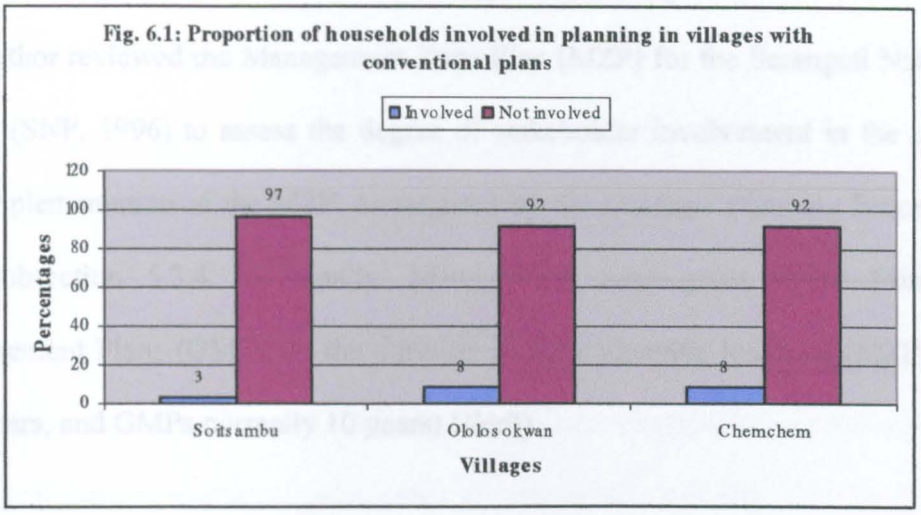


Fig. 6.1: Proportion of households involved in planning in villages with conventional plans

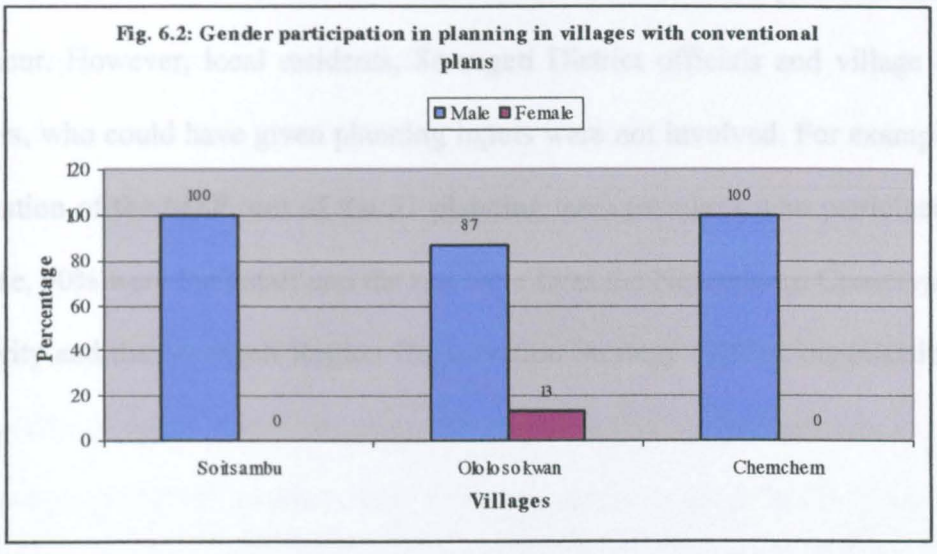


Fig. 6.2: Gender participation in planning in villages with conventional plans

6.3.2. Expert's participation

Two Park staff from Serengeti National Park and two village extension workers from Soitsambu Ward responded to the questions relating to participation in the planning process. These "experts" were not involved in the planning process at any stage. Their non-involvement is probably due to the inadequacy of the planning approach used by the planning agents as will be discussed in Chapter Eight.

6.3.3. Park and the involvement of stakeholders in planning

The author reviewed the Management Zone Plan (MZP) for the Serengeti National Park (SNP) (SNP, 1996) to assess the degree of stakeholder involvement in the preparation and implementation of the MZP, as required by the Strategic Planning Process (SPP) - see Subsection 5.3.4 for details. Management zone plans differ from General Management Plans (GMPs) in the duration of their planning horizons (MZPs - usually five years, and GMPs normally 10 years) (*ibid*)).

The review of the MZP reveals that involvement of some of the potential stakeholders did occur. However, local residents, Serengeti District officials and village extension workers, who could have given planning inputs were not involved. For example, during preparation of the MZP, out of the 31 planning team members who participated in the exercise, 90% were Park staff and the rest were from the Ngorongoro Conservation Area Authority and the Serengeti Region Conservation Strategy (SRCS) organisations (SNP, 1996).

6.3.4. Summary and implications for research question one

The responses from households and experts, and the review of the Serengeti National Park MZP were used to answer research question One: **to what extent have local residents and other stakeholders been actively involved in the land-use planning process?** The evaluation indicators suggest that local residents, district administration staff and village extension workers were not involved in the planning process due to a failure on the part of the planners to make provision for their input during the planning exercise. However, some potential stakeholders such as the Ngorongoro Conservation

Area Authority (NCAA) and Serengeti Region Conservation Strategy (SRCS) were involved, which is a planning strength.

6.4. Conflicts and human encroachments

In this section, an attempt is made to answer research question Two: **have the land-use plans helped in minimising land-use conflicts and conserving wildlife migratory routes/dispersal areas?** Household and expert's interviews, archive data and field visits have been used, as sources of information to answer this question.

6.4.1. Responses supplied by households

6.4.1.1. Pre-and post-plan assessments

- Pre-and post-plan conflicts assessments

Pre-plan conflicts as perceived by respondents[8] varied across villages (see Fig. 6.3a). In Soitsambu, all three respondents (100%) felt conflicts were low to moderate an "acceptable situation" before the plan was implemented. In Ololosokwan, seven out of eight people (88%) felt conflicts were of low to moderate level. In Chemchem, five out of eight respondents (58%) felt conflicts were of low to moderate level. Overall, in the three villages combined, 82% (n=19) felt level of conflicts was low to moderate an "acceptable situation".

[8] *Respondents who actively participated in the planning process.*

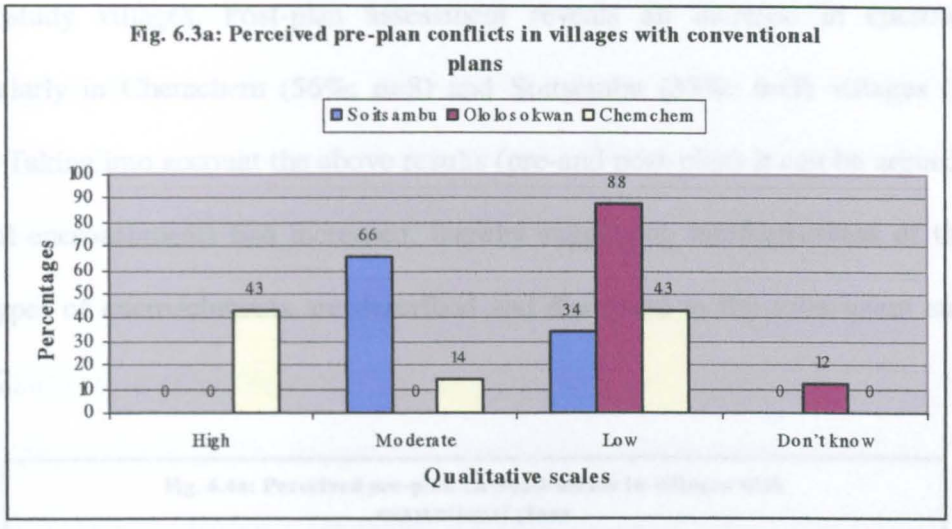


Fig. 6.3a: Perceived pre-plan conflicts in villages with conventional plans

However, conflicts increased after the plans were implemented. Overall, in the three villages combined, 67% (n=19) felt conflicts had "increased" after the plans were implemented in the three study villages (see Fig. 6.3b). The types of conflicts are described and discussed in the subsequent subsection 6.4.1.2.

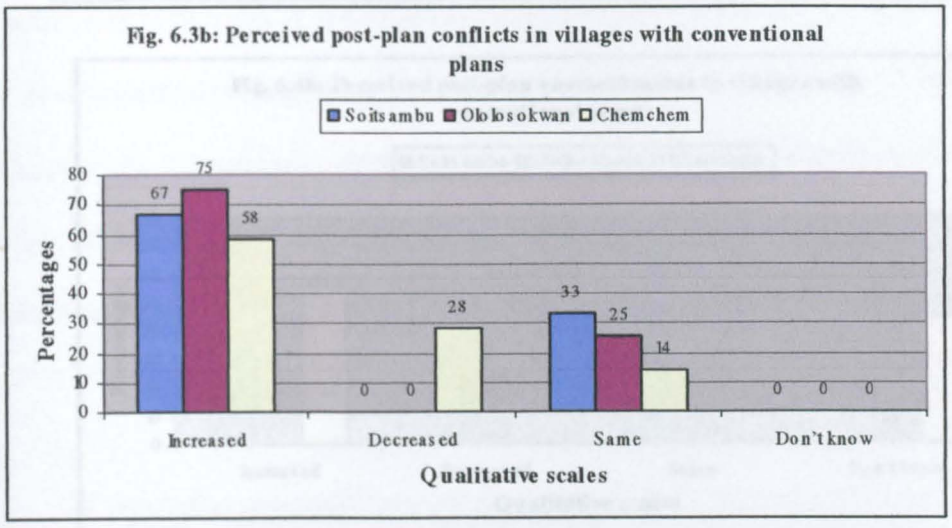


Fig. 6.3b: Perceived post-plan conflicts in villages with conventional plans

- Pre-and post-plan encroachments assessments

Pre-plan encroachments assessment varied. Overall, in the three villages combined, 60% (n=19) felt encroachments were low to moderate while 30% were not sure (see Fig 6.4a). This implies that encroachments were perceived to be something of a problem in the

three study villages. Post-plan assessment reveals an increase in encroachments particularly in Chemchem (56%; n=8) and Soitsambu (33%; n=3) villages (see Fig. 6.4b). Taking into account the above results (pre-and post-plan) it can be argued that, in general encroachments had increased, thereby suggesting ineffectiveness of the plans. The types of encroachments are described and discussed in the subsequent subsection 6.4.1.2.

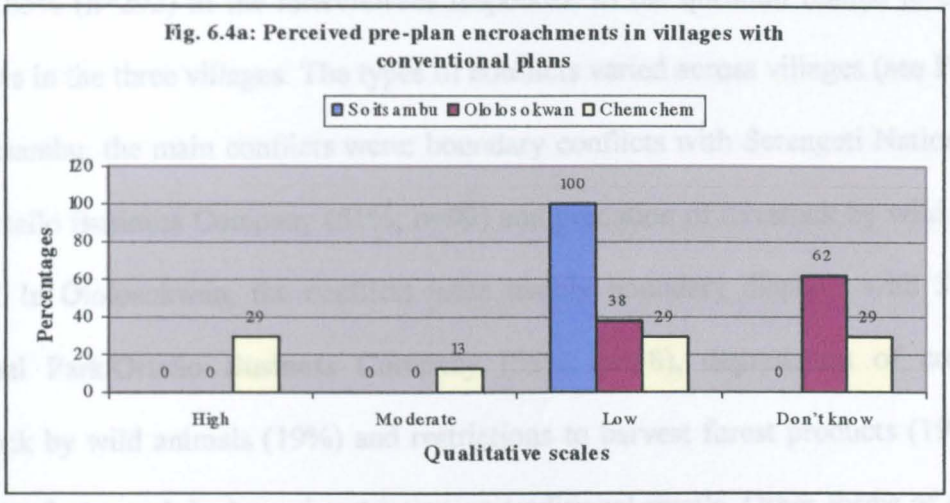


Fig. 6.4a: Perceived pre-plan encroachments in villages with conventional plans

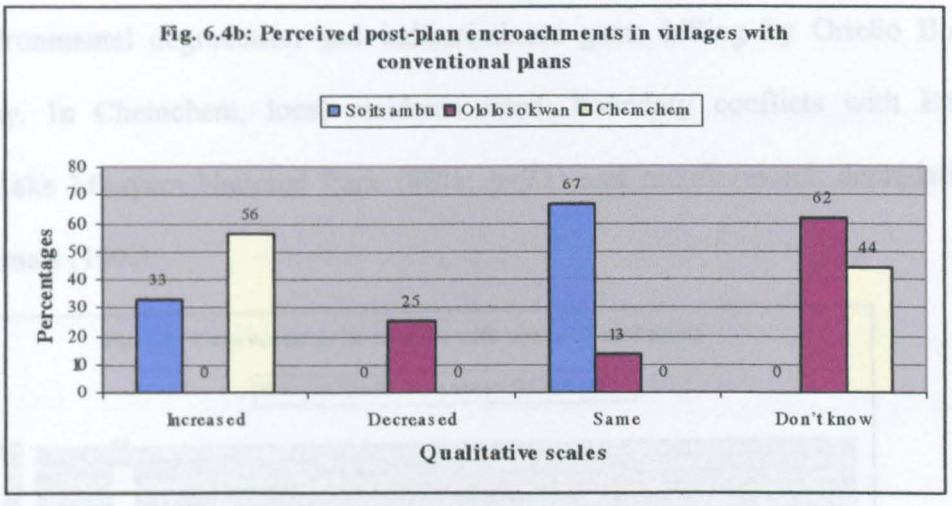


Fig. 6.4b: Perceived post-plan encroachments in villages with conventional plans

6.4.1.2. Main types of conflicts and encroachments

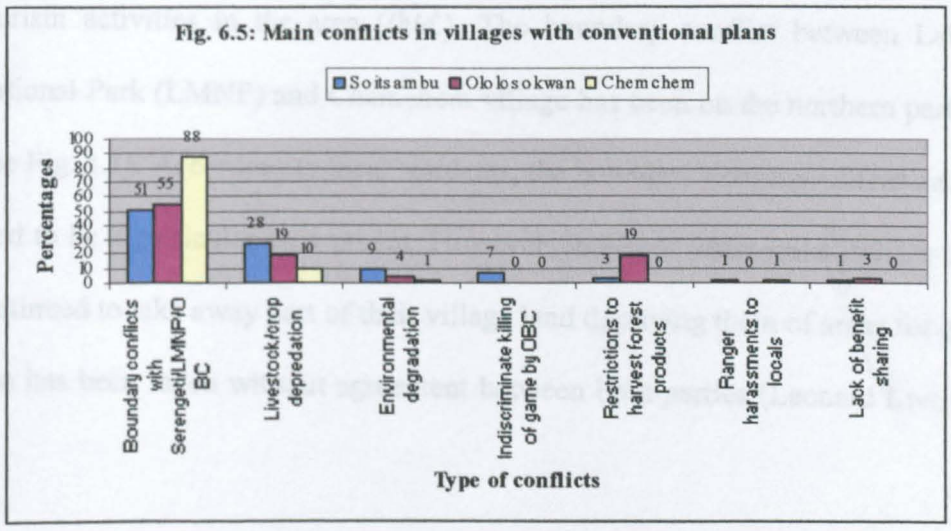
As previously stated in subsection 5.4.1, all respondents were asked about the main types of conflict and encroachment dominant in their respective villages. The presence

or absence of conflict and/or encroachment perceived by local residents (interviewees) was thought by the researcher to be indicators for plan success or failure (see Table 3.3). This is under the assumption that effective plans are likely to record minimum levels of conflict and/or encroachment.

- Main types of conflicts

About 85% (n=292) of the interviewees responded to the question related to pertinent conflicts in the three villages. The types of conflicts varied across villages (see Fig. 6.5). In Soitsambu, the main conflicts were: boundary conflicts with Serengeti National Park and Ortello Business Company (51%; n=90) and predation of livestock by wild animals (28%). In Ololosokwan, the conflicts were mainly boundary disputes with Serengeti National Park/Ortello Business Company (55%; n=88), depredation of crops and livestock by wild animals (19%) and restrictions to harvest forest products (19%) such as poles, fuel wood, herbs and restriction on traditional rituals. Other forms of conflicts are environmental degradation and indiscriminate game killing by Ortello Business Company. In Chemchem, local residents cited: boundary conflicts with Endallah village/Lake Manyara National Park (88%; n=71) and crop/livestock depredation by wild animals (10%).

Fig. 6.5: Main conflicts in villages with conventional plans



Association of gender with conflicts was explored in CLUP villages. In these three villages both genders commonly identified boundary disputes between villages and Parks/reserves as a conflict (see Appendix 18). However, the association of gender with other types of conflicts varied across villages. In Ololosokwan livestock and crop depredation (21%; n=88) was commonly identified by males as a conflict, while females were more associated with restrictions to harvest forest products (29%) from the buffer zone particularly during the hunting season (July-December). The hunting season in the area is usually during the dry season. In the neighbouring Soitsambu both male (24%; n=90) and females (35%) identified depredation as a conflict. In Chemchem both genders regarded depredation as a dispute. Boundary disputes between villages and reserves, which was identified by both genders as a conflict, has been going on for quite some time in CLUPs villages.

Boundary conflicts between Serengeti National Park (eastern part) and Soitsambu/Ololosokwan village governments have continued for much of the past four decades (Nelson, 2004). The conflict relates to access to a grazing area (*ibid*) beyond the 10 km buffer zone established by current land-use plans. Similarly, there have been conflicts between hunting activities by Ortello Business Company (OBC) and other tourism activities in the area (*ibid.*). The boundary conflict between Lake Manyara National Park (LMNP) and Chemchem village has been on the northern part of the Park (see Fig. 1.1). According to local residents, the boundary between LMNP and the village used to be a particular escarpment. However, in recent years (mid 1990s), the Park has continued to take away part of their village land depriving them of areas for grazing. The area has been taken without agreement between both parties (Leonard Lwagwem, pers.

comm.-village elder). On the other hand, one Park official who preferred anonymity said:

> "*Before making any major decision, we normally approach the village administration and therefore, those claims have no base*".

The women's association with restrictions to harvest forest products from the reserves/buffer zones in Ololosokwan, like in PLUPs, could be related to the need to search for fuel wood which is the main source of domestic energy (see also Subsection 5.4.1.2). In Soitsambu and Chemchem, the reasons for both genders to attach depredation as a concern could be explained by two reasons. First, is the demand on time to guard crops against problem animals (from maturity to harvest period). Apart from fatigue and diseases (see Subsection 5.4.1.2), they are denied the opportunity to do other productive work which could have otherwise contributed to increasing household income. Secondly, is the parting of males from the family (normally 10 hours) each night day for three to four consecutive months to protect their crops and/or livestock (Zuberi Mzava, pers. comm.-Barabarani subvillage chairman). Guarding of crops during night hours is normally done immediately after sunset to early morning hours each day (*ibid*).

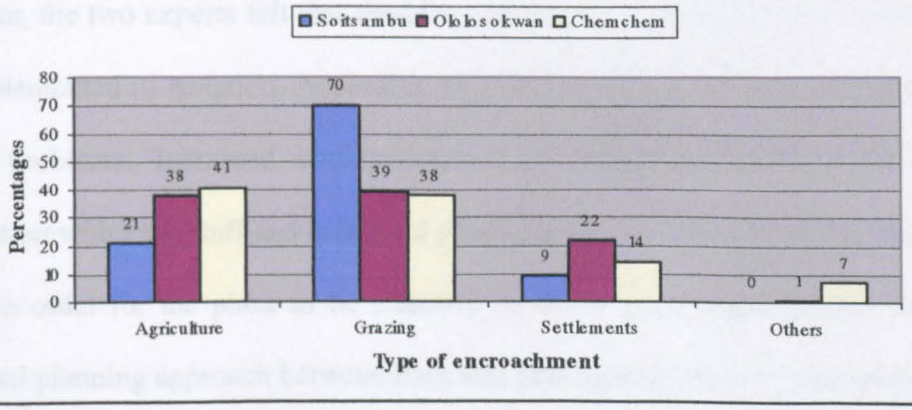
- Types of encroachment

Households were asked to ascertain if human encroachments were a problem or not. The responses were restricted to "yes" or "no". They were further asked to mention the types of human encroachment common in their respective villages. Respondents were given four options to choose from: agriculture, grazing, settlements and others. All interviewees (100%; n=292) responded to the two questions.

Encroachments for different purposes were felt as a problem by 66% (n=292) of the respondents. Of the three villages, encroachments were common in Ololosokwan and Chemchem villages in which 68% (n=100) and 80% (n=93) of the respondents felt encroachment was a problem. In Soitsambu the proportion was 49% (n=99). In Ololosokwan and Chemchem the results indicate a fair degree of certainty that encroachment is a problem in the two villages (see Appendix 7b). However, in Soitsambu, we cannot conclude from this data that there is any "significant" encroachment problem (*ibid.*). But, other evidence suggests that encroachment is a concern in the village (see Fig. 6.6, Table 6.2, plate 6.1 & 6.2).

The main encroachments varied across villages (see Fig. 6.6). Overall, in the three villages combined, the main forms of encroachment were for: grazing area, cultivation and settlements. Other forms of encroachment were to search for forest products (firewood, poles, herbs, charcoal making etc.), poaching, and using certain sites within the reserves for ritual purposes. Further qualitative and quantitative evidence on the problem are discussed and illustrated in subsections 6.4.3 and 6.4.4.

Fig. 6.6: Main types of encroachment in villages with conventional plans



6.4.2. Responses supplied by experts

6.4.2.1. Park staff assessments

Two Serengeti National Park (SNP) staff were asked whether they were aware of the existence of land-use plans in Soitsambu and Ololosokwan. They were also asked to assess if the plans have been able to minimise conflicts and encroachments and if not, to give reasons behind the failure. They were further probed on compatibility of village plans with the Park's MZP. Two Park staff were involved in the assessment (see also Subsection 6.3.2). Chemchem, which is adjacent to Lake Manyara National Park, has been dealt with in the previous subsection 5.4.2.1.

Both Park workers (Park ranger and game warden) were aware of the existence of the land-use plans in the two villages. On conflicts and encroachments in wildlife migratory routes, the two experts felt the plans have failed to mitigate the two problems. They cited local community non-involvement in planning as the main reason for the plans ineffectiveness. Lack of community involvement in planning was also evident during the review of Serengeti National Park (SNP) management zone plan (see Section 6.5).

When questioned on the compatibility of the village land-use plans with the management zone plan, the two experts felt that the plans were not compatible as they were prepared and implemented in isolation. According to both experts, the incompatibility has led to several problems: increased encroachment into wildlife migratory routes, lack of cooperation with Park staff and increased poaching and grazing beyond the Park's buffer zones. In order for the plans to be effective in future, they suggested the need for an integrated planning approach between Park and plan agents, greater involvement of local residents and other potential land-users in decision-making, and impetus for plans from

the local residents themselves, i.e. the plans should not be imposed from above (by experts).

6.4.2.1. Village extension staff assessments

Village extension workers were asked to assess the pre-and post-plan conflicts and encroachments in their respective villages. Two village extension workers (game assistants) stationed at Soitsambu and Wasso were involved in the evaluation exercise (see also Subsection 6.3.2).

The two experts who have been in the area for more than 13 years felt conflicts were occurring before implementation of the plans. In their post-plan assessment, they both said conflicts had increased. The two experts gave similar assessments of trends in human encroachments in wildlife migratory areas, i.e. incursions were already high before the plans, but increased still more after the plans were implemented in Soitsambu and Ololosokwan. From the expert's assessments, it seems clear that the "imposed" plans failed to achieve their set objectives of minimising conflicts and conserving migratory routes.

6.4.3. Physical field visits

As in PLUPs villages, the researcher planned for the field visits in collaboration with village leaders. The aims for the field visits are as described previously in subsection 3.4.4. The summary of field findings is presented in Table 6.2. This is followed by description of some observed aspects: increased blockage of migratory routes, unclear buffer zone boundaries and lack of permanent markers (beacons) for different land-uses.

Table 6.2: Physical observation results in CLUP villages

Village	Observations
Soitsambu	- Vehicles workshop at Olosai Forest (Lima 1) - located in a migratory route and was formerly a water source for wildlife and humans -See plate6.1. - An aerodrome and residential camps (500 people capacity) constructed by OBC within the Soitsambu corridor (Masindilo camp)-See plate. 6.2. - Lack beacons or demarcations for different land-uses - Buffer zone between SNP and village used by OBC hunting company during hunting season not clear.
Ololosokwan	- Buffer zone between SNP and village used by OBC hunting company during hunting season not clear - Lack of clear boundaries for different land-uses - Presence of campsites/hotel in wildlife corridors - Beacon positions not known by most residents
Chemchem	- Clear boundaries/beacons for different land-uses lacking

SNP=Serengeti National Park OBC=Ortello Business Company (hunting) CLUP=Conventional Land-Use Plans

6.4.3.1. Increased blockage of wildlife migratory routes

Blockage of wildlife migratory routes was more evident in Ololosokwan and Soitsambu villages than in Chemchem (pers. obs.). In Soitsambu, permanent structures within the corridor were witnessed by the author. Some of the structures include: a 2 km long aerodrome, residential areas (3 km^2) and a vehicle workshop (2 km^2) (see plates 6.1 & 6.2). In addition, the area is under floodlights. In Ololosokwan, three campsites: Ngutoto, Entapoti and Empilipili are within the wildlife corridor (pers. obs.).

Plate 6.1: Permanent buildings at Olosai Forest within Soitsambu corridor.The area was formerly a water source for humans and wildlife. Photo by: Author. July 2005.

Plate 6.2: Aerodrome constructed within Soitsambu corridor. Photo by: Author. July 2005.

6.4.3.2. Unclear buffer zone boundaries and lack of beacons (markers)

The Soitsambu and Ololosokwan land-use plans set aside a 10 km wide buffer between the village boundaries and SNP (see Appendix 22). The buffer zone is meant for use by residents for different purposes such as grazing, harvesting of forest products, agriculture etc. However, during the field visit, it was difficult to trace major land-use boundaries because of an absence of permanent markers (beacons) and/or signposts. Major land-uses set-aside based on the land-use plans i.e. agriculture with controlled livestock, livestock with livestock grazing, wildlife management area and habited area with subsistence agriculture both had no permanent markers (see Appendix 22). Lack of identification beacons (markers) and signposts has been a source of conflicts among local residents themselves and between Park and village administration. The OBC operates within this buffer zone.

6.4.4. Archive information

Documented data related to conflicts and encroachments from the three study villages (Soitsambu, Ololosokwan and Chemchem) provides both qualitative and quantitative indicators of the problem in the post-plan period. Examples include: Maasai elders protest in Dar es Saalam; Kenya's disputes over OBC hunting activities; inter-tribal fights; environmental conservation pressure groups over OBC's activities in the Loliondo wildlife corridor; indiscriminate killing of wildlife by OBC; and people's dissatisfaction for granting a hunting concession to the company (see Appendix 19 & 20). Data for periods before the plan could have been a good basis for comparison, however such data could not be accessed.

6.4.5. Summary and implications for research question Two

In section 6.4, land-use plan's impact evaluation indicators from different sources, viz: households and experts interviews (see Subsections 6.4.1 & 6.4.2), field visits and archive data (see Subsections 6.4.3 & 6.4.4) have been used to answer research question Two: **have plans helped in minimising land-use conflicts and conserving wildlife migratory routes?** Indicator evidence suggests that the implemented plans in Soitsambu, Ololosokwan and Chemchem have failed to minimise conflicts and to conserve wildlife migratory routes.

6.5. Technical report reviews

Two technical reports prepared by two plan agents: The National Land-Use Planning Commission (NLUPC (1994) and the National Soil Service (Magogo, 1990) were reviewed. The aim of reviewing the reports was to answer research question Three: **what are the major technical/practical strengths and weaknesses of the plans?** The answers to this question, and answers to questions one and two, will be instrumental in the development of a proposed new LUP framework.

6.5.1. Land-use plan reports review

As stated previously in subsection 3.4.5, the review of LUP reports was based on a checklist of themes: procedures used in the planning process, report content, user-friendliness, appropriateness of map scales, types of data collected and the land-use zonation criteria (see Appendix 7a). The identified plans strengths and weaknesses of the plans are presented in Table 6.3 below. The summary of plans' strengths and weaknesses are followed by a description of some aspects of report quality assessment themes (see above).

Table 6.3: Plan agents report's strengths and weaknesses in CLUP villages

Agent	Types of data collected	Map scales used	Strengths	Weaknesses
NLUPC	-Physical environment -Population and its distribution -Analysis of resource base -Economic activities -Social infrastructure	1:500,000	-Involvement of experts with different backgrounds -Collection of enormous basic data necessary for short and long term planning -Attempt to formulate land-use bylaws (on paper) -Moderate quality maps	-Scale used not appropriate at local level (see Appendix 22).) -Planning horizon long (15 years) 1993-2008) – see Appendix 22. -Report not user friendly -Land capability classification based on Malawi classification system (without modifications). -Lack of plan implementation strategies and beacons. -Lack of monitoring and evaluation component
NSS	-Biophysical (geology, physiography, hydrology, climate, land-use, vegetation, soil erosion and soils) -Crop/land-use requirements	1:20,000	-Detailed soils study -Appropriate scale at village level -Use of a combination of techniques in data collection i.e. remote sensing (aerial photos) and secondary data.	-Pedocentric- emphasis on soils management. -Low quality map and unclear (see Appendices 21a & 21b) -No socio-economic information of the study area -Lack of multi-disciplinary approach (done by one specialist). -Monitoring and evaluation components lacking -Lack of plan implementation strategies & beacons.

Source: Magogo, (1990) & NLUPC (1994) NLUPC=National Land-use Planning Commission NSS=National Soil Service USDA=United States Department of Agriculture FAO=United Nations Food and Agriculture Organisation EIA=Environmental Impact Assessment.

6.5.1.1. Procedures used in plan preparation

Conventional plans prepared by the Government Departments (NSS & NLUPC) each adopted a different approach (see Table 6.4). The National Soil Service (NSS) used a five steps approach in which most of the planning work was done in the office. The total time spent in the field was 14 days (Magogo, 1990). In the field, the work was done by one soil surveyor i.e. collection of soil samples in areas pre-determined during aerial photo interpretation - areial photo interpretation legend (see Appendix 21a).

On the other hand, the National Land-Use Planning Commission (NLUPC) adopted a six steps procedure, which involved a formation of multi-disciplinary team of professionals. The actual time used to prepare six villages land-use plans was approximately three months (NLUPC, 1994), an average of 14 days per village. The six villages involved were: Soitsambu, Ololosokwan, Magaiduru, Arash, Sakala and Engaserosambu (see Appendix 22). Like, the NSS, most of the work by NLUPC was done in the office.

Table 6.4: Planning procedures used in CLUP villages

Plan agent/organisation	Procedures
National Land Use Planning Commission (NLUPC)	1. Request from client (Mbulu District Council)-Netherlands funded project 2. Pre-field work (aerial photo interpretation, base maps collection and logistics) 3. Soil survey based on aerial photo interpretation (physiographic approach) 4. Soil sample analysis 5. Report and map production
National Soil Service (NSS)	1. Request from Serengeti Regional Conservation Strategy (SRCS) project 2. Establishment of a multidisciplinary team comprising eight experts 3. Each member of the planning team assigned tasks related to his/her expertise including writing a subject area report 4. Presentation of individual results for discussion - team members 5. Discussion with residents and local institutions 6. Final plan preparation and report writing

Source: Magogo (1990) & NLUPC (1994)

6.5.1.2. Mapping scales

A critical appraisal of land-use maps prepared by the two organisations indicates that map scales for Chemchem (1:20,000) were within the recommended scale range (see Table 5.5). Despite the appropriateness of the scale the quality of the maps e.g. Chemchem was low (see Appendices 21a & 21b). On the other hand, map scales for Soitsambu and Ololosokwan (1: 500, 000) were outside the recommended scales to be used at village level (see Appendix 22). The scale (meant for exploratory survey) is recommended at national and sub-national levels (FAO/UNEP, 1999). However, the quality of maps was of reasonable quality with clear boundaries for different land-uses.

6.5.1.3. Types of data collected and zonation criteria used

Review of the two reports indicates that the NLUPC organisation collected massive amounts of data i.e. biophysical and economic data (see Table 6.3). On the other hand, the NSS also collected biophysical data but not socio-economic data (*ibid.*). Both physical and socio-economic data are important in rural land-use planning (see Appendx 7a) if sustainability of plans has to be achieved. In land-use zoning, the NSS used the famous FAO land suitability evaluation framework (FAO, 1976). The system is "pedocentric" and takes into account land quality and characteristics e.g. soil depth, soil physical and chemical characteristics, relief etc. (see also Subsection 2.3.4.2; pers. obs.). As for NLUPC, the team used the Malawi Land Classification Manual (Young, 1976). Apart from the manual being outdated, it was also applied without modifications to suit the local Tanzanian environment.

6.5.1.4. User-friendly reports

As stated earlier in subsection 5.5.1.4, a good report needs to be compact, free of technical jargon, presented in a language which is understood by most land-users and should be accompanied with high quality maps. The review of NLUPC and NSS technical reports reveals some strengths and weaknesses.

The main strength of the NSS was its compactness (35 pages). However, the report had several weaknesses: use of technical jargon (soil science terms), use of English (not understood by land-users), poor quality maps and illustrations (see Appendix 21a & b), a lack of basic land-use zones descriptions (see Subsection 5.5.1.4) and inaccessibility of the report at village, district and regional level. The report was in Tanga, the NSS headquarters and therefore not accessible to the intended beneficiaries i.e. the local

people. On the other hand, the NLUPC report had relatively high quality maps and illustrations. However, it had most of the weaknesses observed in the NSS report i.e. technical jargon, use of language not understood by most land-users, bulkiness (300 pages) and inaccessibility at village, district and regional level. A copy was accessed at the NLUPC headquarters in Dar es Salaam.

6.5.1.5. Qualifications and experiences of planning officials

The NLUPC team had several strengths and weaknesses. Their strengths were: the multi-disciplinary team composition, vast field experience (>10 years) and the team members' professional qualifications (see Table 6.5). However, two weaknesses were revealed, viz: involvement of professions not relevant in rural land-use planning (e.g. engineer) and the professional background of the team leader (Town Planner). On one hand, the involvement of water and civil engineers seems not to be relevant. Probably the involvement of a community development specialist and a sociologist would have been helpful to the team. On the other hand, the team being under a Town Planner implies use of town planning concepts in the rural context and therefore likely to apply town planning concepts.

As for the NSS, the field experience of the soil surveyor (> 10 years) and professional qualifications were appropriate qualities required. However, lack of involvement of other professions and failure to collect socio-economic data were major weaknesses. The planning was done by a soil surveyor, using local residents for casual work such as digging soil profiles, augering (drilling holes for soil sampling), ranging of survey lines, guidance etc.

Table 6.5: Qualifications of plan agent staff in CLUP villages

Organisation	Post	Qualification	Experience (yrs)
National Land-use Planning Commission (NLUPC)	Town Planner (Team Leader)	Msc	> 10
	Civil Engineer	Msc	> 10
	Land-use planner	Diploma	> 10
	Wildlife Officer	Bsc	> 10
	Water Engineer	Msc	> 10
	Director General (NLUPC)	Msc	> 10
National Soil Service (NSS)	Soil Surveyor	Msc	> 10

Source: NLUPC (1994) CLUP=Conventional Land-Use Plan
Bsc=Bachelor of Science Msc=Master of Science

6.5.2. Summary and implications for research question three

The review of National Soil Service (NSS) and National Land-use Planning Commission (NLUPC) documentation was an attempt to answer research question Three: **what are the major technical/practical strengths and weaknesses of the plans?** The review reveals several positive and negative aspects (see Tables 6.3 & 6.5), which are important to be considered in the development of a new land-use planning framework by improving the negative aspects observed in the evaluation - use of appropriate scale at village level, production of user-friendly reports/high quality maps, accessibility of reports/maps etc.

6.6. Suggestions to mitigate conflicts

In this section, suggestions by households (all interviewees) and experts on how to make plans effective i.e. minimise conflicts and conserve wildlife migratory routes are given. 75% (n=292) of the local residents and four experts (2 Park staff and 2 village extension workers) gave their suggestions as detailed below.

6.6.1. Households suggestions

Households (all interviewees) suggestions are presented in Fig. 6.7 below. Suggestions varied from one village to another, however, the need to involve residents in planning, conservation education and benefit sharing was generic. In Soitambu (61%; n=53) and Chemchem (63%; n=88), emphasised the need for conservation education for residents. However, in Ololosokwan (41%; n=78) stressed on the need to involve local residents in the preparation of plan.

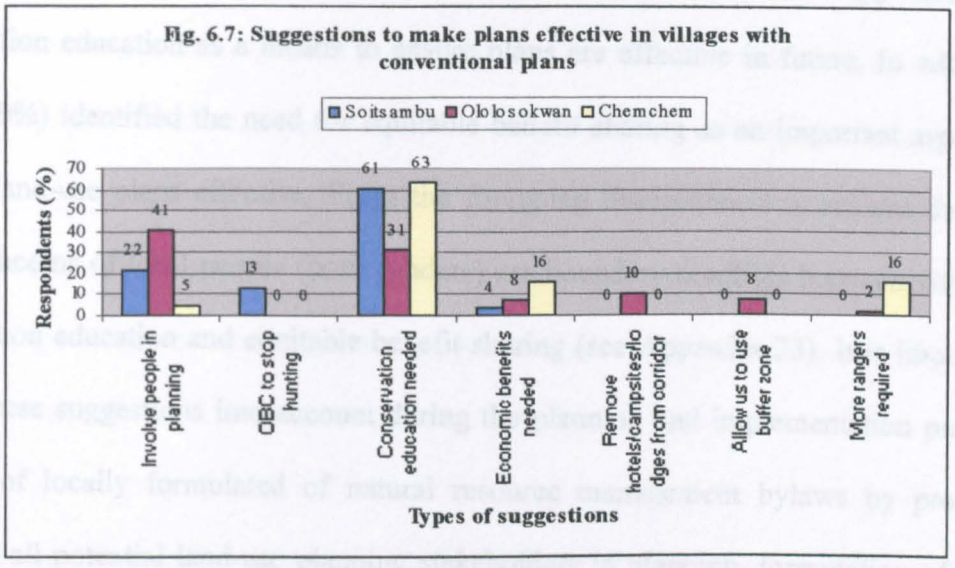


Fig. 6.7: Suggestions to make plans effective in villages with conventional plans

Other suggestions include: realisation of economic benefits from wildlife related enterprises, removal of campsites and hotels in wildlife migratory routes, residents be allowed to graze their livestock in buffer zones particularly during critical pasture stress periods (dry seasons) and the need for the government to withdraw a hunting concession granted to Ortello Business Company (OBC).

Association between gender and households' suggestions was observed for each village (see Appendix 23). In Soitsambu, males (56%; n=32) and females (71%; n=21) both identified the need to emphasise conservation education and boundary conflicts as a way

forward in mitigating conflicts. It is probable that both males and females are concerned in ensuring that both conservation education and resolving boundary conflicts are given due weight by both TANAPA and the Wildlife Division (WD). In Ololosokwan, males (50%; n=48) and females (32%; n=30) both commonly identified need to involve local people in planning and conservation education (62%) as important to be resolved for future reconciliation of conflicts in the village.

In Chemchem males (63%; n=74) and females (67%; n=14) both strongly identified conservation education as a means to ensure plans are effective in future. In addition, males (19%) identified the need for equitable benefit sharing as an important aspect in making land-use plans effective. From the foregoing discussion it is evident that the major concerns of local people (both genders) are boundary conflicts between villages, conservation education and equitable benefit sharing (see Appendix 23). It is important to take these suggestions into account during the planning and implementation process e.g. use of locally formulated of natural resource management bylaws by process, involving all potential land-use planning stakeholders in planning, formulation of both short-term and long-term plan implementation strategies etc.

6.6.2. Suggestions made by Park staff

Two Park staff from Serengeti National Park gave some suggestions to make plans effective in future. Both suggested: the need for integrated planning between villages and Park management, active involvement of residents in planning and that the decision to mark and demarcate wildlife corridors should emanate from the residents themselves and not otherwise.

6.6.3. Suggestions by village extension workers

Two extension workers'from Ololosokwan and Wasso suggested: the need to minimise hunting activities; promotion of conservation education; capacity building in land-use planning both at local and district level; need to involve residents in planning; and to educate people on the importance of land-use plans in resources conservation. The need to involve local people and emphasis on conservation were stressed by local residents, Park staff and village extension workers. Table 6.6 gives a summary of the suggestions given by households and experts (Park staff and village extension workers). What can be deduced is that suggestions by local people and that of extension workers to a larger part seem to be similar. Both emphasize: conservation education, economic benefits and the need to involve local communities in planning. The similarity is probably due to the fact that they workers normally stay in their respective villages, therefore they understand the needs and priorities of local residents more than Park staff who live away from the villages concerned.

Table 6.6: Residents and expert's suggestions to make plans effective in CLUP villages

Suggestions given by:		
Local residents	Park staff	Village extension workers
-Emphasis on conservation education -Benefit sharing from conservation activities -Need to involve local people in planning -Removal campsites and hotels in corridors -Recruitment of more rangers -OBC to stop hunting in Loliondo GCA	-The need for integrated planning between plan agents and Park administrations -Involvement of local people in planning -Planning initiatives to emanate from local people rather than experts	-Minimisation of hunting activities -Emphasis on conservation education -Capacity building in rural land-use planning at district level -Involvement of local people in planning -Educate local people the importance of plans in conservation

GCA=Game Controlled Area OBC=Ortello Business Company

6.7. Comparison of levels of conflicts and encroachment between PLUP and CLUP villages

Comparison of post-plan conflicts and encroachments between the two village groups based on the household perceptions is illustrated below. First, is the comparison made based on households who were active in the planning process i.e. 32 % of the respondents in PLUP (n=259) and 6% of the respondents in CLUP villages (see Fig. 5.3b & 6.3b). Secondly, is the comparison based on all respondents regardless of whether they participated in planning or not i.e. the total number of respondents who felt the two issues are problematic (see Subsection 5.4.1.2 & 6.4.1.2). The data used here are the number of respondents (in percentage terms) who made the assessment of the two problems.

6.7.1. Assessment of conflicts and encroachments by households' involved in planning

Figure 6.8 shows that overall, the post-plan level of conflict increase was more in conventional (67%; n=19) than in participatory (55%; n=82) villages. It is important to note that the number of respondents in villages with conventional plans was four times lower than in villages with participatory plans. It can therefore be concluded that conflicts in the two village groups increased after the plans were implemented. The increase was perceived by 61% (n=101) of the respondents. However, 17% felt conflicts had decreased, 20% could not see any change and 2% were not sure.

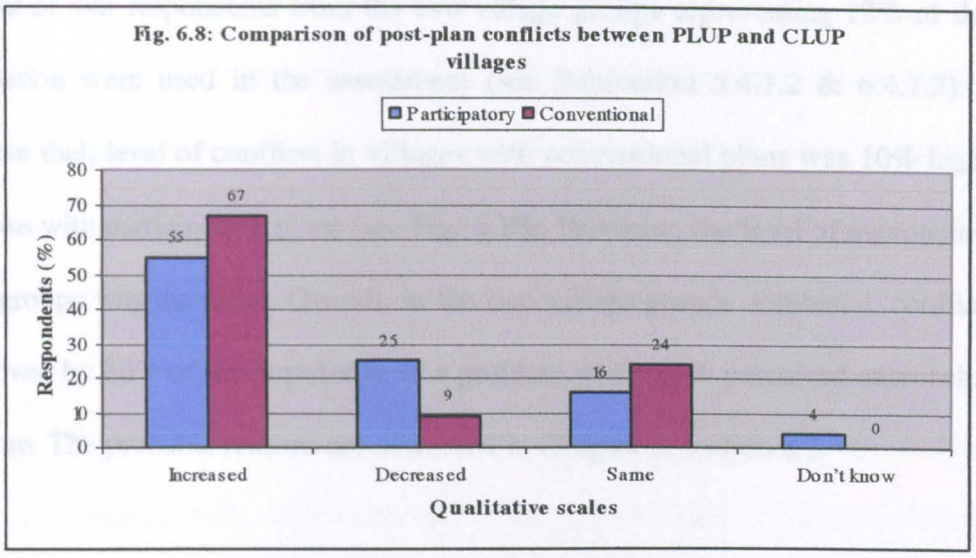


Fig. 6.8: Comparison of post-plan conflicts between PLUP and CLUP villages

As for encroachments, if respondents who were not sure (don't know) are disregarded, the level encroachments after the plans were implemented can be said to have increased in the two village groups. However, the increase was not statistically significant (see Appendices 8a-8c & 9a-9c). The highest being recorded in villages with participatory plans (41%; n=82) (see Fig. 6.9). Overall, in the two village groups combined, 36% felt encroachments had increased, 16% felt they had decreased and 25% saw no change. (see Fig. 6.9).

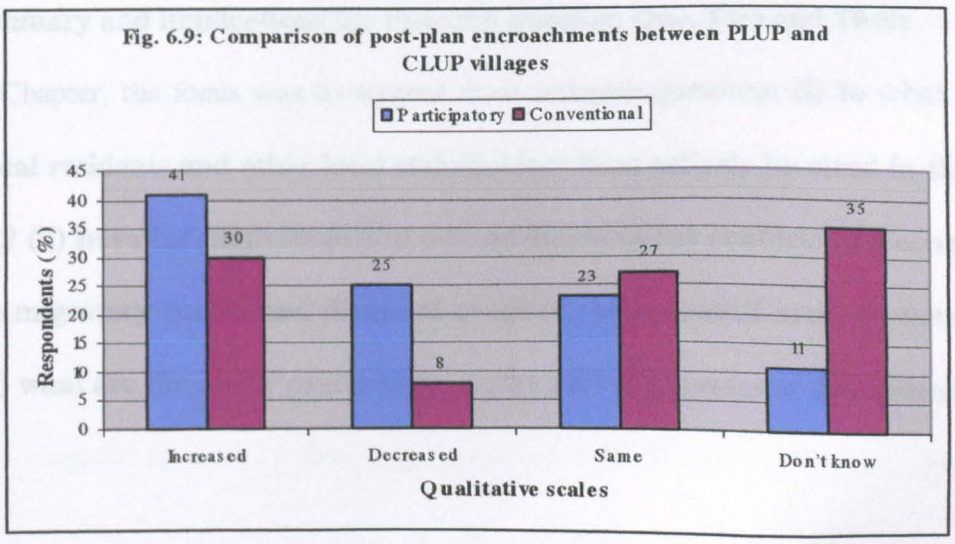


Fig. 6.9: Comparison of post-plan encroachments between PLUP and CLUP villages

6.7.2. Perception of conflicts and encroachments by all respondents

A total of 442 respondents from the two village groups representing 12% of the target population were used in the assessment (see Subsection 5.4.1.2 & 6.4.1.2). Results indicate that, level of conflicts in villages with conventional plans was 10% higher than in those with participatory plans (see Fig. 6.10). However, the level of encroachments in both groups was the same. Overall, in the two village groups combined, conflicts were perceived by 80% of the population as a problem while 66% perceived encroachment as an issue. The probable reasons are discussed in Chapter 8, section 8.3.

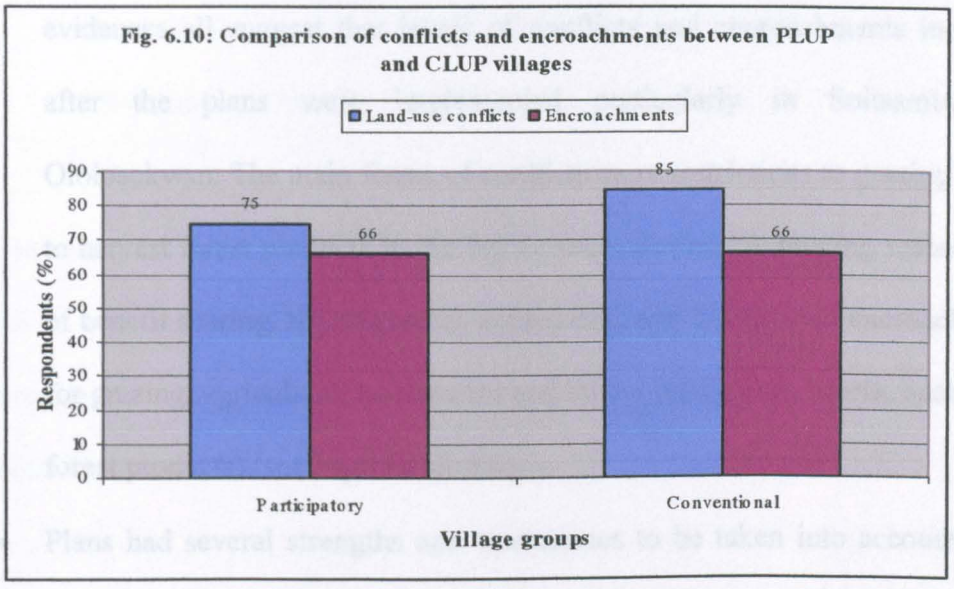


Fig. 6.10: Comparison of conflicts and encroachments between PLUP and CLUP villages

6.8. Summary and implications for research question One, Two and Three

In this Chapter, the focus was to answer three research questions: **(i) to what extent have local residents and other local stakeholders been actively involved in the LUP process? (ii) have the plans helped in minimizing land-use conflicts and conserving wildlife migratory routes and dispersal areas in the protected area bio-networks? and (iii) what are the major practical strengths and weaknesses of these plans?**

In evaluating the process and impact of conventional plans with respect to the three research questions; overall results suggests that:

- There was little involvement of local communities and other stakeholders in planning (see Section 6.3). Overall, in the three villages combined, local people's participation was only 6% (n=292) of the respondents, five fold lower than that recorded in PLUPs. Other primary stakeholders such as village extension workers and Park were not involved at all.
- Plans failed either to minimise conflicts or safeguard wildlife habitats (see Section 6.4). Perception of local communities, field and documentary evidences all suggest that levels of conflicts and encroachments increased after the plans were implemented particularly in Soitsambu and Ololosokwan. The main forms of conflicts were restrictions to grazing and/or to harvest forest products in the buffer zones during the hunting season, lack of benefit sharing, livestock/crop depredation and buffer zone encroachments for grazing, agriculture, settlements and others (campsites, hotels, bush meat, forest products) (see Figs. 6.5 & 6.6).
- Plans had several strengths and weaknesses to be taken into account when developing a new LUP framework (see Section 6.5 & Table 6.3). Some of the strengths were the involvement of multi-disciplinary team in planning (NLUPC) and use of appropriate map (land-use plan) scales (NSS). On the other hand, several weaknesses such as reports being too technical (NSS/NLUPC), plans based on existing land-uses, inaccessibility of reports and maps at village level were observed. Others include: low quality maps (NSS), disregard of socio-economic factors in planning (both planning agents) and lack of plan implementation strategies (both planning agents).

- Local people and "experts" suggestions to mitigate conflicts and make plans effective in future include: emphasis on conservation education, involvement of local people in planning, minimising hunting activities, equitable benefit sharing, recruitment of more rangers, emphasis on integrated planning, educate people on importance of LUP and capacity building in land-use planning (see Fig. 6.7 & Table 6.6).
- There was lack of integrated planning. The Serengeti National Parks failed to involve local communities in the planning process. On the other hand, the area planning agents (NLUPC) failed to involve the Maasai-Mara National Reserve (Kenya) in the planning of the area. The two villages (Ololosokwan and Soitsambu border the Kenya's reserve.

The summary of the findings and implications for the above mentioned research questions are summarised in Table 6.7 below. Having presented the process and impact evaluation results and discussions for "conventional" plans; the next Chapter (Chapter 7), presents evaluation results of three villages with no plans.

Table 6.7: Summary and implications for research questions 1, 2 & 3 in CLUPs

Research question	Evaluation indicators used	Implications for research question
1. To what extents have local residents and other local stakeholders been actively involved in the LUP process?	Households, Park management, extension workers, Park's management zone plan review	Little participation observed from household (6%; n=292). Moderate leaders participation (40%; n=5)
2. Have the plans helped in minimizing land-use conflicts and conserving wildlife migratory routes and dispersal areas in the protected area bio-networks?	Households, Park management, extension workers, physical visits	Plans failed to minimise conflicts and enhance conservation
3. What are the major practical strengths and weaknesses of these plans?	Plan technical reports reviews	Yes, plans have strengths and weaknesses for use in a proposed new land-use planning framework (see Table 6.3)

LUP=Land-use planning CLUP=Conventional land-use plan n=respondents

CHAPTER 7

7.0. ASSESSMENT OF LAND-USE CONFLICTS IN "COMPARISON GROUP" VILLAGES

7.1. Introduction

Chapters 5 and 6 presented and discussed the processes and impacts of "participatory" and "conventional" plans in six villages with the purpose of answering research questions One, Two and Three. Chapter 7 addresses research question Four: **is there any difference in amount of land-use conflicts and/or encroachments into wildlife habitats between villages with and without plans?**. The purpose of including "Comparison Group" villages (CGs) i.e. those without land-use plans, was to allow comparison with planned villages and provided a means of addressing the problem of accurate attribution of causes and effects (see Sections 3.2 & 3.6). The methods used in the assessment of CG villages were interviews with households and extension workers, and field visits.

Chapter 7 is organised into six sections covering:

1) The socio-economic characteristics of CGs i.e. Barabarani, Migombani and Mkonga-Ijinyu (see Fig. 1.1)
2) Pertinent problems in the CGs
3) Field visit assessments
4) A comparison of the level of conflict/encroachment between planned and CGs villages
5) Suggestions to mitigate conflicts and encroachments
6) A summary of findings relative to research question Four.

7.2. Socio-economic characteristics of "Comparison group" villages (CGs)

The socio-economic characteristics of the population of the three CGs are presented in Table 7.1 below. Of the total respondents 59% (n=301) were males and the rest were females. Like in the previous two village groups (those with participatory plans, and those with conventional plans), the CGs had youthful age structure. Youths and adults comprise 82% of the population.

The major economic activity in these three villages is agriculture (90%), with a small proportion (4%) practising livestock production. Other non-farm livelihood activities (6%) include: off-licence shops, hoteliers, souvenir shops for tourists and small businesses. Most of the non-farm activities are carried out in Migombani and Barabarani, which can be described as sub-urban centres (see Subsection 4.4.7). Apart from this, the two villages are the main tourist stopover for Lake Manyara National Park (LMNP), Ngorongoro Conservation Area Authority (NCAA) and Serengeti National Park (SNP) bound tourists. As in the previous two village groups (participatory and conventional) the level of illiteracy is high, as only 11% have attained secondary education.

Table 7.1: Socio-economic characteristics for comparison group villages' (CG)

Village	Sample size	Gender (%)		Age category (%)			Education (%)			Economic activity (%		
		M	F	18-34	35-54	>54	Nf	Pr	Sc	Ag	Lv	ot
B/barani	99	64	36	44	39	17	7	83	10	86	2	12
M/mbani	101	61	39	42	38	20	10	85	5	94	3	3
M/Ijinyu	101	51	49	37	45	18	15	65	20	89	8	3
Total	301	176	124	123	122	55	32	233	35	269	13	18
Average	100	59	41	41	41	18	11	78	11	90	4	6

M=male F=female Nf=non-formal Pr=primary Sec=secondary
Ag=agriculture Liv=livestock Ot=other activities
n=respondents. CG=comparison group villages' B/barani=Barabarani
M/mbani M/ijinyu=Mkonga-Ijinyu

7.3. Main land-use problems

Respondents were asked to identify the three main land-use problems in their respective villages. Answers were restricted to four options: land-use conflicts, encroachment, low crop yields and land scarcity for different uses. These options were thought by the author to be the main problems in the study areas (Kiwasila & Homewood, 1999; LMNP, 2002). Respondents were further asked to specify the types of land-use conflict and encroachment (see subsequent Subsection 7.3.1.2).

7.3.1. Responses supplied by households

7.3.1.1. Main land-use problems

All interviewees (100%; n=301) responded to the question related to four main land-use problems in the area. The summary of their responses is presented in Table 7.2. The table reveals that the three main problems in order of importance are: land-use conflicts (45%; n=301), land scarcity (35%) and low crop yields (18%). Encroachments into wildlife migratory routes or reserves were perceived to be low by most local residents (2%).

Table 7.2: Main problems in "Comparison Group" villages

Village	Number of respondents	Problems (%)			
		Land-use conflicts	Encroachments	Low crop yields	Land scarcity
Barabarani	99	51	2	20	27
Migombani	101	38	3	17	42
Mkonga-Ijinyu	101	46	0	19	35
Average	100	45	2	18	35

7.3.1.2. Types of land-use conflicts

86% (n=301) responded to the question related to the types of conflicts. In general seven types of conflicts were identified by local residents, i.e. crop destruction by wild animals, unfair distribution of irrigation water, land scarcity and restrictions on the harvesting of forest products from Mkomazi game reserve and Lake Manyara National Park (see Fig. 7.1). Others include: boundary disputes with reserves, harassment by reserve rangers and insufficient buffer zone. Overall, in the three villages combined, the main types of conflicts identified were: boundary disputes with reserves (49%), crop destruction by wild animals (15%) and land scarcity (27%) (see details below).

At the village level, conflicts varied. In Barabarani (n=84) and Migombani (n=79) villages, which are adjacent to Lake Manyara National Park (LMNP), their main conflicts were mainly: boundary disputes (43%; n=163), land scarcity (27%) for different uses (agriculture, settlement, grazing etc.) and crop damage by wild animals (23%). In Mkonga-Ijinyu (n=96), the main concerns were boundary disputes (60%) with Mkomazi Game Reserve (MGR) and land scarcity (27%) (see Fig. 7.1).

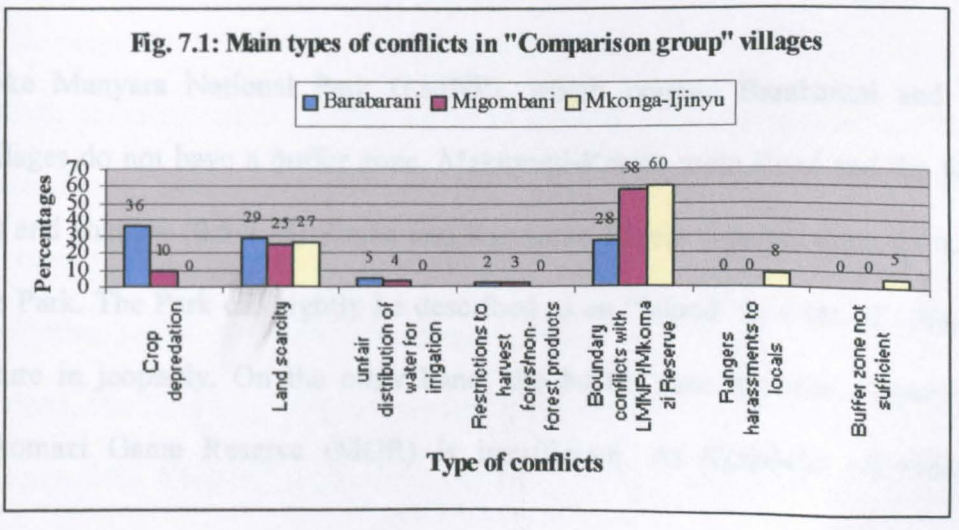


Fig. 7.1: Main types of conflicts in "Comparison group" villages

- Crop destruction by wild animals

Crop destruction in "Comparison group" villages (CGs) was mainly by elephants (*Loxodanta africana*), baboons (*Papio spp*), hippopotamus (*Hippopotamus amphibious*), vervet monkeys (*Cercopithecus aethiops*) and buffalos (*Syncerus caffer*). Data on the extent of crop damage by monetary value indicates that wild animals can cause a significant loss of household cash income and food security. Between 1999 and 2004, the two villages (Barabarani and Mkonga-Ijinyu) lost crops worth in Tanzanian Shillings (Tshs.) 10 million (US $ 10,000) (see Appendix 24).

- Insufficient buffer zone

The buffer zone between protected areas and villages is meant to be used by local residents for socio-economic activities such as firewood collection, grazing, performing rituals, honey gathering, harvesting herbs for traditional medicines etc. (Kauzeni, 1995). During field visits (see Table 7.3), buffer zones were found to be either lacking or were regarded as insufficient for community needs i.e. not able to satisfy local needs particularly grazing, natural forest harvests (fuel wood, timber, herbs, fruits etc.) and agriculture.

Lake Manyara National Park (LMNP), which borders Barabarani and Migombani villages do not have a buffer zone. Makuyuni-Karatu main Road and the narrow (3-15 m) and shallow (0.5-5 m) Simba and Kirurumo Rivers separate them (pers. obs.) from the Park. The Park can rightly be described as an "Island" in a sea of villages, with its future in jeopardy. On the other hand, the buffer zone between Mkonga-Ijinyu and Mkomazi Game Reserve (MGR) is insufficient. At Kamdufo sub-village (Maasai

dominant), the MGR boundary is about 50 m while at Kamorei sub-village (Pare pastoralists) the reserve boundary is estimated at 300 m (pers. obs.).

Gender-conflicts association was explored in the three CG villages (see Appendix 25). In these three villages both genders commonly identified crop destruction by wild animals, land scarcity and boundaries disputes between villages and reserves as a conflict. However, the association varied across villages. In Barabarani both genders identified crop destruction (32% - males; 43% - females), land scarcity (32% - males; 35% - females) and boundary disputes (30% - males; 25% - females) with Lake Manyara National Park (LMNP) as a conflict. In Migombani, both genders identified boundary conflict (50%- males; 75% - females) with LMNP as the main conflict. In Mkonga-Ijinyu a similar observation like Migombani was observed i.e. boundary disputes (74% - males; 47% - females). The above observations indicate that crop destruction; land scarcity and boundary conflicts with reserves are the most pressing problems affecting the communities in the three villages. For any successful planning, these issues are important to be taken into consideration by either suggesting supportive policies e.g. crop/livestock depredation compansation schemes or conflict resolving mechanisms.

7.3.2. Responses supplied by village extension staff

Village extension workers were asked to identify the main land-use problems in their respective villages. The question had four options, similar to those used in the household interviews. They were also asked to assess the level of land-use conflicts using four qualitative scales of "high", "moderate", "low" and "don't know". Three extension workers, one from Migombani (agriculture officer), one from Barabarani (forest officer) and one from Kisiwani (agriculture officer) were involved in the evaluation exercise. The main problems mentioned by three village extension workers were very similar. In

all three villages, the main problems were: land-use conflicts, land scarcity and depredation of crops and livestock by wild animals. In assessing the level of conflicts, the rating varied from one village to another. In Barabarani and Mkonga-Ijinyu, the experts rated conflicts as "high". In Migombani, conflicts were rated as "moderate".

7.4. Physical field visits

Village reconnaissance surveys/field visits to areas used by wildlife as migratory or dispersal areas were made in Barabarani, Migombani and Mkonga-Ijinyu villages. Crop destruction, encroachments into reserves for harvesting forest resources and gemstones, grazing and lack of sufficient buffer zone for residents were evident during the field visits (see Table 7.3).

Table 7.3: physical observation results in comparison group villages

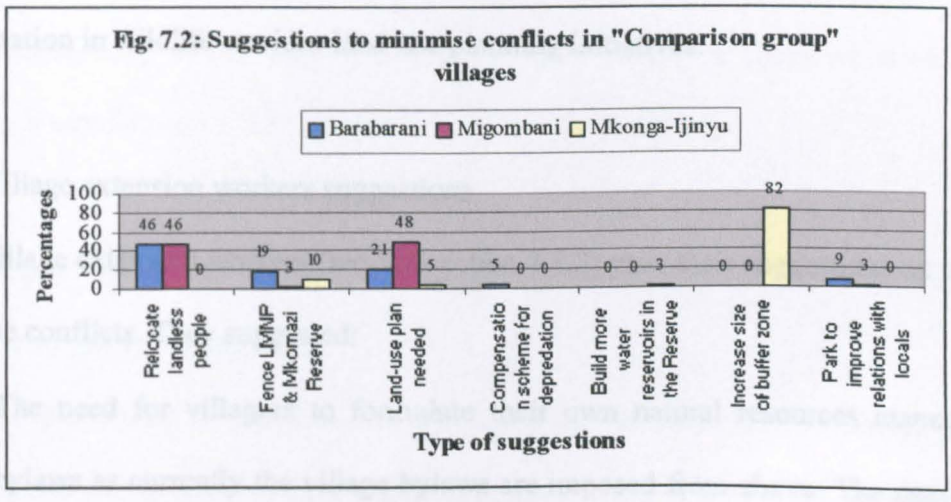
Village	Observations
Barabarani	- Destruction of crops by wild animals: rice, finger millet and banana crops. - Insufficient buffer zone between Lake Manyara National Park (LMNP) and the village (separated only by Simba River).
Migombani	- Lack of sufficient buffer zone between LMNP and the village: separated only by Kirurumo River.
Mkonga-Ijinyu	- Insufficient buffer zone (less than 1 km) between village and Mkomazi game reserve. - Illegal mining of gemstones in Mkomazi game reserve. - Destruction of crops by wild animals - Livestock grazing in Mkomazi game reserve.

7.5. Suggestions to mitigate conflicts

7.5.1. Households suggestions

76% (n=301) of interviewees gave suggestions on how to mitigate conflicts (see Fig. 7.2). Suggestions by households adjacent to Lake Manyara National Park i.e. Barabarani (n=76) and Migombani (n=59) were similar. Their suggestions were to relocate people to areas with low population density (e.g. Tanga and Morogoro Regions) (46%) and the need for the government to prepare a land-use plan (35%). In Mkonga-Ijinyu the main suggestions were for the buffer zone of Mkomazi Game Reserve (MGR) to be increased (82%; n=94) and for fencing of the reserve to deter wild animals from crop and livestock depredation (10%). Other suggestions include: implementation of compensation schemes (Barabarani) for destruction made by wild animals (5%) and construction of more reservoirs (3%) in MGR to help restrict animals from roaming in search of water during dry seasons.

Fig. 7.2: Suggestions to minimise conflicts in "Comparison group" villages



Association between gender and households' suggestions was observed for each village (see Appendix 26). In Barabarani, both genders identified need to relocate landless people (43% - males; 52% - females) and preparation and implementation of land-use plan (17% - males; 30% - females) as a way to ease the on-going conflicts. Similar

observations were made for the neighbouring Migombani. The need for land-use plans by residents could be attributed to the township nature of the two villages. In urban and rural environments a land-use plan is an important planning tool in harmonising land-use conflicts. The idea for relocation of landless people emanates from the high population density of the villages, which is above 200 people/km^2 (see Subsection 4.4.7 & Table 4.2).

The high population density in Barabarani and Migombani (see Table Subsection 4.4.7) implies a land scarcity problem and plot/farm boundary disputes. As for Mkonga-Ijinyu, both genders suggest the need for Mkomazi game reserve administration to increase the size for the buffer zone to ease the land scarcity problem. Other suggestions, which were identified by local communities include protection of people's property and LMNP to improve relations with local people (see Appendix 26). As discussed earlier (see Subsection 7.3.1.2) these suggestions are important for planners to take into consideration in wildlife corridor land-use planning initiatives.

7.5.2. Village extension workers suggestions

Three village extension workers (see Subsection 7.3.2) gave their suggestions on ways to minimise conflicts. They suggested:

- The need for villagers to formulate their own natural resources management bylaws as currently the village bylaws are imposed from above. The operational village bylaws in Tanzania are based on the Local Government Act of 1982 (LGA, 1982).

- Awareness and education among local residents - waging of campaigns on the importance of conserving the environment e.g. impacts of deforestation, overgrazing, overstocking of livestock, cultivation near water sources etc.
- The three villages to have land-use plans so as minimise land-use conflicts
- Fencing of two reserves (LMNP & MGR) to deter destructive wild animals against people's properties and lives and
- Intensification of ranger patrols to safeguard local people's property and lives.

Suggestions to mitigate conflicts and encroachments in CG varied between experts and local communities. However, perception of the need for land-use plans in Barabarani and Migombani villages was common to both experts and local people. Experts also suggested the need for local communities to formulate their own natural resources management bylaws, fencing of reserves and intensification of patrols. Local people proposed relocation of landless people and increase in areas of the buffer zones. Despite the incompatibility of the suggestions, both views should be taken on board during planning if conflicts are to be mitigated.

7.6. Comparison of levels of conflict and encroachment between planned and comparison group villages

As stated previously in sections 3.2, 3.6 and 7.1, the purpose of selecting villages without plans was to allow comparison with planned villages and to address the problem of attribution, the underlying assumption being that planned villages are likely to record fewer incidences of conflicts and/or encroachments compared to villages without plans.

7.6.1. Qualitative comparison between village groups

Figure 7.3 presents a comparison of the incidence of conflicts and encroachments between three village groups i.e. participatory (n=259), conventional (n=292) and comparison group (n=301). These data represent the proportion of respondents who felt conflicts and encroachments were a problem in their respective villages (see Subsections 5.4.1.2, 6.4.1.2 and 7.3.1). Figure 7.3 above reveals that:

- The levels of conflicts recorded in the three village groups i.e. those with participatory plans (75%), those with conventional plans (85%) and those in the comparison group (86%) were comparable and
- Villages with participatory and conventional plans recorded a much higher (66%) incidence of encroachment than in comparison group villages (2%).

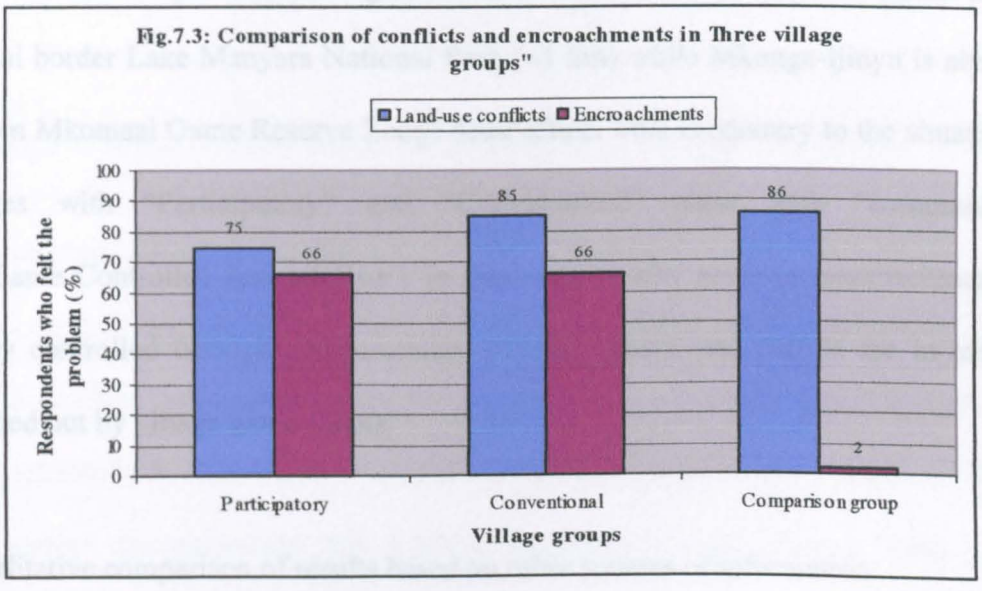


Fig.7.3: Comparison of conflicts and encroachments in Three village groups"

The author's assumption that planned villages would be likely to record fewer conflicts and encroachments than villages without plans (see Section 3.2) is not supported by the findings of this study. Instead, there appears to be no difference in amount of conflicts

between planned (80%) and un-planned (86%) villages in terms of people's perceptions. These results were not statistically significant (see Appendices 10 & 18). A comparable result of the amount of conflicts between Comparison Group villages (CGs) and planned villages suggests the failure of the implemented plans to attain their set objectives.

On the other hand, high levels of encroachment in planned villages compared to CGs could be attributed to other factors (non-plan) such as the legislative powers of National Parks and game reserves to prosecute offenders and the intensity of patrols. The three CGs villages are located adjacent to Lake Manyara National Park (Barabarani & Migombani) and Mkomazi game reserve (Mkonga-Ijinyu). Managers of these protected areas have legislated powers to prosecute encroachers, and they carry out routine ranger patrols which tend to scare off potential infringers. In addition, these villages are located close to the Park headquarters, making them liable for frequent patrols. Barabarani and Migombani border Lake Manyara National Park (<1 km) while Mkonga-Ijinyu is about 15 km from Mkomazi Game Reserve Zange head office. This is contrary to the situation in villages with "Participatory" and "Conventional" plans with "community reserves/Game Controlled Areas-GCAs". In these community reserves, encroachments are mainly controlled through comparatively lenient bylaws, and patrols are in most cases carried out by village game scouts.

7.6.2. Qualitative comparison of results based on other sources of information

As stated earlier in section 7.6, five sources of information (evaluation indicators): physical field visits, extension workers and Park staff views, minority group (Barabeig) and archive information have been used to compare the results. Household views have been used in subsection 7.6.1 above. The summary of results is presented in Table 7.4.

The table reveals that in the three village groups the problems of conflicts and encroachments were common in villages with or without plans. However, the degree of encroachments in CGs was relatively lower (2%) compared to planned villages (66%).

Table 7.4: Comparison of conflicts & encroachment between planned and CGs based on the rest of the indicators

Sources of evaluation indicators used	Village groups					
	Planned villages				Without plans	
	"Participatory		"Conventional"		"Comparison Group"	
	Conflict	Encro	Conflict	Encro	Conflict	Encro
Physical visits	Yes	Yes	Yes	Yes	Yes	Yes (slight)
Park staff	Yes	Yes	Yes	Yes	n.r.	n.r.
Extension staff	Undecided	Undecided	Yes	Yes	Yes (except Migombani-moderate	n.r.
Archive data	Yes	Yes	Yes	Yes	Yes	Yes
Minority ethnic group (Barabeig)	Yes	Yes	n.r.	n.r.	n.r.	n.r.

CG=Comparison Group (without plans) n.r. =not relevant Encro=encroachment

7.7. Summary and implications for research question Four

Household, experts, archive information and physical field visits were meant to compare the level of conflicts and encroachments in the three village groups in order to answer research question Four: **Is there any difference in amount of land-use/human-wildlife conflicts and/or encroachment into wildlife habitats between villages' with and without plans?** Evidence from these data suggest that:

- There was no significant difference in the level of conflicts between village groups, denying the earlier assumption that villages with plans are likely to record fewer conflicts than non-planned ones. Village groups (participatory, conventional and comparison group) experienced similar problems and almost

the same intensity of conflicts. The evidence suggests that both "Participatory" and "Conventional" plans have failed to attain their set objectives of conflicts minimisation and conservation of wildlife habitats. The main reasons were lack of stakeholders' involvement and planning weakness (planning done in isolation and without sectoral coordination).

- Main land-use conflicts and suggestions to resolve them were comparable in all three-village groups. The main land-use conflicts observed across the three villages groups were: loss of land; boundary disputes with reserves; restrictions to harvest forest and non-forest products; crop/livestock depredation; lack of equitable benefits and harassment of local people by rangers. The suggestions to mitigate these conflicts include emphasis on conservation education, intensification of patrols against problem animals, need to involve local people in planning, increase of buffer zone and easement of restrictions to use reserves e.g. WMAs/TLCT and buffer zones during hunting season (Loliondo).

The foregoing Chapter compared the levels of conflicts and/or encroachments between planned villages and villages without plans; the following Chapter discusses the main findings from this study and its implications to the overall aim and objectives of the study and a proposed new LUP framework is presented.

CHAPTER 8

8.0. GENERAL DISCUSSION

8.1. Introduction

This Chapter discusses the main empirical results from the study in relation to the general literature reviewed. The aim of this chapter is to examine the extent to which the four research questions raised in subsection 1.3.2 have been answered. In order to achieve the goals of this research, this Chapter is organised into four main parts. First, the socio-economic features of the study area are discussed. These features are important to be taken into account in the development of the proposed LUP framework (see subsequent Section 8.2). Secondly, the performance of the land-use plans and reasons for their ineffectiveness are described and discussed. Thirdly, discussion on conflicts/encroachments and their implications for local people's livelihood are discussed and suggestions to mitigate them are presented. Discussion of conflicts and encroachments are of interest mainly because they were perceived by land-use plan stakeholders as prerequisites for successful plan implementation (see Sections 5.6 & 6.6). Lastly, a proposed new Land-Use Planning framework is presented, which could be used in areas where humans co-exist with wildlife in Tanzania.

8.2. Socio-economic characteristics

Several scholars have stressed the need to understand the underlying socio-economic conditions of local people in areas where land-use plans are to be prepared and implemented (e.g. Kaoneka, 1993; Kauzeni, 1995; Campbell *et al.*, 2000; Kideghesho & Mokiti, 2003; Nidumolu *et al.*, 2004). They argue that if there is failure to consider these factors, land-use plans are likely to fail. For example, Kaoneka (1993) argues that it is important to consider income per capita, population density, growth rates, distributional

effects and traditional habits. Other factors are environmental conditions, levels of technology, planning capability and tenurial arrangements (*ibid.*). To increase acceptance rate of land-use plans, the socio-economic context has to be better integrated into the generation of the plans (Nidumolu, *et al.*, 2004).

This thesis shows that villages adjacent to protected areas in Northeastern Tanzania depend mainly on agriculture and livestock production for their livelihood (see Tables 5.1, 6.1 & 7.1). Both crop and livestock yields are low due to climatic limitations, pests and diseases, crop predation, poor extension services and high costs of agricultural and veterinary inputs (Kauzeni, 1995; Sechambo, 2001; Yanda *et al.*, 2001; BDC, 2004). The area has high livestock density with a range of between 20-40 Livestock Units (LU)/km^2 (see Section 4.4).

A study by Kauzeni (1995) in villages adjacent to Serengeti National Park estimated an annual average household income of Tshs. 82, 000 (US $ 150) and maize yield of 0.72 ton/ha, which are both barely adequate to meet human basic needs. According to Landon (1991) the average maize yield under normal farming (rainfed) conditions is estimated at 2.3 ton/ha. In villages around Lake Manyara National Park the per capita income is estimated at US $ 200 (LMNP, 2002). Limited livelihood options and strategies compel people to set priorities and make economic choices that are not compatible with conservation goals in the western part of Serengeti National Park (Campbell *et al.*, 2000). Those authors argue that over 75% of illegal hunters in Serengeti come from poor families, who have limited sources of income and virtually no livestock.

In terms of education, as shown in sections 5.2, 6.2 and 7.2, the level of illiteracy is high. The most affected groups are the pastoral Maasai. The high illiteracy levels among the Maasai are likely to be caused by two factors. First, the Maasai's former nomadic life style encouraged school-age children (youths) to be engaged in herding livestock instead of attending school (pers. obs.). Secondly, the government has failed to promote adequate educational awareness campaigns among the semi-nomadic and nomadic pastoral societies in the country e.g. Maasai, Hadzabe and Barabeig (pers. obs.). As for the other ethnic groups, the probable causes of high illiteracy are an insufficient number of schools and teachers relative to the size of the population (see Section 4.4).

If not checked illiteracy can have negative implications for the development of any social group. According to Ngailo *et al.*, (2003), education is a necessary condition for socio-economic and technological development in any society. With education one can easily learn new technological advancements, adapt to changing environmental conditions, and learn new skills to help cope with prevailing conditions at hand (*ibid.*).

8.3. Plan performance and reasons for ineffectiveness

According to Karn *et al.*, (2002; 2004) and Calbick *et al.*, (2003; 2004) there are four key criteria for successful plan implementation: stakeholder support; sound plan characteristics; supportive institutional structure; and collaborative implementation design. In regard to wildlife corridor planning specifically, Kideghesho *et al.* (2000) suggest several conditions which are important for sound plan performance, including holistic planning, guarantee of land security, tapping of local knowledge, involvement of pressure groups and commitment by politicians (*ibid.*). Other important aspects of successful plan implementation include: presence of implementation strategies; use of

appropriate planning scales; institutional coordination; sufficient planning skills; and need to safeguard cultural aspects of the communities concerned (see Lyimo *et al.*, 1993; De Pauw, 1996; Mango, 1996; Stevenson, 1996; Lerise, 1998; Dalal-Clayton *et al.*, 2003).

The research shows that before both types of plans (PLUPs & CLUPs) were implemented in six villages, the amount of conflict and/or encroachments were low to moderate (see Figs. 5.3a & 6.4b). However, after the plans were implemented the conflicts and/or encroachments increased (see Figs. 5.4b & 6.4b). Overall, in the two village groups combined, conflicts and encroachments were perceived by 80% and 66% of the respondents respectively as a problem (see Fig. 6.10).

Other sources of data used in the assessment i.e. "experts" perceptions, minority ethnic (Barabeig) focus group discussion, evidence from field visits and archive data further indicate the ineffectiveness of the plans in achieving their objectives of mitigating conflicts enhancing conservation of wildlife corridors in the six villages (see Tables 5.8, 6.7 & 7.4). Comparison of amount of conflicts between planned and unplanned villages show comparable results (see Fig. 7.3) implying further evidence of the ineffectiveness of the implemented plans. Again, the amount of encroachments in unplanned villages was 33 times lower than that recorded in planned villages (See Fig. 7.3) - for discussion on conflicts and encroachments see section 8.4.

According to the research, the failure of the plans emanates from three main factors. First, the lack of involvement of stakeholders in the planning process, particularly the main beneficiaries of the plan i.e. the local people (see Sections 5.3 & 6.3); Secondly,

the observed weakness in the LUP technical reports, viz: un-streamed planning procedures, preparation of plans in a rush, lack of implementation strategies, use of unqualified personel and un-holistic planning approach (see Sections 5.5 & 6.5; Tables 5.3, 5.4, 5.5, 5.6, 6.3, 6.4 & 6.5); Thirdly, the Park's failure to integrate local communities in the preparation and implementation of the Park's GMPs (see Sections 5.3.4 & 6.3.3). For the purpose of discussion, these three weaknesses are referred to as "planning weaknesses" as discussed below.

8.3.1. Stakeholder participation

Stakeholders should all be equally represented in developing an effective management system for the resources of all common interest (Borrini-Feyerabend & Brown, 1997; Ashley & Karim, 2000). Stakeholder participation strengthens commitment, increases user satisfaction, creates realistic expectations of outcomes, respects local people's attitudes and builds trust (Luz, 2000; Bryner, 2001; Tress & Tress, 2003). It gives researchers and planners access to community expertise and knowledge, which enables them to produce better plans and designs (Roe & Rowe, 2000). Research has further shown that people are likely to accept an issue when they had a voice in the decision-making process (Decker & Chase, 1997).

In this investigation the involvement of stakeholders (local communities, "experts" and minority groups) in planning was low in villages with participatory and conventional land-use plans (see Subsections 5.3.1-5.3.3 & 6.3.1-6.3.2). The worst was recorded in those with conventional land-use plans in which the participation level was five times lower relative to those with participatory land-use plans (see Fig. 5.1 & 6.1). The low level of participation was contrary to the Terms of Reference (ToR) given to the

planning teams i.e. the African Wildlife Foundation (AWF), World Wide Fund for Nature (WWF) and National Land-use Planning Commission (NLUPC) planning agents. Their terms of reference among others required them to involve stakeholders (NLUPC, 1994; WWF/TPO, 2002; AWF, 2005a & b). The probable causes for low participation of stakeholders could be a lack of rural planning skills and lack of time spent in planning (see Sections 5.5.1.1 & 6.5.1.1; Tables 5.6 & 6.5 & Appendix 13).

8.3.1.1. Lack of planning skills

Review of planning reports prepared by planning agents and interviews with planning team members indicates a lack of participatory planning skills among most of the team members (see Tables 5.6 & 6.5). Participatory Rural Appraisal (PRA) skills could have allowed: in-depth consultations with stakeholders to reach consensus; tapping of indigenous land-use planning knowledge; and development of a common understanding of land-use patterns, livelihood systems and their impact on protected area resources (Christ, 1999; FAO/UNEP, 1999).

Planning team leaders also lacked training and rural planning backgrounds except that of WWF - Diploma qualification. The team leader for AWF was a game assistant with a two-year diploma qualification. The NLUPC team leader was a town planner (MSc). (see Tables 5.6 & 6.5). Lack of rural skills led to the application of town-planning concepts in rural environments in the preparation of Soitsambu and Ololosokwan plans. Town-planning concepts lack flexibility while the situation in the rural environment is dynamic and the planning process is not always continuous (Mango, 1996; Lerise, 1998). On the other hand, organisations such as the National Soil Service (Mlingano Research Institute) accomplished the task of preparing a land-use plan for Chemchem

using a single expert (soil scientist). Bouma & Hoosebeek (1996) argue that soil scientists are not usually qualified to cover all specialities necessary for useful land-use planning.

Lack of rural planning skills amongst planners is acknowledged as one of the planning weaknesses in Tanzania (Kauzeni *et al.*, 1993; Mango, 1996). In most cases, planning is accomplished by planners in the office thus undermining the need to involve potential stakeholders in planning (De Pauw, 1996; Mango, 1996; Stevenson, 1996; Lerise, 1998; Lerise, 2000). As a remedy, Mango (1996) suggests that, planning teams need to be led by land-use planners from the Ministry of Lands or Ministry of Agriculture.

Despite the weakness of not involving stakeholders, the use of experienced (>10 years) personnel within AWF, WWF and NLUPC of different professional background was one of the planning strengths. However, the National Soil Service (NSS) didn't and instead only one professional was used. In contrast, the NSS used land-users for casual work related to soil survey work - digging of soil profiles and Auger holes to enable soil description and collection of soil samples for laboratory analysis (pers. obs.). In this type of planning - NSS approach, most of the survey work is normally done in the office using remote sensing techniques such as aerial photo interpretation (e.g. see Appendix 21a). Fieldwork is usually for ground truthing, soil description and collection of soil samples (pers. obs.). August *et al.*, (2002) stresses the need for an interdisciplinary approach by arguing that lack of multidisciplinary interaction is perhaps the most significant gap in our resource management strategies.

8.3.1.2. Insufficient time spent in planning

The thesis results (see Subsections 5.5.1.1 & Appendix 13) have shown that the period of time used in the whole planning process in each village, wasn't enough for meaningful consultation. In other words, the whole process rushed. In Sangaiwe and Vilima Vitatu villages for example, the planning exercise in each village was completed in less than a week. In Esilalei, the time spent for consultation and data collection was two weeks (see Subsections 5.5.1.1). Similar durations were used in Soitsambu, Ololosokwan and Chemchem villages (see 6.5.1.1). Given the short planning period, it was not easy to involve a large number of stakeholders.

8.3.2. Plans prepared in isolation and without sectoral coordination

The thesis shows that each village land-use plan was prepared in isolation i.e. based on administrative boundaries instead of taking into account the ecological criteria (see Appendices 14-16 & 21a-22). This weakness among others led to boundary disputes between villages and between protected areas and villages (e.g. see Figs. 5.5, 6.5). For example, in the case of the preparation of Vilima Vitatu, Sangaiwe and Esilalei, which was meant to protect the Tarangire-Manyara migratory routes. Since these villages are adjacent to one another, an appropriate planning approach would have been a holistic one, involving the three villages and their planning agents consulting one another or joining forces. However, this wasn't the case. Each village plan was prepared in isolation (see Appendices 14-16) and planning agents also worked in isolation.

Similarly, the National Land-use Planning Commission (NLUPC) failed to collaborate with their counterparts in Kenya i.e. Maasai-Mara National Reserve (Kenya). Involving the whole ecosystem and their Kenyan counterparts would have reduced or resolved the

on-going conflicts between Tanzania and Kenya e.g. attempts by Kenya conservationists to sue Tanzania in the International court for game carnage, blockage of migratory routes and environmental degradation (East African Newspapers of 4/4/02, 8/12/03; 15/12/03). The corridor is the main wildlife migratory route and dispersal area for the two protected areas i.e. Serengeti and Maasai-Mara (NLUPC, 1994).

Several scholars stress the need for village plans to be prepared using holistic planning approaches (Johnson, 1996; Booth, *et al.*, 2001; Yanda *et al.*, 2001). Sound (short and long term) planning cannot be achieved without due consideration to ecology (Booth, *et al.*, 2001). It is unrealistic to demarcate a land-use plan based on administrative boundaries; instead, ecological criteria need to be applied (Yanda *et al.*, 2001). Ecological factors include e.g. dry season grazing, dry season watering, breeding sites connecting other protected areas and viable population (*ibid.*). Due to the interdependencies of ecosystems, a planning approach is needed that examines a site in its broader context (*ibid.*).

Apart from preparing plans based on administrative boundaries, the thesis also shows that sectoral coordination between planning agents and institutions was lacking (see above discussion). Similar findings have also been observed by several scholars in the country (Lyimo *et al.*, 1993; De Pauw; 1996; Mango, 1996). They argue that land-use planning in Tanzania is largely sectorised and un-integrated. As argued by Koontz (2003), collaborative planning can lead to better plans as well as foster increased community capacity to constructively address important issues. Failure to consider holistic planning and lack of sectoral coordination has led to duplication of planning efforts (wastage of resources) which could have otherwise channelled to other important

conservation activities; less consultation time with resource owners; and un-streamlined planning procedures (e.g. see Tables 5.4 & 6.4). The estimated cost for preparing a village land-use plan in 1998 was estimated at Tshs. 18 million (US $ 12,000) (NLUPC, 1998).

The forgoing discussion has demonstrated how planning weaknesses have led to increased conflicts and encroachments in Northeastern Tanzania. However, even if we assumed that planning approach i.e. planning had involved potential stakeholders, had been well co-ordinated and had used appropriate and skilled professionals, the research results suggest the plans could have failed to deliver the anticipated results for two main reasons.

First, the plan agents left immediately after the plans were prepared without providing necessary plan implementation strategies. Plan implementation strategies include: availability of reports/maps; action plans (short and long-term); and bylaws to guide the implementation of plans (Lerise, 1996; Mango, 1996). The thesis shows that all these important implementation strategies were lacking (e.g. see Tables 5.3 & 6.3). The reports and maps were accessed at planning agents head offices in Arusha (AWF & WWF), Tanga (NSS) and Dar es Salaam (NLUPC) a distance between 400 and 2000 km for a return journey.

According to Mango (1996), the lack of a sustainable planning process – i.e. once the plan is prepared it is left to local people to implement - is one of the major land-use planning (LUP) problems in Tanzania (*ibid*). The other problem is the preparation of plans according to the wishes of clients (*ibid.*). The importance of plan implementation

is underscored by many scholars. Lerise (1998; 2000) argues that LUP in Tanzania, pays very little attention to plan implementation, and plans prepared by planners are rarely sent back to respective districts and village councils for comments or approval. Plans are in most cases accomplished by planners in the office and are finalised and approved by the central government only (*ibid.*). Regardless of the quality of the planning process, or of a plan, little can be expected to emerge from the exercise without effective implementation (Gray, 1989; Mazmanian & Sabatier, 1989; Morah, 1990;Vedung, 1997). As Fallding (2000) points out, there is no point in writing a plan unless it is implemented.

The second reason concerns the low quality of the reports and maps, and the fact that they are sometimes produced in a language not understood by intended beneficiaries. Moreover, the plans lack land-use zone demarcations (beacons). The quality of maps was inadequate for a land-user to use them as a guide or even to interpret them (e.g. see Appendices 14, 15, 16, 21a & b, 22). In addition, the scale of some of the maps i.e. Soitsambu and Ololosokwan, was inappropriate to be used at local level (see Subsection 5.5.1.2 & Appendix 22). Unfortunately, maps/reports (except that of AWF) were in English instead of *Kiswahili* which is the national language. Taking the high level of illiteracy in the area (see Tables 5.1, 61. & 7.1), writing a report in English means the reports are likely not to be used and therefore a waste of resources. During the second phase of data collection (2005), WWF had made efforts to translate the Esilalei land-use plan into *Kiswahili* (see Appendix 22). However, when the map was shown to some residents they were puzzled to see it.

Apart from reports and maps not being in a "user-friendly" language, reports (except AWF) used technical jargon such as acrisols, catena, highly suitable (S1), moderately suitable (S2), marginally suitable (S3) and not suitable (NS) land units etc. (WWF, NLUPC & NSS) which cannot be understood by non-professionals. Absence of boundary markers (beacons) or signposts for different land-use zones within the corridors could have also failed the plans (see Tables 5.3 & 6.3). Beacons and signposts are important in reducing trespassing to restricted areas.

Dalal-Clayton *et al.*, (2003) argues that rural land-use planning in developing countries is confronted with ten major problems, viz: policy and development decisions are usually taken on political and economic grounds - natural resource information plays only a minor role; planners and decision makers are confounded by the jargon and intimidated by the welter of details; survey data are usually static - rarely updated, and lacking interpretation of interactions between resources and their use; there is little consultation between end-users and providers of natural resource information; and natural resource professionals are few and usually inadequately resourced. Others include: planning being centralised, technocratic with participation by local people lacking; descriptive plans lacking analysis and vision; planning being predominantly sectoral and coordination between institutions absent or very weak; weak linkages between district authorities and both local communities and higher-level authorities; and planning departments being overloaded, especially since decentralization, and chronically under-resourced - lack of professional capacity (*ibid*).

8.4. Conflicts, encroachments and suggestions to make plans effective

The research employed several data sources: households/experts interviews and focus group discussions (see Fig. 3.1), to show that the level of conflict and encroachment in Northeastern Tanzania before land-use plans were implemented, was regarded as acceptable i.e. low to moderate (see Section 8.3). The study also shows that conflicts and encroachments were perceived to have increased after both participatory and conventional plans were implemented (*ibid.*). Other sources of information which showed conflicts and encroachments as a problem in planned villages were: field visits and archive data from different sources (see Subsections 5.4.4, 5.4.5, 6.4.3 & 6.4.4).

This study shows three main land-use conflicts prevailing in the three village groups, viz: establishment of Wildlife Management Areas (WMAs)/Tanzania Lands Conservation Trust (TLCT); crop/livestock depredation and lack of benefit sharing (see Figs. 5.5, 6.5 & 7.2). Others include boundary conflicts with reserves and/or hunting companies and restrictions on the use of forest products. As for encroachments, the main types were: agriculture, grazing and settlements/campsites (e.g. see Fig. 5.6 & 6.6). As stated earlier (see Section 8.1) the discussion of the conflicts are of importance mainly because they need to be addressed if the implemented plans are to be successful - plan stakeholders' perceptions (see Tables 5.7, 6.6). The main conflicts and encroachments are further discussed as follows:

8.4.1. Conflicts

8.4.1.1. Establishment of community conservation reserves and TLCT

The establishment of WMAs has been a major thrust of the Government's efforts to transfer natural resource management responsibilities to local communities. This includes stewardship of wildlife resources found in village lands, wildlife migration routes and corridors (Noe, 2003). The transfer of management responsibility to local people also authorises villagers to receive revenues from resident game fees, tourist hunting game fees, tourist hunting block fees, bed night fees, WMA entry fees and concession fees (Severre, 2000). On the other hand, the establishment of TLCT is meant to preserve the wildlife migratory routes/dispersal areas between Tarangire and Lake Manyara National Parks (WWF/TPO, 2002). The objectives of the establishment both WMAs and TLCT sounds appealing. Why, then, do local people perceive the formation of these institutions as one of the causes of conflicts? There are two likely reasons.

The first concerns the amount of land that villagers lost during the establishment of WMAs and TLCT. The establishment of reserves in Sangaiwe, Vilima Vitatu and Esilalei led to loss of 27%, 65% and 59% of the total villages lands (WWF/TPO, 2002; BDC, 2004; AWF, 2005a & b). These areas were formerly used for grazing, agriculture and other activities but after their establishment local people were no longer allowed to graze, cultivate or harvest forest products from the area. In order to graze or harvest forest products, persons needed to acquire a permit from the village government office and be escorted in the conservation areas by Village Game Scout(s). The establishment of WMAs/TLCT therefore increased pressure on resources as perceived by local villagers.

According to local government bylaws (village governments) no. 7 of 1982, there are eight activities which are forbidden in areas set aside as community reserves including WMAs. These include restriction to harvest forest products, mining, subsistence hunting, felling of any tree, walking with dogs within WMAs, bee harvesting, charcoal making and uncontrolled fires (LGA, 1982). The village bylaws further stipulate activities which are allowed in reserves, subject to permission from the village government offices. These include: collection of dead wood for fires, pruning of tree branches to be used in charcoal making, harvesting of forest fruits, and fishing. Escort by village game scouts is necessary in these cases also. The perceived loss of large amounts of land, and restrictions on the use of natural resources without alternatives at hand, has had serious negative socio-economic consequences on people's livelihoods. As a consequence, local people have seen the establishment of the reserves as disincentives to conservation, thus fuelling antagonism between the local people and conservationists.

The second reason for regarding the WMAs and the TLCT in a negative light, was the lack of transparency during the establishment of these conservation areas (see Figs. 5.5 & 6.5). Despite the procedures for designation of WMAs being well articulated (WMA, 2002), it is probable that these procedures were not strictly followed, resulting in conflicts between local people and conservationists. The WMA procedures (WMA, 2002: p.15) state that: "(i) the village council will recommend to the village assembly part of the village land that will be set aside as communal village land for the purpose of establishing WMA (ii) the village assembly will make a decision on recommendations by the village council (iii) the village council shall record in the public register the decision of the village assembly where it has approved that an area of the village land set aside for use as a WMAs." The village assembly comprises all village members aged 18

years and above and is the highest decision making organ in the country's village administrative set-up (*ibid.*). Had the procedures been correctly followed and all competent villagers been empowered in the decision-making, then conflicts may have been minimal or absent.

As for the Tanzania Lands Conservation Trust (TLCT), despite the presence of a Memorandum of Understanding (MoA) between AWF and the two villages (Esilalei and Oltukai), local people complained of being harassed when caught grazing in the TLCT land (e.g. see Fig. 5.5 & Subsection 5.4.1.2). They also complained about being fined up to Tshs. 60,000 (US $ 60) for a grazing offence, and there being a lack of assistance from the ranch administration (Boniface Ngimojino, pers. comm.-subvillage chair). Such disputes suggest that it was not the consensus of many local people to turn the area into a Trust land.

Mr. Macokecha was the Babati District planning team leader (planning agent's representative) and is the current District Game Officer. When he was approached to comment on complaints about loss of village land in Sangaiwe and Vilima Vitatu, he had this to say:

> "*We involved them through various meetings organised by the village councils, and these meeting deliberations were endorsed by the village general assemblies as required by the WMA regulations. The plans were prepared after all parties had reached a consensus*".

Dr. Mwachang'a of TLCT also gave similar views. Despite these conflicting views of the WMA/TLCT establishment process, villagers and planners need to be brought together again if positive progress is to be made against this background of discord and mistrust. Based on personal observations made during the study, recommendations for

achieving this are as follows: For the establishment of WMAs, more thorough consultation with land-users is recommended. Villagers need to be given sufficient time to discuss plans and agree on whether or not to convert their land as required by the WMA regulations. If villagers agree to establish WMAs, they should then take a leading role in preparation of the land-use plan, and the district authorities (planning team members) should play a facilitation role only. As for TLCT, the two villages owning the land i.e. Esilalei and Oltukai and AWF need to sit around the table again to resolve the ongoing conflicts and chart a way forward.

One of the strategies to resolve the current conflicts could be to widen the representation of local people in the Board of Trustees. The current Board structure (composed mainly of politicians and Directors) does not give sufficient room for local people to air their views. The Board is under the chairmanship of the Member of Parliament for Monduli constituency (Dr. Mwachang'a, pers. comm.-TLCT Veterinary Officer). Other members are: the AWF coordinator; TANAPA Director General; National Ranching Company (NARCO) Director General; United Nations Development Programme (UNDP) representative; the Monduli District Commissioner; Monduli District Council chairman; Maasai elder (*Laibon*) and two sub-village chairmen (*ibid.*). Another strategy would be to employ residents from the two villages in the administration department. Currently, there are no locals in the department (Dr. Mwachang'a, pers. Comm.). The third strategy might be to hand over the administrative role to villagers. However, basic training in enterprise and wildlife management would be necessary prerequisites for this, as was the in Makuleke Community when they received their ancestral land back from the Kruger National Park authorities in South Africa (IUCN, 2000).

8.4.1.2. Crop and livestock depredation

Crop damage, which is defined as the feeding on cultigens by wildlife (Newmark *et al.*, 1994), can cause substantial financial losss to farmers and is a source of conflict between local residents and protected area authorities (Nahonyo, 2001). Crop damage around protected areas results in negative attitudes towards wildlife conservation (Epimack & Kabigumila, 2002). Killing of livestock by wild animals is also a major concern in areas where the main economic activity is cattle production (Rabinowitz, 2005). According to Nahonyo (2001) agricultural losses due to wild animals are higher in Africa than elsewhere in the world in that the average loss is about 40% of all crops that are planted.

The results of this investigation through various data sources indicates that depredation of crops and livestock by wild animals is a major concern to local people in the nine villages studied (e.g. see Figs. 5.5 & 6.5; Table 5.2 & Appendices 12, 19 & 24). For example, in villages with "Participatory" plans, more than 150 tons of crops were destroyed between 2001 and 2004 (see Appendix 12). Also, a loss of human life was recorded (*ibid.*). In Chemchem (conventional) about 148 ha was destroyed between 2001 and 2004 (see Appendix 19). In control group villages of Barabarani and Mkonga-Ijinyu, crop worth Tshs. 10 million (US $ 10,000) were reported to be destroyed by wild animals between 1999 and 2003 (see Appendix 24).

The thesis further shows that the main destructive wild animals are vervet monkey (*Cercopithecusia ethipos*), baboon (*Papio spp*), elephant (*Loxodonta africana*), bush pig (*Potamochoerus porcus*), buffalo (*Syncerus caffer caffer*), hippopotamus (*hippopotamus amphibious*) and zebra (*Equus burchellii*) (see Appendices 12, 19 & 24). Crops destroyed include maize, finger millet, rice, banana, beans and cassava. As for livestock

predation, lions (*Panthera leo*) and spotted hyena (*Crocuta crocuta*) are the most responsible (*ibid.*).

Research findings elsewhere in the country (e.g. Songorwa, 1999; Nahonyo, 2001; Epimack & Kabigumila, 2002) indicate the significance of the crop and livestock depredation problem. Studies in villages adjacent to Lake Manyara National Park (LMNP) and Selous game reserve have indicated significant crop damage during the night by elephants (*Loxodonta africana)* and Olive baboons (*Papio anubis*) (Songorwa, 1999; Epimack & Kabigumila, 2002). However, in this previous research the destruction could not be quantified. Newmark *et al.*, (1993) reported that more than 71% of the local communities living adjacent to five protected areas in Tanzania (Selous game reserve, Arusha, Kilimanjaro, Tarangire and Lake Manyara National Parks) cited problems with wild animals, specifically crop damage. Moreover, people living adjacent to Selous and Tarangire National Park reported significant (more destructive) problems with wild animals compared to those adjacent to other three Parks (*ibid.*).

Kabigumila (1992) reported significant damage to life and property in villages around Mkomazi Game Reserve (MGR). The most frequent damage was destruction of crops, mainly banana, cassava and beans. Other less common forms included predation of livestock and loss of human life (*ibid.*). Nahonyo (2001) showed that crop damage by elephants in the Greater Ruaha ecosystem in Southern Tanzania involved both raiding and trampling. Over the whole Greater Ruaha ecosystem, most incidents involved damage to maize, sweet potatoes, bulrush millet, common millet and rice, with damage to sweet potatoes and rice being common in areas around Ruaha National Park (*ibid.*).

This discussion has revealed how crop/livestock depredation impacts on the livelihood of local communities living in abject poverty. In this state of affairs it is difficult to expect people to have incentives to conserve. The situation is more alarming due to the failure of wildlife policy to accommodate compensation schemes for depredation by wild animals (WPT, 1998). The use of compensation schemes as a means to minimize human-wildlife conflicts is debatable, however, in areas where majority of the population live below the poverty line (see Subsection 4.2.3), such a measure is probably indispensable (see also Subsection 8.5.2). Another alternative is for the government in collaboration with international conservation agencies to pay some form of allowances to local residents as a disincentive to incompatible land-uses in rangelands. However, this requires further research before its implementation.

8.4.1.3. Lack of benefit sharing

Benefit sharing in this study is described as mutual socio-economic gains realised from partners in business namely local investors (e.g. hunting companies, photographic safari, campsites, lodges, eco-tourism etc.) and local communities in villages with wildlife resources i.e. Wildlife Management Areas (WMAs), Tanzania Lands Conservation Trust (TLCT) and villages within the Game Controlled Areas (GCAs). All Game Controlled Areas (GCAs) in the country are potential WMAs (Severre, 2000; WMA, 2002).

The WMAs regulations, Tanzania National Parks Authority (TANAPA) and wildlife policy provides guidelines on benefit sharing in WMAs and GCAs (WPT, 1998; WMA, 2002; Kaswamila, 2003). According to WMA regulations, investors, local or foreign are required to contribute to the improvement of livelihoods in the villages, and in the process help in reducing and eliminating poaching (WMA, 2002). Furthermore, the wildlife policy stipulates that, 25% of total annual hunting fees are to be sent to local

communities who are living within the hunting blocks (WPT, 1998). The TANAPA policy also sets aside 17.5% of the annual Parks revenue to assist in implementing socio-economic projects in villages adjacent to Parks (Kaswamila, 2003).

This thesis shows that in reality the anticipated benefits rarely trickle back to the local community (e.g. see Appendices 11 & 20, Fig. 6.5). For example, in Vilima Vitatu and Sangaiwe, villagers accuse the Northern Hunting Company (NHC) of operating in their village land for almost 20 years without providing tangible benefits to locals (see Appendix 11). The Chief of the Mbugwe tribe in Vilima Vitatu had this to comment on the performance of NHC:

> *"We are not benefiting at all from his activities. He promised to bring running water, build schools and provide employment to our youths. To date none has been implemented" Chief* Mtakaiko (Mbugwe tribe).

The NHC, which has been operating in the block since 1990 (Yanda *et al.*, 2001), has failed to honour promises given to Vilima Vitatu village i.e. building a classroom and provision of running water to Vilima Vitatu village community (Nicolas Bruno, pers. comm.-sub village chairman).

In Soitsambu and Ololosokwan lack of benefit sharing from Ortello Business Company (OBC) was also raised (see Fig. 6.5). Similar allegations from different archive data show the significance of the problem. According to Mr. Raphael Ole Leng'oi, the Loliondo Ward Councillor, OBC obligations in the area included the construction of primary schools, dispensaries, cattle troughs and village road networks and the excavation of boreholes (Arusha Times Newspaper, 2002). To date most of these obligations have not been fulfilled. Peasants and pastoralists in the area are still compelled to travel long distances in search of water.

Local residents admit to receiving some benefits, however they claim that these are insignificant or do not compensate for or match the resources extracted; they also lack binding mechanisms to ensure payments on regular basis (Arusha Times Newspaper, 2002).

> *"It is true that OBC contributes Tshs. 30 million (US $ 30,000) to six villages, equivalent to 5 million (US $ 5,000) per village. The amount was raised only in 2000 despite the company having been in the area since 1993"* (*ibid.*).

The government on behalf of OBC denies these claims. The statement of the government (ministry) on OBC accusations said:

> *"OBC has done the following: contribution towards the development of Ngorongoro District ($ 46,000); construction of Wasso primary and secondary schools, 6 bore holes and cattle dips. The company also purchased 2 buses to enhance local transport and contributed Tshs. 30 million to 6 villages in the hunting area; provided secondary school education to 21 children; purchased a generator; and a water pump worth Tshs. 11 million (US $ 11,000) for provision of water to 6 villages"* (*East African newspaper, 2002).*

The Ngorongoro District Commissioner, retired Colonel A.G.N. Msangi, four months later issued the following statement on OBC accusations:

> *"OBC have invested more money here than any other company in the district. They have given support, which include vehicles, transreceivers and field gear. There is no other district in Tanzania within hunting area, other than Ngorongoro, which receives enormous funds from hunting business for community development. OBC contributes up to US $ 350,000 annually for community development in Ngorongoro"* (*East African newspaper, 2002*).

The government statements clearly show that the central government receives substantial amount of money from hunting companies/investors. However, the money rarely reaches the anticipated beneficiaries i.e. the local people. For example, the primary school constructed at Wasso is about 25 km from the affected villages (Soitsambu & Ololosokwan) (pers. obs.). The buses (now vanished) used to ply between Wasso (the

district headquarter) and Arusha Municipality. Again, the transport facility was not beneficial to the affected population (pers. obs.).

Benefit sharing schemes in the country shows mixed results. For example, between 1992 and 2003, Serengeti National Park (SNP) generated US $ 31 million from tourism but only 1.6% was allocated to adjacent villages for socio-economic development projects (Kideghesho & Mokiti, 2003). Instead, a substantial amount was allocated to law enforcement (*ibid.*). Emerton & Mfunda (1999) in their studies in Western Serengeti; found that an individual household got an average of US $ 2.5 per year from benefit sharing received indirectly through implementation of development projects.

A study by Kaswamila (2003) in 10 villages adjacent to Kilimanjaro National Park, on the impact of Support for Community Initiated Project (SCIP), revealed that between 1994 and 2001 about US $ 213, 000 was spent on socio-economic development projects in four districts (Moshi Rural, Rombo, Hai & Monduli). However, several weaknesses were observed: 70% of the projects were not priority projects to local communities; there were imbalances in fund allocation; and there was nepotism in disbursement of funds and lack of criteria in allocating funds to villages (*ibid.*).

Where decision-making has been devolved to local people, however, for example through eco-tourism, it has been shown to deliver tangible benefits relative to "top-down" projects (e.g. hunting concessions). Community-partnership studies carried out in Northeastern Tanzania on benefit sharing have shown encouraging efforts in respect of poverty alleviation. Oliver's Camp (Simanjiro District), a private sector-community partnership recorded direct financial benefits to the community from employment

wages, village income from wildlife fee collection and spin-off enterprises like beadwork and other crafts (Nelson, 2004). However, only a one-third of the total workers came from the local villages. In Ololosokwan, revenues from land rented (98 km^2) to a South African eco-tourism company and revenues from campsite near the Klein's gate have resulted in the village council's annual budget increase from only US $ 2,500 between 1995 and 1997 to an average of US $ 57,000 between 2000 and 2002 (*ibid.*).

In Sinya (Monduli District), located within the Greater Amboseli ecosystem (Tanzania part), agreement between the village and a local eco-tourism company has led to increase of tourism income generated from bed-night fees. The income increased rapidly during the five years from 1999-2003, from US $ 5,000 to $ 19,000 *(ibid.)*. The income has been used for conventional social service infrastructure priorities, notably construction of the primary school dormitory and maintenance of water supply machinery (*ibid.*). Nonetheless, while some revenue has clearly been invested in socially valuable community projects, much of the revenue has not been used well (*ibid.*).

In Engare Sero (Ngorongoro District), the village hosts two campsites belonging to one tour foreign operator and a modest tented lodge belonging to another operator. But unlike in Sinya or Ololosokwan, neither of these developments had a contractual agreement between the tourist company and the village (Nelson, 2004). A company granted title by the village purchased land for the lodge outright, and the land for the two campsites was apparently settled and developed without any local authorisation (*ibid.*).

The owner of the two campsites pays nothing to the village while the tented camp pays a US $ 5 bed-night fee, considerably less than most villages in the region earn. As a result the village has little stake in income produced by increasing number of tourists (*ibid.*). Estimates of earnings is estimated at US $ 2,500 annually from payments made by lodge, only 5 to10% of that earned through tourism by Sinya or Ololosowan (*ibid.*).

Well-documented cases of community based wildlife management are found widely in different cultural and physical settings, like Sarawak, Malaysia and Quebec, Canada (IUCN, 2000). The most famous case, however, is the CAMPFIRE (Communal Areas Management Programme for indigenous Resources) in Zimbabwe (Jones, 1999; IUCN, 2000; Haule *et al.*, 2002). CAMPFIRE has transferred management responsibility as well as the authority to collect fees from tourists' hunters from the central government to the local level (Haule *et al.*, 2002). Devolution of power to local people has started to bear fruit. For example, CAMPFIRE provides training in managing ventures, developing ancillary enterprises, legal assistance etc. (Jones, 1999). The income earned by rural communities from CAMPFIRE represents an individual annual income of about Z $40 per person or some Z $ 240 per household (IUCN, 2000). However, the success story of CAMPFIRE is debatable due to the fact that there are mixed conclusions about the program (Haule *et al.*, 2002).

The preceding discussion has shown that where local people obtain tangible benefits, these act as an incentive to conservation initiatives and vice versa. Also, community-partnership projects, in particular eco-tourism and game fee hunting are better placed to trickle down benefits to local people. What is important is to devolve power to lower

levels (local people). What the people need is to be equipped with enterprise management skills and clear and transparent contractual agreements.

8.4.2. Encroachments

Encroachment is the most well known form of land alteration, which leads to destruction of natural areas, through land clearance (August *et al.*, 2002; Moulton & Sanderson, 2002). Environmental modifications associated with agriculture, urbanisation, and timber extraction often degrade or destroy natural landscapes through five processes: perforation, dissection, fragmentation, shrinkage and attrition (Gutziwiller, 2002).

In a conservation setting, environmental modifications leads to loss of species and ecological integrity as a result of loss of shelter, breeding places, dispersal and foraging grounds, movement and access to critical resources in other localities (Kideghesho & Mokiti, 2003). In heavily disturbed settings, fragments of original habitat become disconnected from one another and become isolated islands and large predators and wide ranging taxa are first affected by habitat loss (August *et al.*, 2002).

This thesis has shown that encroachment into wildlife habitats for different uses such as agriculture, grazing, settlements, tree cutting - for charcoal, fuel wood and timber, poaching etc. is on the increase in the study area particularly in villages where plans have been implemented (e.g. see plates 5.2, 5.3 & 5.5-5.9). Other forms of encroachment are the erection of permanent structures such as campsites, hotels, lodges, airstrips etc. in wildlife corridors particularly in the Loliondo game controlled area (e.g. see plates 6.1 & 6.2).

The scope of different types of encroachments in areas adjacent to protected areas in Northeastern Tanzania and in other parts of the country is widely documented. For example, Kideghesho *et al.*, (2000) estimates use of 650 m^3/month of wood for charcoal burning in Mwada and Vilima Vitatu villages. The authors further reveal that an average of 137 and 269 bags of charcoal are produced monthly in Mwada and Vilima Vitatu respectively. The most commonly used woody species for charcoal are *Acacia xanthophloea*, *Acacia kirki*, *Acacia siberiana*, *Acacia tortilis* and *Balanites aegyptiaca* (*ibid.*). Because of their dominance, these species are ecologically important. They provide protection to soil, shelter and cover for the wild fauna species. Their over-exploitation therefore, lowers the quality of the corridor as a wildlife habitat and therefore exacerbates the loss of biodiversity. The national estimate of domestic fuel wood use is estimated at $1m^3$ per inhabitant (Madulu, 2000).

Cultivation is also impacting the wildlife corridors in Northeastern Tanzania. The proportion of cultivated lands in the Kwakuchinja corridor linking Tarangire and Lake Manyara National Park has doubled since 1987, from 8% to approximately 16% of the land area (Kideghesho, 2001; Rodgers *et al.*, 2003). The Kitendeni corridor providing the last remnant link between Mount Kilimanjaro and Amboseli National Park in Kenya is similarly threatened by conversion to agriculture (Kideghesho, 2001). This corridor has shrunk from 21 km^2 in 1952 to 5 km^2 in 2001, resulting in a reduction of wildlife habitat and increasing human-wildlife conflicts (Noe, 2003). Cultivation in the Simanjiro plains to the east of Tarangire National Park has increased from 1% to 4% of the total land area, due to both large-scale land alienations and smallholder conversions (TMCP, 2002) leading increased blockage of wildlife migratory routes.

At present, wildlife's status in unprotected communal and private lands in Northern Tanzania is deteriorating in terms of both abundance and diversity due to encroachments (Rodgers *et al.*, 2003). Wildlife in the Tarangire ecosystem, for example, shows signs of undergoing a population crash with respect to species such as wildebeest (*Connochaetes taurinus*), zebra (*Equus burchellii*), hartebeest (*Alcelaphus buselaphus*) and oryx (*Gazella callotis*). Wildlife corridors between Lake Manyara and Tarangire National Parks have been eroded and depleted of their large mammals (*ibid.*). The Tanzania portion of Amboseli ecosystem has been heavily impacted by bush meat exploitation and has lost much of its wildlife (*ibid.*). Through the pressures of open access, exploitation and land-use changes that convert rangeland to cultivation, wildlife populations in Northern Tanzania are increasingly fragmented and depleted (*ibid.*).

To date, Serengeti ecosystem has lost over 40% of its original area (Sinclair & Arcese 1995). This loss is believed to be accelerating rather than abating and it has taken place largely within the legal boundaries of the Park (*ibid.*). It is further observed that the greatest loss occurred between 1960s and 1990s, despite the attention devoted to the area by researchers and conservationists (*ibid.*). The habitat loss in Serengeti through agriculture and other activities has had some serious ecological implications. For example, local extinction of Roan antelope (*Hippotragus aequinus*) in many areas of the ecosystem is linked to loss of its *Combretum* dominated habitats (Campbell & Borner 1995; Sinclair 1995).

Encroachment for agriculture is highly pronounced in Serengeti National Park and Maswa game reserve (Kauzeni, 1995). Mining and settlements is increasingly blocking the migratory corridors while overgrazing by livestock and deforestation augment to loss

of ecological integrity due to land degradation (Kideghesho & Mokiti, 2003). Following destruction of the core breeding and calving grounds for wildebeest caused by mechanised agriculture in the Maasai Mara, part of Serengeti ecosystem, the population of the species is said to have suffered a 75% decrease in numbers in a period between 1977 and 1997 (Campbell *et al.*, 2000).

Encroachment for both subsistence and commercial poaching is at an alarming rate. The results of this investigation show that in Sangaiwe, game worth Tshs. 17,388,270 (US $ 17,000) was poached for both subsistence and commercial purposes between 2001 and 2005 (BDC, 2004, see also Appendix 12). In Esilalei, game trophies worth Tshs. 2,710,258 (US $ 2,700) were poached between 2003 and 2004 (see Appendix 12). In Chemchem, trophies worth Tshs. 5, 360,000 (US $ 5,360) were poached between 2000 and 2004 (see Appendix 19). The most commonly poached game species were: zebra (*Equus burchellii*), buffalo (*Syncerus caffer*), leopard (*Panthera pardus*), eland (*Taurotragus oryx*), bushbuck (*Tragelaphus scriptus*), impala (*Aepyceros melampus*), lion (*Panthera leo*) and elephant (*Loxodonta africana*) (BDC, 2004).

A study around Lake Manyara National Park (LMNP) reveals that out of the 43 elephants reported to have been killed by poachers between 1997 and 2002 only one was killed inside the Park (LMNP, 2002). Subsistence poaching (in particular of bush pigs (*Potamochoerus porcus*), dik dik (*Rynchotragus kirkii*), warthog (*Phacochoerus aethiopicus*), bushbuck (*Tragelaphus scriptus*) and impala (*Aepyceros melampus*), illegal fishing, fuel wood collection, and logging still occur in areas bordering the Park (*ibid.*). Poaching in Tarangire National Park shows that between 1995 and 2000 about 269 poaching cases were reported (TNP, 2002).

In the western part of Serengeti National Park hunting, which is conducted illegally, is regarded as a coping strategy for the livelihood of the majority of local people (Loibooki *et al.* 2002). Illegal hunting is a vital source of protein and income, especially for poor households (*ibid.*). Kauzeni (1995) estimates that as many as 40,000 animals are killed each year in the Serengeti ecosystem due to lack of economic opportunities. Extensive poaching between 1975 and 1986, which was essentially targeted for trophies, drove the black rhinoceros (*Diceros bicornis)* to virtual extinction and caused a drastic decline of 80% in the elephant (*Loxodonta africana)* population (Dublin and Douglas Hamilton 1987 in Sinclair 1995). Hunting is also linked to a severe decline in the buffalo (*Syncerus caffer)* population from 63,144 in 1970 to 15,144 in 1998 (Campbell & Borner, 1995).

It is estimated that some 210,000 herbivores (75,000 residents and 135,000 migratory) are hunted illegally per annum in the western part of Serengeti National Park (Campbell & Hofer 1995; Campbell *et al.*, 2000). Between 1995 and 2002, Serengeti National Park alone arrested some 7,359 poachers, an average of 1,051 per annum (Kideghesho & Mokiti, 2003). This implies that only 1.9% of the estimated number of poachers is arrested annually (*ibid.*). Between July 2002 and June 2003, the court cases filed against poachers in four districts adjacent to the western part of Serengeti National Park i.e. Serengeti, Bunda, Maswa and Magu amounted to some 433 (*ibid.*).

Human population growth along with limited alternative survival strategies has led to extensive utilization of land and other resources at the expense of wildlife. Poverty makes cropland expansion the primary method of increasing agricultural production to

match the increased high human population (*ibid.*). Unless local people get tangible benefits and are provided with alternative sources for e.g. fuel wood, timber, income sources; conservation of corridors will continue to be a long-standing debate. On the other hand, tangible benefits will have implications for socio-economic developments e.g. electrification of residential areas, agriculture expansion through mechanisation which will also have negative impacts on the corridors. Benefit sharing will likely lead to increased development, which will also have negative impacts on the corridors - unless very carefully planned.

The challenge to scientists is to start predicting the future of wildlife corridors in developing countries. Important assumptions among others are to regard societies in rangelands as dynamic and to recognise that they are in transition to change their lifestyles for the better. Local people in rangelands are unlikely to be able to continue depending on natural resources (agriculture/ grazing) and/or fuel wood as source of energy. Long-term strategies are needed now rather than later. Given the high population growth rates in developing countries and people's quest for socio-economic developments, the future of wildlife corridors in developing world is bleak.

With long-term conservation vision, we can prescribe sustainable conservation measures and strategies. Warning signals are exemplified by the significant transformation of the Tanzania's Maasai socio-economic and cultural make-up since the 1980s (Nelson, 2004). Maasai are now cultivating using tractors, they own mobile phones, and are increasingly building modern houses in rangelands. These socio-economic developments are challenges to conservationists - Tanzania Government, International conservation agencies (IUCN, AWF, WWF etc.), and local CBOs (Community-Based Organisations).

8.4.3. Suggestions to make plans effective and mitigate conflicts

An understanding of how local people perceive their problems is a crucial element in the design of projects designed to encourage and support community-based management regimes to enable people to improve their lives and the environment on which those lives depend (Quan, 1998; Lovett *et al.*, 2001; Quinn *et al.*, 2003; 2006). Quinn *et al.*, (2006) argues that in order to mitigate conflicts in common pool resources it is important that people have a greater ability to negotiate over resource management under changing conditions. This will require support from higher institutional levels and better links between management regimes that operate in different parts of the same resource (*ibid.*). The local context is also very important to the construction of management institutions and this should be central to further study in semi-arid resource management regimes (*ibid.*).

The thesis has shown that suggestions given by local people as a way to make plans effective and to mitigate conflicts were similar to those given by "experts" (see Figs. 5.7, & 6.7 & Tables 5.7 & 6.6). The generic suggestions were: an emphasis on benefit sharing; the need to involve local people in planning; recruitment of more rangers; and conservation education. The first two aspects have been discussed in detail in previous sections (see Subsection 8.3.1.3 & Subsection 8.4.1), therefore in this section only conservation education, compensation scheme for destructions caused by wild animals and recruitment of rangers/wildlife officers and/or environmental officers will be discussed.

8.4.3.1. Conservation education

Community conservation education within Tanzania National Parks (TANAPA) and Wildlife Division started in late 1980s as a Community Conservation Service (CCS) pilot project and Community Based Conservation (CBC) respectively (Songorwa, 1999; Siege, 2000). The main objectives of the two programs are to improve relations between protected areas and local communities; facilitate the planned sharing of benefits; and strengthen local institutional capacity (Songorwa, 1999; TANAPA, 2000; Kaswamila, 2003). Currently, all 14 National Parks in the country have fully operational CCS departments (Kaswamila, 2003).

Based on the findings of this study, it is clear that the achievements of both CCS and CBC are far from the local people's expectations (see Figs. 5.7, 6.7 & 7.2). The dissatisfaction of local people probably emanates from three factors: First, the minimal trickle down of benefits (see Subsection 8.4.3.1) compared to the costs endured e.g. crop and livestock depredation, insecurity and disease transmission to livestock and humans. In a situation where communities perceive the social and economic costs as far outweighing the benefits, they can hardly appreciate these efforts and therefore benefit provision becomes a less effective conservation strategy (Emerton & Mfunda, 1999).

Second, the failure of the two programs to disseminate conservation education to a large proportion of people. Field evidence revealed insufficient numbers of CCS staff at Park level (pers. obs.). For example, Tarangire and Lake Manyara National Parks each had one CCS member of staff. On the other hand, Kilimanjaro National Park surrounded by more than 70 villages had only two CCS staff (Kaswamila, 2003). The low staff-area

ratio is an indirect indicator that more staff needs to be recruited in order for the two programs to attain their multiple goals of conservation and development.

Third, the narrow focus of both CCS and CBC programs. Despite the programs having broad objectives, the focus has been on benefit sharing (Kideghesho and Mokiti, 2003), disregarding other important aspects which could have raised people's awareness on conservation issues. Other important aspects which need to be considered include: film or video shows; conservation education in primary and secondary schools; distribution of conservation related leaflets, policies and legislations - in *Kiswahili* language; and organising study tours to successful community conservation at local (e.g. MBOMIPA-Matumizi Bora ya Malihai Idodi na Pawaga, Selous conservation programme) and where possible abroad - e.g. Community Based Natural Resource Management (CBNRM) programmes in Botswana and Nambia, ADEMADE (Administrative Design Programme for Game Management Areas) - Zambia and CAMPFIRE in Zimbabwe.

8.4.3.2. Compensation schemes

In their most common form, compensation schemes reimburse individuals or their families who have experienced wildlife damage to crops, livestock, or property, or who have been injured, killed or physically threatened by wildlife (Nyhus *et al.*, 2005). It is normally in form of cash or in-kind assistance (*ibid.*). The Tanzania wildlife policy does not provide compensation for damage caused by wildlife, however, the agricultural policy (MOA, 1992) has such a provision for damages caused by livestock. The wildlife policy has the following disappointing policy statement related to compensation:

> *"...Accordingly, the government does not intend to introduce a compensation scheme for wildlife damage and will continue to control dangerous animal species as a matter of priority devolving progressively the responsibility for problem animal control to rural communities operating community based conservation programmes. In long-term, alternative strategies to reduce the conflict between people and wildlife will be explored"* (WPT, 1998: pp.22-23).

The lack of any compensation scheme for depredation of crops, livestock and loss of life has both social and economic implications to local people. One respondent who preferred anonymity stated:

> "*We live with wildlife as un-paid wildlife managers, incur all costs, but in turn we are not compensated in any way by TANAPA or the government as an appreciation to our sacrifices. We continue to become worse-off economically*".

Considering the fact that local residents in rangelands live in abject poverty with a per capita income of less than a dollar per day (URT, 2000); depredation by wild animals adds salt to a wound. Initiation of compensation scheme will be an incentive to conserve. Nyhus *et al.*, (2005: p. 109) argues that:

> "*Economics makes ranchers hate the wolf. Pay them for their losses and you will buy tolerance and take away their only legitimate reason to oppose wolf recovery*".

8.4.3.3. Recruitment of wildlife officers and environmental officers

The result of the research suggest that, availability of sufficient number of rangers/wildlife officers and environmental officers at village and district levels are likely to mitigate conflicts and make plans effective. Insufficient numbers of rangers and wildlife officers to deter wild animals have put local communities' property and lives at risk. Currently, there is only one rangers' training institute (Pansiansi) to cater for the whole country (pers. obs.). However, the number of graduates (not > 100/annum) do not meet the demands of the whole country. Similarly, there is only one middle level wildlife training institute in the country (Mweka) with annual graduates not exceeding

100 per annum at certificate and diploma levels (pers. obs.). During this survey, only one village out of the nine – Barabarani – had a ranger (pers. obs.).

Districts and villages also lack trained environmental officers. During this survey, no districts surveyed had any environmental inspectors/officers. Environmental officers could have helped to monitor infrastructural developments in wildlife corridors and to prosecute offenders. The lack of environmental officers is also related to institutional failures to train these experts. Currently, there is no middle level environmental management training institutes in the country. The only institutions capable of training environmental officers are the University of Dar es Saalaam and University of College of Lands and Architectural Studies. However, the number of graduates is low compared with the country's demand.

The preceding discussion has shown that conflicts and encroachments increased after the plans were implemented mainly due to planning weaknesses. The study has also revealed that high quality plans alone cannot ensure their effectiveness in wildlife corridors. There are other important factors which need to go parallel with the plan implementation. They include benefit sharing, conservation education and bylaws formulated by local people themselves. Others are: security of property and lives, short and long-term action plans, availability of reports and maps and in a user-friendly language, and presence of boundary demarcations for different land-use zones. The subsequent section presents a proposed new LUP framework, which has taken into account the main findings from this study.

8.5. A framework for rural land-use planning in wildlife corridors

As stated above, the development of the Buffer Zone Land-Use Planning (BUZLUP) framework is based on the findings of this study. The BUZLUP framework has also taken into account the existing administrative set-ups and the operating sectoral policies/guidelines and legislations in the country e.g. land, wildlife, WMA policies, and village administration set-ups. Figure 8.1 and Table 8.1 provides the structure of the framework in terms of the main planning stages involved and its corresponding activities and output respectively.

The framework is composed of three planning phases: the pre-field (step 1-2), field (steps 3) and post-field phase (steps 4-6) (see Fig. 8.1). The framework, which assumes that land-use planning has been deemed necessary by the local people (it is supported) and both human and financial resources are available for the planning exercise, has several advantages of being: simple, participatory, demand-driven-and locally owned. Implementation is based on resources available at the local level and locals have the right to modify the plan depending on circumstances at hand. The framework is also built on local people's priorities and interests and having taken into consideration the local cultural values and institutions. The planning process is thus also an empowering process by the local people.

8.5.1. Pre-field phase

In this investigation several weaknesses at district and village level were observed, viz: lack of sectoral coordination (see Tables 5.4 & 6.4); formation of planning team members without set criteria (see Tables 5.6 & 6.5); donors negotiating with district administrations only (see Tables 5.4 & 6.4); and lack of power for the village council or

village assembly to reject (on behalf of the local people) projects which they think are non-beneficial (*ibid.*). The suggested activities to be undertaken during the pre-field phase (see Table 8.1) are meant to resolve the above-mentioned weaknesses. In this phase, it is envisaged that, in order to foster sectoral coordination at district level; the District Natural Resource Advisory Board (DNRAB) should have powers of forming land-use planning teams based on some set criteria such as planning qualification/skills and experience. For example, it will be appropriate for the planning team to consist of 3-4 members e.g. rural planner, game officer and a sociologist - with participatory skills and field experience of more than one year.

According to WMA regulations (2002), the DNRAB is chaired by the District Commissioner (political post). Other members include: District Executive Director (political post), heads of district departments - game (secretary), lands, forestry, community development, fisheries, economic planning and representatives from community-based organisations. Where applicable, the provision is extended to representatives from game reserve, National Parks, Ngorongoro Conservation Area and other co-opted experts. These latter have no voting powers on the committee (*ibid.*).

In order to solve the problem of imposing projects from above (district), in the pre-field phase, the suggested activities are meant to ensure that the established District Planning Teams (DPTs) work closely with the village administration set-ups, including providing awareness raising and education on land-use planning. Failure to raise awareness could lead to project rejection. Similarly, donors will be required to negotiate with grass root administration instead of the current practice where the negotiation is only done at district level (see Tables 5.4 & 6.4).

Figure 8.1: Stages for Buffer Zone Land-Use Planning (BUZLUP) framework

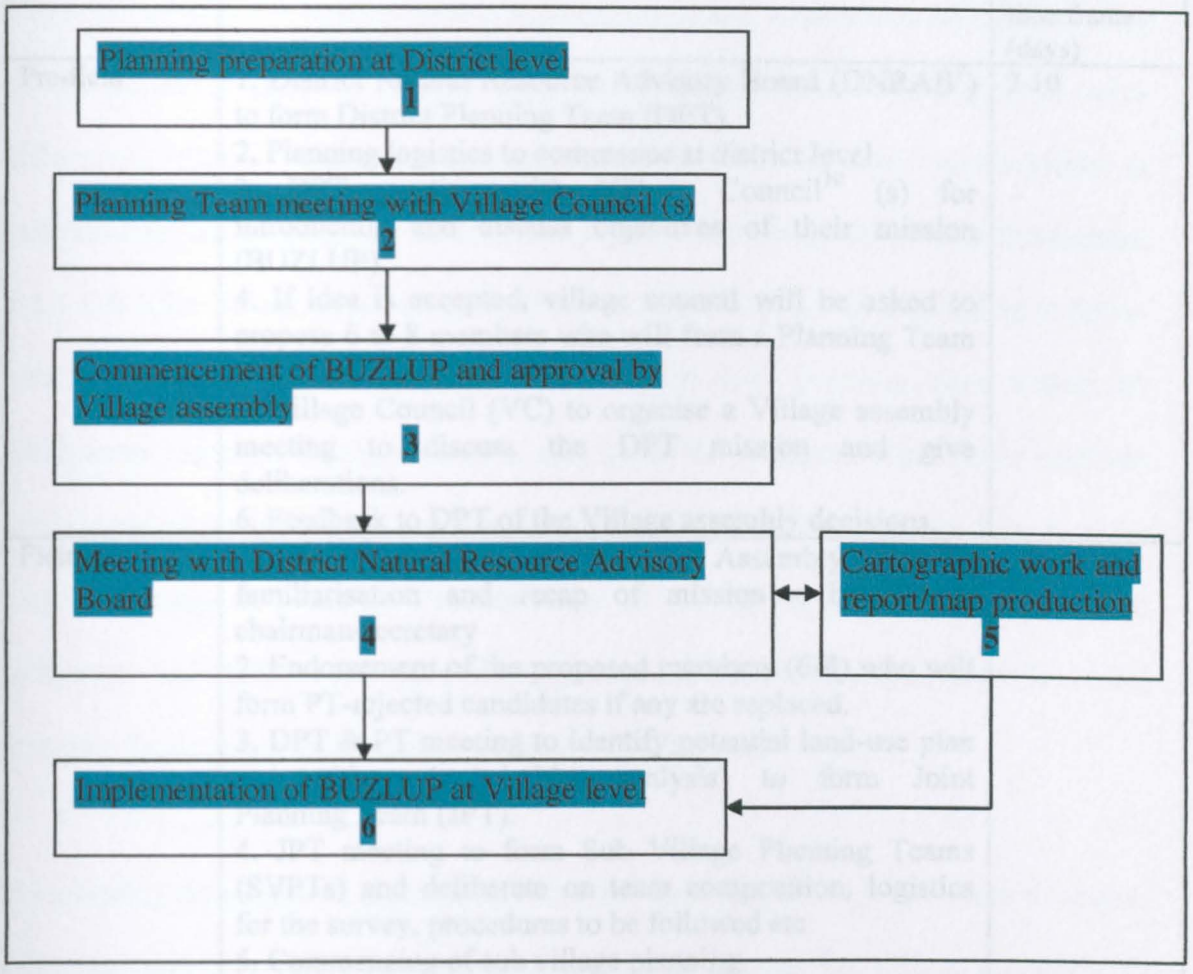


Table 8.1: BUZLUP algorithm of main activities*

Planning phase	Activities	Estimated time frame (days)
Pre-field	1. District Natural Resource Advisory Board (DNRAB[9]) to form District Planning Team (DPT). 2. Planning logistics to commence at district level. 3. DPT meeting with Village Council[10] (s) for introduction and discuss objectives of their mission (BUZLUP). 4. If idea is accepted, village council will be asked to propose 6 to 8 members who will form a Planning Team (PT) at a latter stage. 5. Village Council (VC) to organise a Village assembly meeting to discuss the DPT mission and give deliberations. 6. Feedback to DPT of the Village assembly decisions.	7-10
Field	1. Introduce DPT to Village Assembly (VA[11])- familiarisation and recap of mission - by village chairman/secretary 2. Endorsement of the proposed members (6-8) who will form PT-rejected candidates if any are replaced. 3. DPT & PT meeting to identify potential land-use plan stakeholders (stakeholder analysis) to form Joint Planning Team (JPT). 4. JPT meeting to form Sub Village Planning Teams (SVPTs) and deliberate on team composition, logistics for the survey, procedures to be followed etc. 5. Commencing of sub village planning. 6. Merging of sub village plans-led by local member but facilitated by DPT member (2 plan options desired).	21-28
Post-field	1. Presentation of proposed plan(s) to Village Council for discussion and amendments. 2. Presentation of proposed plan, bylaws, action plan to Village assembly for discussion, amendments and approval. 3. Selected JPT to present the endorsed plan to DNRAB for endorsement. 4. Cartographic work (maps) and report writing 5. Implementation	7-10

*Estimated costs for proposed activities for one village is estimated at Tshs. 11 (US $ 11,000). The costed activities include daily subsistence allowances, transport, cartographic costs, beaconing and production of reports and maps (5 copies).

[9] *The District Council is empowered by law to establish DNRAB mandated to oversee matters relating to the coordination and administration of Wildlife Management Areas. Should consist of no more than 12 members (WMA, 2002).*

[10] *Village government organ in which all executive power is vested to all affairs and business of a village (Lerise, 1998).*

[11] *Is the supreme authority of all matters of general policy making in the village and is responsible for election of the village council. Includes every resident who has attained apparent age of 18 years (Lerise, 1998).*

8.5.2. Field phase

The result of this investigation reveals numerous planning weaknesses, which in turn led to the failure of plans to achieve their set objectives notwithstanding some other influencing factors. Some of the drawbacks include: minimal involvement of stakeholders (see Sections 5.3 & 6.3), less time used for negotiation (see Subsections 5.5.1.1 & 6.5.1.1), lack of planning coordination (see Tables 5.4 & 6.4), failure to devise plan implementation strategies (see Tables 5.3 & 6.4), planning done mainly by technocrats and plans being prepared in isolations. The suggested algorithmic activities in the field phase (see Table 8.1) are intended to empower local people to apply their local knowledge in planning. The advantage of the approach apart from the use of indigenous knowledge is that it provides a good platform for exchange of experience and learning. Technocrats in this planning phase act as facilitators only.

By adopting the suggested algorithmic steps, the local people are empowered to choose planning team members from among themselves - through the village assembly; to involve other stakeholders in planning; and to provide sufficient time for negotiation at sub-village/village levels. Communities have the mandate to accept or reject a project. The process ensures easy implementation of plans and land-use maps can be easily interpreted by local communities (because they are prepared by communities themselves). For example, the village council can propose the planning team members, but the village assembly has the power to reject them. Provision is also extended to involve other land-use plan stakeholders such as neighbouring villages, Tanzania National Parks' (TANAPA) representative, extension workers and community-based organisation representatives. It is suggested that the Joint Planning Team (JPT) should

consist of a maximum of 16 people to enable formation of at least 2-3 sub-village planning teams.

It is recommended that the JPT split and form sub-village planning teams comprising 6-8 members for logistical purposes (planning organisation). The number of sub village team will depend on the size of the village or village administration set-up. Each sub-village team will be facilitated by DPT expert. However, team chairmen needs to come from the local members. The sub-village planning teams will accomplish the following sub-tasks:

8.5.2.1. Sub-village planning outputs

- Socio-economic data - households, family size, economic activities
- Thematic maps using PRA skills: present land-use, migratory routes, individual farm holdings (owner, approximate size, crops grown, soil names-*Kiswahili*/local)
- Proposed land-use plan aimed at conserving wildlife habitats-criteria, reasons for the proposed plan to be probed by facilitator. Input of the facilitator (scientific arguments) is crucial at this stage
- Synthesis of the proposed thematic maps (proposed land-use, migratory routes and soil)
- Proposed bylaws to effect the plan
- Identification of problems and opportunities and
- Development of action plan (both short and long-term).

8.5.2.2. Village planning outputs

After completion of sub-village planning, a joint meeting of all planning teams is then organised. The objective of the meeting will be to present planning outputs, discuss the results and merge the plans. The JPT will nominate one of its members (local) to chair the session meetings. The anticipated outputs from this meeting will include:

- Presentation of the proposed sub-village plans, bylaws and action plans
- Merging of the sub-villages plan and come out with two plan options
- Discuss and adopt appropriate bylaws and action plans
- Proposed date/time to present proposed plan(s) to the village council for discussion
- Presentation of the two proposed land-use plan options, bylaws, actions to the village council for discussion and amendments.

8.5.2.3. Village assembly outputs

- Accept or reject the proposed land-use plans (2 options presented)
- If the plans are accepted, a consensus land-use plan is then endorsed
- Endorsement of bylaws and action plans and where necessary amendments are made.

8.5.3. Post-field phase

This thesis revealed a lack of reports and maps at village and district level, which made plan implementation impossible (see Tables 5.3 & 6.3). Other flaws include: lack of feedback to district authorities, reports and maps being in a language not understood by the majority/technical jargon, and failure for the district councils to assist in the implementation of the plans (*ibid.*). The suggested algorithmic steps ensure that the

proposed plan(s) represents the interests, wishes and aspirations of the local people; maps and reports are available at local level; and district administrations are better placed to assist in the implementation, monitoring and evaluation of the plans.

Representation of local people's interests can be achieved in two ways. First, starting planning at sub-village level in which a large number of people are involved – i.e. led by local people themselves. Second, the proposed plan(s) are presented and discussed by the village council before asking the village assembly for endorsement. These two administrative organs have the mandate to suggest ways in which the plan can be improved before the final endorsement. On the other hand, the presentation of the consensus plan to the District Natural Resources Advisory Board (DNRAB) has several strengths. First, is a way of providing feedback to the district management. Secondly, the Board is likely to put in place strategies which could ensure effective implementation of the plan(s) e.g. provision of funds for monitoring and evaluation. Furthermore, the suggested steps could ensure availability of maps and reports at village level, which are key for plan implementation.

The framework activities in Table 8.1 are consistent with land, wildlife and environmental policies (NEP, 1997; NLP, 1997; WPT, 1998). Implementation of the suggested activities as delineated and discussed above requires an understanding of policy implications of the research findings and making recommendations to achieve sustainable land-use planning in areas where humans co-exist with wildlife. These issues are examined in the forthcoming Chapter (Chapter 9).

CHAPTER 9

9.0. CONCLUSIONS

9.1. Introduction

The central purpose of the research was to evaluate both the process and impact of qualitative LUP in wildlife corridors in Northeastern Tanzania and to develop an improved approach to the LUP methodological framework that would enhance connectivity, wildlife conservation and development objectives in wildlife corridors. In order to achieve the research aim and objectives several assessment methods/indicators (see Table 3.3) were used. In this Chapter, a brief description of how the research aim and objectives were achieved and conclusions about the methodology are presented first. Secondly, policy implications of the findings, recommendations and suggestions for future work are given. Lastly, the general conclusions from the study are highlighted.

9.2. Evaluation of the process and impact of LUP and methodological limitations

9.2.1. Evaluation of the process and impact of LUP

The framework for this subsection is set by the four general research questions that were presented in section 1.3. As the study was an ex-post evaluation, it required an assessment of whether the plans had managed to achieve their set objectives or not. To achieve this, a set of evaluation indicators as presented in Table 3.3 and a review of technical documents were used. Four research objectives were identified: (i) assessment of the impacts of plans in minimising land-use conflicts and conserving wildlife migratory routes and dispersal areas (ii) comparison of the intensity of land-use conflicts between villages with plans and those without (iii) identification of the strengths and weaknesses of the two planning approaches and (iv) development of an improved approach to the LUP methodological framework that would enhance connectivity,

wildlife habitat conservation and development objectives and which could be applied in other similar situations.

Evaluation of the first, second and, in part, the third objective was achieved by obtaining data pertinent to the performance indicators (see Table 3.3) from household and experts interviews; focus group discussions with nomadic ethnic groups; and field visits. In addition, a review of technical reports i.e. land-use plans and general management plans and/or management zone plans were used to evaluate research objective three. To satisfy the research objectives four research questions were posed: (i) to what extent have local residents and other local stakeholders been actively involved in the LUP process? (ii) to what extent have the plans helped in minimizing land-use conflicts and conserving wildlife migratory routes and dispersal areas in the protected area bio-networks? (iii) what are the major practical strengths and weaknesses of these plans? (iv) is there any difference in amount of land-use conflict and/or encroachment into wildlife habitats between villages with and without plans?

9.2.2. Methodological limitations

It is crucial, throughout this interpretation, to keep in mind the limitations (possible sources of bias) that were discussed in Chapter 3 with respect to the attribution problem, use of local research assistants, memory lapse and limitation of analysis, which could influence the conclusions reached. The attribution problem, which is the difficulty of establishing whether it was specifically the land-use planning program that had brought about particular impacts, or whether wider forces were having an impact (McGibbon, 1990) is a problem in all ex-post evaluation. In this study the wider influences could be demographic factors and policy and institutional failures. The implication here is that it

is not actually possible to guarantee that the plans done caused particular effects. The most that can be done is to determine whether the plan's objectives have been met. From the analyses of various performance indicators in Chapters 5 and 6 it is established that conflicts and encroachments increased after the plans were implemented. The degree to which that is due to a plan is then a matter of interpretation (McGibbon, 1990). In an attempt to solve the problem a comparison group of villages, that is villages without plans, were included in the research design.

The use of trained local research assistants was a valuable way of encouraging the local community to air their views more freely and resolve the problem of a language barrier, particularly for the Maasai who were unable to speak *Kiswahili*. However, their use could have introduced some bias thus affecting the accuracy of the data. This bias could have occurred because of the short time period used in their training (3-4 days) and their inexperience in administering the questionnaires. However, to minimise the problems arising from any potential bias the researcher crosschecked the questionnaires immediately after the exercise and where inconsistencies were observed the research assistant was directed to rectify the problem the next day. Overall the use of local research assistants was a strength in terms of the methodology and in terms of empowerment of local communities through the use of acquired knowledge to solve minor researchable problems.

Difficulty remembering events accurately could have affected the information supplied by some respondents since the research was carried out after the plans had been in place for some time. For example, the plans for Soitsambu, Ololosokwan and Chemchem had been implemented more than 10 years before the evaluation. Those for Sangaiwe, Vilima Vitatu and Esilalei were implemented four years ago. In human nature it is

always difficult to memorise past events and again the ability to memorise varies from one person to another. Researchers triggered memories through their introductory statement to respondents (e.g. institutional affiliation, research objectives, agents who prepared the plans, the years in which the plans were implemented etc.).

Limitation of analysis is also a point worth mentioning. On one hand, limited responses to a questionnaire and the belief by the author that the research could be satisfied by employing simple rather than more advanced statistical techniques could be one of the limitations of the analysis in this study. The former made application of some statistical analysis such as Chi-square or parametric analysis inappropriate. However, a process of triangulation was used to verify the findings and minimise the weaknesses. On the other hand, due to the large amount of data collected from a wide range of sources, combining data for analysis proved difficult in terms of time and effort. It was difficult to distinguish the most relevant to the study as at times all the collected data looked crucial. However, this challenge was also a strength in the development of the author's research and analytical skills.

9.3. Policy implications of findings, recommendations and suggestions for future work

9.3.1. Policy implications

The results of this investigation revealed several planning, policy/legislation and institutional failures and flaws, which have made rural land-use plans ineffective in wildlife corridors. The following are the policy implications of the findings:

9.3.1.1. A need to devolve power to local communities

The results of this investigation have clearly indicated that where local people have not been involved in decision-making on major issues affecting their livelihood, conflict has increased as a result. Examples include: loss of vast areas of village land in order to establish reserves (see Figs. 5.5 & 6.5); plans being imposed from above (district or national level); granting of hunting blocks (e.g. see Appendices 11 & 20); and, natural resources policy utilisation formulation.

In addition, policies are required which encourage development of local administrative institutions and which take into account the socio-cultural characteristics of the village concerned. The current systems of village administration are bureaucratic and political. To rectify this, policies geared towards empowering local communities at grass roots level are imperative - e.g. the formation of a Wildlife Management Areas (WMAs) national umbrella organisation - to represent the interests of grass-roots organisations at higher government levels such as that of the ministry or parliamentary level.

9.3.1.2. Need to improve the quality of plan preparation

The thesis has shown weaknesses in the way plans are prepared at village level. Such weaknesses include involving unqualified personnel, lack of rural planning skills, sub standard reports/maps, lack of monitoring and evaluation components, and plans being prepared in a rush (see Tables 5.3 & 6.3). It was evident during the study that rural planning was conducted without coordination between plan implementing agents, and through the use of un-streamlined planning procedures (see Tables 5.4 & 6.4). To a large extent, these problems arise from the lack of rural land-use planning legislation. To ensure efficient rural planning, rural legislation to back-up the existing land management

related policies is urgently needed. The legislation can also have a provision of requiring all practising rural planning professionals to belong to a professional body, which could ensure maintenance of planning standards and ethics.

9.3.1.3. Supportive structures for LUP

The results of this investigation show that plans in wildlife corridors need to go hand in hand with certain conditions for them to be effective, for example equitable benefit sharing, provision of alternatives for natural resource uses - fuel wood, poles, herbs etc. and control of problem animals (see Tables 5.7 & 6.6). The challenge for the government is to formulate policies which could support the implemented plans such as instituting crop and livestock depredation schemes – including conservation incentives and genuine benefit sharing schemes - sending funds direct to villages instead of the current practice where funds are sent to district councils and fail to trickle-down to the intended beneficiaries.

9.3.2. Recommendations

The aim and objectives of this study as stated in section 1.3 were to evaluate both the process and impact of qualitative land-use plans in Northeastern Tanzania and to develop a new framework, which could enhance conservation of wildlife corridors and mitigate conflicts. In order to achieve the aforementioned aim and objectives, this study recommends the following:

- Formation of an independent land-use planning body at national level instead of the current body (NLUPC) under the Ministry of Lands - currently NLUPC comprise staff from the same ministry;

- Strengthening of environmental management departments at district and village level - to facilitate monitoring of undesired developments in wildlife corridors and prosecute offenders;
- Emphasis on conservation education - to include provision of environmental education in schools (primary and secondary), conservation related film shows, study tours, distribution of *Kiswahili* translated conservation leaflets/policies;
- Government to take an active role in rural planning - to work hand in hand with donors/NGOs/CBOs to ensure e.g. plan preparation are executed with qualified personnell;
- More supportive legislative and policy content to be established alongside effective planning e.g. enabling policies and legislation on benefit sharing, provision alternatives for resource restrictions etc.
- Provision of dis-incentives for non-compatible land-uses

9.3.3. Suggestions for future work

- Testing the proposed BUZLUP framework

The aim is to try to test and validate these procedures in several pilot areas in Tanzania where humans and wildlife interact so that lessons learned could be used to improve the framework and extrapolate it to other parts of the country and to other Sub-Saharan countries with similar socio-environmental settings.

- Relationship between operational plans and productivity

The thesis suggests that there is lack of clarity regarding the role and objectives of LUP in the context of rural development in Tanzania. It is therefore important to carry out detailed study that could compare productivity with or without plans to ascertain its cost effectiveness. According to De Pauw (1996) LUP is often used in a way that it makes it

difficult to assert its own identity in relation to physical planning, environmental management, resource assessment, land classification, land management and zoning regulations. He further argues that the biggest problem for LUP, even if well implemented is that it cannot prove its cost effectiveness.

- Predictions on the future of corridors

Taking into account the fast rate of technological development worldwide and rapid change of lifestyles of people living in rangelands; research aimed at forecasting the future of wildlife corridors is suggested. Warning signs are evident in Northeastern Tanzania rangelands (and probably elsewhere in developing countries) such as the emergence of mechanised farming, electrification, increased encroachments and demographic pressure. Research guided by three philosophical questions or assumptions could shed some light what need to be done before it is too late:

(i) Are people living in rangelands going to continue to be poor and natural resource dependent for their livelihood for half-a century or a century to come? (low household income, without electricity and depend on agriculture and grazing)?

(ii) If no, what challenges are likely to emerge? and

(iii) Under such emerging conditions what strategies need to be in place to conserve these wildlife habitats?

- Impact of policies and legislation on the performance of land-use plans

In order for land-use plans to be recognised by rural communities as an important tool in mitigating conflicts in areas where humans co-exist with wildlife, examination of the impact of various policies and legislation relevant to conservation and natural resource management in rangelands is required. The result of such work will be important for policy makers, planners, administrators and politicians.

9.4. Answers to research questions

As stated earlier the research, objectives were to be answered through four research questions (see Section 9.2). In relation to the highlighted research questions and on the basis of empirical evidences obtained from this study, eight conclusions can be drawn:

1. The involvement of land-use plan stakeholders' in planning was low (see Sections 5.3 & 6.3). Overall, the participation of local people in planning in both PLUP and CLUP villages was 19% (n=551). Local people's participation in planning in CLUP villages was five times lower than in PLUP villages. Other plan stakeholders such as village extension workers, minority Barabeig and Park staff were not involved at all.
2. Converging evidence from various data collection methods/indicators suggest that conflicts and encroachments increased after the plans were implemented in the six villages (see Sections 5.4 & 6.4). 80% (n=551) of the local people and 69% (n=13) of "experts" in planned villages perceived conflicts and encroachments as having increased after the implementation of the plans. Increased blockages of corridors for different uses e.g. agriculture, settlements, campsites, lodges, aerodrome etc., environmental degradation - deforestation for charcoal making, poles, uncontrolled wildfires etc. were evident during the field visits in five planned villages except Chemchem (see Subsections 5.4.4 & 6.4.3).
3. The four main conflicts in areas where humans co-exist with wildlife in Northeastern Tanzania as perceived by local people are: the establishment of community reserves (WMAs)/TLCT; boundary disputes with National Parks; depredation of crops and livestock by wild animals; and restrictions to use the reserves areas/buffer zone (OBC) to harvest forest/non-forest products and for livestock grazing purposes particularly during critical pasture stress periods (see

Figs. 5.5 & 6.5). Other less pronounced conflicts are lack of tangible benefit sharing, indiscriminate killing of wildlife by OBC, ranger harassments to local people and environmental degradation.

4. Implemented plans had several strengths and weaknesses (see Tables 5.3 & 6.3). However, the latter overshadowed the strengths as its impacts led to the ineffectiveness of the plans (see Sections 5.3, 5.5, 6.3 & 6.5). The strengths were the involvement of different professionals in planning and an attempt to translate land-use plans (WWF) and reports into *Kiswahili*, the Tanzania national language. However, several weaknesses were observed. These include: inaccessibility of reports/maps at village level; lack of short-and long-term plan implementation guidelines; poor quality plans; lack of land-use boundary makers to guide the land-users; lack of criteria for land-use designations; and failure to take into account the socio-economic factors during the planning process.
5. The amounts of conflicts in planned and unplanned villages were comparable (see Fig. 7.3). Perceived conflicts in planned villages were 80% (n=551) while in unplanned villages was 86% (n=301). In addition, encroachment in planned villages was 33 times lower than in planned villages (see Fig. 7.3). These indications provide further evidence that the implemented plans were ineffective.
6. Tarangire, Lake Manyara and Serengeti National Parks failed to involve local communities from adjacent villages in the preparation and implementation of the Park's GMPs and this led to increased antagonism between Parks and local people (see Subsections 5.3.4 & 6.3.3).
7. Plans in wildlife corridors in Northeastern Tanzania are likely to succeed if most of these conditions are satisfied. These are: equitable benefit sharing between local people and investors; strengthening of conservation education; protection of

local peoples properties; implementation of compensation schemes and local level decision-making empowerment on major issues affecting their livelihood e.g. granting of hunting concessions to investors, loss of land as result of establishing protected areas/community reserves; benefit sharing policy formulation etc. (see Table 5.7 & 6.6).

8. Both conventional and participatory plans failed to attain its set objectives of mitigating conflicts and enhancing of wildlife migratory routes and dispersal areas. The failure was mainly due to planning weaknesses (see Section 8.3). Stakeholders could not be involved fully in planning; plans were implemented in isolation and lack of rural planning skills and participatory techniques. To ensure effectiveness of the plans BUZLUP framework has been proposed (see 8.5).

The research suggest that, the success of plans in wildlife corridors does not solely depend on how well the planning process was carried out, in terms of meaningful local participation in planning, use of qualified and experienced staff, enabling land policies, availability of implementation strategies, holistic planning and legislation and availability of reports/maps. The above-mentioned conditions for plan success are supported by several scholars (Hogwood & Gunn, 1984; Gray, 1989; Mazmanian & Sabatier, 1989; Kauzeni *et al.*, 1993; De Pauw, 1996; Lerise, 1998; Margerum, 2002; Calbick *et al.*, 2003; 2004; Dalal-Clayton, 2003; Gunton & Day, 2003; Joseph, 2004; Karin *et al.*, 2004).

The thesis has shown that there are other necessary conditions, which need to go hand-in-hand with the plans. These necessary requirements, which were identified by both local communities and experts include: equitable benefit sharing between local communities and investors; strengthening of community conservation education among communities adjacent to protected areas; protection of local people's properties and lives; compensation for the losses caused by wild animals; and decision-making empowerment on major issues affecting their livelihood strategies - establishment of WMAs, granting of hunting concessions, and in policy formulation.

The aforementioned issues and problems related to planning weaknesses have been accommodated in the new BUZLUP framework which hinges on local people's active participation, other potential land-users' involvement and empowerment of local communities in making decisions for major issues and problems directly or indirectly affecting their livelihood survivals. As stated earlier however, the success of BUZLUP depends on how effectively the other parallel plan measures will be considered.

The study concludes that land-use planning in wildlife corridors if well implemented by taking into account the interests, wishes, and aspirations of the local communities has a better chance of conserving wildlife corridors in the short-term. The long-term survival of these corridors seems to be bleak, given the demographic pressure, technological advancement and changing of lifestyles of communities living in rangelands.

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APPENDICES

Appendix 1a: Itinerary-Babati and Monduli Districts

Date	Venue(s)	Contacted	Main activities
10/2- 5/3/04	Arrival in Tanzania	Several	Literature reviews, purchase of base maps, field work logistics, research permission letter sent to district councils (Babati, Monduli, Ngorongoro, Karatu and Same Districts)
8-10/3/04	Visit to Babati District	Regional and District officials	-Courtesy call to District officials -Access to plans and reports -discussion on natural resources issues and problems
11-13/3/04	Visits to Sangaiwe, Vilima Vitatu and Tarangire National Park	Ward, village Park officials	-Discussion with village leaders-dates for interviews, selection of research assistants-to be trained
15/3/04	Sangaiwe/Vilima Vitatu	Meeting with research assistants	Discuss logistics for training
17-20/3/04	Vilima Vitatu	Research assistants	-Training sessions for research assistants (Sangaiwe and Vilima Vitatu)
23/3/04	Sangaiwe	Research assistants	-Pre-testing of questionnaires
24/3/04	Vilima Vitatu	Research assistants	-Pre-testing of questionnaires
26-27/3/04	Sangaiwe	Village leaders/game scouts	-Village reconnaissance (field visits)
29/3-9/4/04	Sangaiwe	Selected households	-Interviews
10/4/04	Sangaiwe	Extension workers	-Interviews
12/4-13/4/04	Vilima Vitatu	Village leaders/game scouts	-Village reconnaissance (field visits)
14-23/4/04	Vilima Vitatu	Selected households	-Interviews
24/4/04	Vilima Vitatu	Extension workers	-Interviews
27-28/4/04	Tarangire National Park	Chief Park Warden and Park officials	-Interviews
30/4/04	Monduli District Council	District officials	-Courtesy call to District officials -Access to plans and reports -Discussion on natural resources issues and problems
3-4/5/04	Esilalei	Ward, village Park officials	-Discussion with village leaders-dates for interviews, selection of research assistants-to be trained
6/5/04	Esilalei	Research assistants	-Training logistics
10-13/5/04	Esilalei	Research assistants	-Training
14/5/04	Esilalei	Research assistants	-Recap of training sessions
17/5/04	Esilalei	Research assistants	-Questionnaire pre-testing
20-21/5/04	Esilalei	Village leaders/game scouts	-Reconnaissance survey (field visits)
24/5/04	Tanzania Lands Conservation Trust (TLCT)	TLCT leaders	- Discussion with TLCT administration
26/5-5/6/04	Esilalei	Selected households	- Interviews

Appendix 1b: Itinerary-Karatu,Ngorongoro and Same Districts

Date	Venue(s)	Contacted	Main activities
7-8/6/04	Karatu District Council	District officials	-Courtesy call to District officials -Access to plans and reports -Discussion on natural resources issues and problems
10-14/6/04	Chemchem, Barabarani and Migombani visits	Ward and village officials	-Courtesy call to ward/Village officials - Discussion with village leaders-dates for interviews, selection of research assistants-to be trained
16/6/04	Mto wa Mbu	Research assistants	-Logistics for training
17/6-21/6/04	Mto wa Mbu	Research assistants	-Training (Chemchem, Barabarani and Migombani)
13-25/6/04	Chemchem, Barabarani and Migombani	Research assistants	-Questionnaire pre-testing
1-2/7/04	Barabarani & Migombani	Village leaders and game scouts	-Village reconnaissance (Barabarani & Chemchem)
5-6/7/04	Mto wa Mbu	Lake Manyara National Park officials	-Discussion and interviews
8-17/7/04	Barabarani	Selected households	-Interviews
19-28/7/04	Migombani	Selected households	-Interviews
29-31/7/04	Mto wa Mbu	Extension workers	-Interviews
5-7/8/04	Chemchem	Village leaders/game scouts	-Village reconnaissance (field visits)
9-18/8/04	Chemchem	Selected households	-Interviews
23-24/8/04	Wasso (Loliondo)	Ngorongoro District officials	-Courtesy call to District officials -Access to plans and reports -Discussion on natural resources issues and problems
25-28/8/04	Soitsambu, Ololosokwan, Kleins Gate (TANAPA) and Conservation Africa visits	Ward and village officials	-Courtesy call to ward/village officials - Discussion with village leaders-dates for interviews, selection of research assistants-to be trained
31/8/04	Soitsambu	Meeting with research assistants	-Training logistics
2-7/9/04	Soitsambu	Research assistants	-Training (Soitsambu and Ololosokwan)
8/9/04	Soitsambu	Research assistants	-Recap of training sessions
9-11/9/04	Soitsambu /Ololosokwan	Research assistants	-Questionnaire pre-testing
13-16/9/04	Soitsambu /Ololosokwan/OBC (denied access)	Village leaders/game scouts	-Village reconnaissance
20-30/9/04	Ololosokwan	Selected households	-Interviews
4-15/10/04	Soitsambu	Selected households	-Interviews
18/10/04	Same	District officials	-Courtesy call to District officials -Access to plans and reports -Discussion on natural resources issues and problems
20-22/10/04	Mkonga-Ijinyu and Mkomazi Game Reserve Head Office	Ward/Village and Reserve leaders	- Discussion with village leaders-dates for interviews, selection of research assistants-to be trained
25-26/10/04	Mkonga-Ijinyu	Village leaders/game scouts	-Village reconnaissance (visits)
28/10/04	Mkonga-Ijinyu	Research assistants	-Training logistics
29/10-2/11/04	Mkonga-Ijinyu	Research assistants	-Training
3-4/11/04	Mkonga-Ijinyu	Research assistants	-Recap of training and questionnaire pre-testing
5-14/11/04	Mkonga-Ijinyu	Selected households	-Interviews
July-August 2005	Sangaiwe, Vilima Vitatu, Loliondo	District and village officials	- verification of previously collected data

Appendix 2: Household questionnaire-planned villages

(In villages with either conventional or participatory plan)

Village:.....Date.....

A. Socio-economic characteristics

What is your name?.....

1. Sex? Male 1 ☐
   Female 2 ☐
2. Age? 18-34 years 1 ☐
   35-54 years 2 ☐
   >54 years 3 ☐
3. Education level? Primary (Std 1-VIII) 1 ☐
   Secondary (I-VI) 2 ☐
   Above 3 ☐
   Non-formal 4 ☐
4. Ethnic group? Maasai 1 ☐
   Mbugwe 2 ☐
   Barbeig 3 ☐
   Other (specify)..... 4 ☐
5. What is the size of your household?
   1-2 people 1 ☐
   3 people 2 ☐
   4 people 3 ☐
   > 4 people 4 ☐
6. How long have you been in this village?
   < 1 year 1 ☐
   1-3 years 2 ☐
   4-6 years 3 ☐
   > 6 years 4 ☐
7. What is your main economic activity? (Tick one)
   Agriculture 1 ☐
   Livestock keeping 2 ☐
   Handcrafts 3 ☐
   Other (specify) 4 ☐

B. Land-use plan

8. Where you involved in the plan preparation at any stage? (In case of participatory plan)

Yes	1 (go to Q9a)	☐
No	2 (go to 11)	☐

9a. Please compare the levels of the land-use conflicts problems before the plan.

Before plan		
High	1	☐
Moderate	2	☐
Low	3	☐
Don't know	4	☐

9b. Please compare the levels of the land-use conflicts problems after the plan.

After plan		
Increased	1	☐
Decreased	2	☐
Same	3	☐
Don't know	4	☐

10a. Please compare the level of encroachment into wildlife migratory routes before the plan.

Before plan		
High	1	☐
Moderate	2	☐
Low	3	☐
Don't know	4	☐

10b. Please compare the level of encroachment into wildlife migratory routes after the plan.

After plan		
Increased	1	☐
Decreased	2	☐
Same	3	☐
Don't know	4	☐

11. What are the main land-use conflicts in your village? (*mention at least three*)

.....

.....

.....

12. Is human encroachment on wildlife habitats a problem now?

Yes	1	☐
No	2	☐

13. What is the nature of human encroachment?

Agriculture	1	☐
Grazing	2	☐
Settlement	3	☐
Other *(Mention)*	4	☐

14. What are your suggestions to make the plan effective and mitigate conflicts i.e. land-use conflicts and encroachments *(Mention at least three)*

.....

.....

.....

15. Do you have any leadership role in the village?

Yes *(go to Q16)*	1	☐
No *(end of interview)*	2	☐

16. Mention your post.....

17. How do you assess the land-use conflicts?

Increased	1	☐
Decreased	2	☐
Same	3	☐
Don't know	4	☐

18. How do you assess encroachment problem?

Increased	1	☐
Decreased	2	☐
Same	3	☐
Don't know	4	☐

THANK YOU

Appendix 3: Household questionnaire-un-planned villages

(In villages without land-use plan)

Village:.....Date.....

A. Socio-economic characteristics

1. What is your name?.....

2. Sex?
   - Male 1 ☐
   - Female 2 ☐

3. Age?
   - 18-34 years 1 ☐
   - 35-54 years 2 ☐
   - >54 years 3 ☐

4. Education level?
   - Primary (Std 1-VIII) 1 ☐
   - Secondary (I-VI) 2 ☐
   - Above 3 ☐

5. Ethnic group?
   - Maasai 1 ☐
   - Mbugwe 2 ☐
   - Barabeig 3 ☐
   - Other (specify)..... 4 ☐

6. What is the size of your household?
   - 2 people 1 ☐
   - 3 people 2 ☐
   - 4 people 3 ☐
   - > 4 people 4 ☐

7. How long have you been in this village?
   - < 1 year 1 ☐
   - 1-3 years 2 ☐
   - 4-6 years 3 ☐
   - > 6 years 4 ☐

8. What is your main economic activity? (Tick one)
   - Agriculture 1 ☐
   - Livestock keeping 2 ☐
   - Handcrafts 3 ☐
   - Other (specify)..... 4 ☐

B. Conservation and conflicts

9. Among the below mentioned problems, mention the *three* most pertinent ones in your village?

Land-use conflicts	1	☐
Low crop yields	2	☐
Human Encroachment of wildlife migratory routes	3	☐
Land scarcity for agriculture	4	☐

10. Specify the land-use conflicts *(mention at least three)*

.....

.....

.....

11. What are your suggestions to minimise land-use conflicts in the village?

.....

.....

.....

THANK YOU

Appendix 4: extension officer's questionnaire-planned villages

(In villages with either conventional or participatory plan)

Village:.....Date.....

A. Socio-economic characteristics

1. What is your name?.....

2. Sex? Male 1 ☐

Female 2 ☐

3. Post?

Game officer	1	☐
Agriculture and livestock officer	2	☐
Forestry officer	3	☐
Social development officer	4	☐
Other (*please specify*)	5	☐

4. How long have you been in this village?

< 1 year	1	☐
1-3 years	2	☐
4-6 years	3	☐
> 6 years	4	☐

B. Land-use plan

5a. Where you involved in the plan preparation?

Yes	(*go 6*)	1	☐
No	(*go to Q5b,*)	2	☐

5b. Are you aware of the existence of such a plan?

Yes	1	☐
No	2	☐

6a. Please compare the levels of the land-use conflicts problems before the plan.

Before plan

High	1	☐
Moderate	2	☐
Low	3	☐
Don't know	4	☐

7b. Please compare the levels of the land-use conflicts problems after the plan

After plan

Increased (*go to Q10*)	1	☐
Decreased (*to Q8, 9,10*)	2	☐
Same (*go to Q10*)	3	☐
Don't know (*go to Q10)*	4	☐

8a. Please compare the level of encroachments before the plan.

Before plan

High	1	☐
Moderate	2	☐
Low	3	☐
Don't know	4	☐

8b. Please compare the level of encroachments after the plan.

After plan

Increased	1	☐
Decreased	2	☐
Same)	3	☐
Don't know	4	☐

9. What are your suggestions to mitigate make plans (*Mention at least three reasons)*

.....

.....

.....

THANK YOU

Appendix 5: extension officer's questionnaire-un-planned vilages

(In villages without land-use plan)

Village:.....Date.....

A. Socio-economic characteristics

1. What is your name?.....

2. Sex?
   - Male 1 ☐
   - Female 2 ☐

3. Post?
   - Game officer 1 ☐
   - Agriculture and livestock officer 2 ☐
   - Forestry officer 3 ☐
   - Social development officer 4 ☐
   - Other (*please specify*) 5 ☐

5. How long have you been in this village?
   - < 1 year 1 ☐
   - 1-3 years 2 ☐
   - 4-6 years 3 ☐
   - > 6 years 4 ☐

B. Conservation and conflicts

6. Among the below mentioned problems, which one do you consider more pertinent? (*Rank them in order of importance*)
   - Land-use conflicts 1 ☐
   - Human-wildlife conflicts 2 ☐
   - Low crop yields 3 ☐
   - Encroachment of wildlife migratory routes 4 ☐
   - Land scarcity for agriculture 5 ☐

7. How do you assess the level of land-use conflicts in your village?
   - High 1 ☐
   - Moderate 2 ☐
   - Low 3 ☐
   - Don't know 4 ☐

8. What is the nature of land-use conflicts?

.....

.....

.....

9. What are your suggestions in resolving land-use conflicts in your villages? *(Give at least three suggestions)*

.....

.....

.....

10. How do you assess the level of human encroachment on wildlife migratory areas in your village?

High	1	☐
Moderate	2	☐
Low	3	☐
Don't know	4	☐

11. What is the nature of encroachments *(Mention at least three)*

.....

.....

.....

12. What are your suggestions to minimise human encroachment in these areas? *(Give at least three suggestions)*

.....

.....

.....

THANK YOU

Appendix 6: questionnaire for park staff

GENERAL

Park ..... District.....

Interviewee..... Post..... Qualification:.....

LAND-USE PLAN

1. Are you aware of the existence of land-use plans in your neighbouring villages?

Yes (go to Q.2)	1	☐
No	2	☐

2. Have the plans in these villages helped in reducing land-use conflicts and encroachments?

Yes	1	
No	2	☐

3. If the answer to Q.2 is no, could you please give reasons? (at least three)

.....
.....
.....

4. Are the village land-use plans compatible with your Park General Management Plan?

Yes	1	☐
No *(go to 5)*	2	☐

5. What are the general management problems you are experiencing as the result of incompatibility?

(i).....
(ii).....
(iii).....
(iv).....

6. What are your suggestions to address these problems?

(i).....
(ii).....
(iii).....

7. What are your proposals to make any land-use plan effective in wildlife corridors in future?

(i).....
(ii).....
(iii).....

THANK YOU

Appendix 7a: A checklist of LUP reports assessment criteria

- Planning process procedures used
- Planning approach used - conentional or participatory
- Report contents
- Types of data collected
- Land-use zonation designation criteria
- Appropriateness of map scales used
- User-friendlines-language used, compactness, conciseness
- Qality of illustrations e.g. maps
- Presence or absence of monitoring, evaluation and EIA component
- Availability of reports/maps at village and district level

Source: Author's LUP experince (> 20 years)

Appendix 7b: Margin of error statistical table for a randomly selected sample*

Finding from survey (%)	95% confidence interval
50/50	±9.8
40/60	±9.6
30/70	±9.0
20/80	±7.8
10/90	±5.9
5/95	±4.3

Source: Hoinville & Jowell, 1978, p.69; Veal, 1997, p.211; *Sample size=100

All sample surveys are subject to margin of statistical error. The margins of error, or 'confidence intervals', for this survey are as follows:

How the table is interpreted:

Suppose we have a sample of 100 (in this study this was the sample size/village) and we have a finding that 30% of the sample have a certain characteristic-say, have been away on holiday (so 70% have not been on holiday). Reading off the table, for a sample size of 100, we find that a finding of 30% (and 70%) is subject to a confidence interval of ± 9.0. So we can fairly certain that the population value lies in the range of 21% and 39%.

Example:

Suppose a survey is conducted with a sample of 100 and it is found that 20% of respondents went swimming and 30% played football. The 20% is subject to a margin of error of ± 7.8 and the 30% is subject to a margin of ± 9.0. Thus it is estimated that the proportions playing the two activities are as follows:

Swimming: between 12.2 and 27.8% Football: between 21 and 39%.

The confidence intervals overlap, so we cannot conclude that there is any 'significant' difference in the popularity of the two activities, despite a 10% difference given by the survey. Where no overlap e.g. swimming: between 16.5 and 23.5% and tennis: between 26.0 and 34.0%, in this case we can be 95% confident that football is more popular than swimming.

Appendix 8a-8c: Cross-tabulation for pre-and post-plan conflicts in PLUP villages

Appendix 8a: Sangaiwe*

			Post-plan ratings (%)			
			Increased	Decreased	Same	Don't know
Pre-plan ratings (%)	High	14	7	7	0	0
	Moderate	9	4	2	3	0
	Low	75	41	7	27	0
	Don't know	2	0	0	0	2
		n=42**	n=22	n=7	n=12	n=1

Null hypothesis: Amount of conflicts before and after the plans are the same
*=not significant at 0.05 level **=Total respondents

Appendix 8b: Vilima Vitatu*

			Post-plan ratings (%)			
			Increased	Decreased	Same	Don't know
Pre-plan ratings (%)	High	29	0	29	0	0
	Moderate	15	10	0	5	0
	Low	56	38	9	5	4
	Don't know	0	0	0	0	0
		n=21**	n=10	n=8	n=2	n=1

Null hypothesis: Amount of conflicts before and after the plans are the same
*=not significant at 0.05 level **=Total respondents

Appendix 8b: Esilalei*

			Post-plan ratings (%)			
			Increased	Decreased	Same	Don't know
Pre-plan ratings (%)	High	3	0	3	0	0
	Moderate	34	17	14	0	3
	Low	60	47	3	7	3
	Don't know	3	3	0	0	0
		n=19**	n=13	n=4	n=1	n=1

Null hypothesis: Amount of conflicts before and after the plans are the same
*=not significant at 0.05 level **=Total respondents

Appendix 9a-9c: Cross-tabulation for pre-and post-plan encroachments in PLUP villages

Appendix 9a: Sangaiwe*

			Post-plan ratings (%)			
			Increased	Decreased	Same	Don't know
Pre-plan ratings (%)	High	31	21	5	5	0
	Moderate	2	0	0	2	0
	Low	53	19	5	27	2
	Don't know	14	0	0	0	14
		n=42**	n=17	n=4	n=14	n=7

Null hypothesis: Amount of conflicts before and after the plans are the same
*=not significant at 0.05 level **=Total respondents

Appendix 9b: Vilima Vitatu*

			Post-plan ratings (%)			
			Increased	Decreased	Same	Don't know
Pre-plan ratings (%)	High	56	14	37	5	0
	Moderate	20	5	10	5	0
	Low	14	5	0	9	0
	Don't know	10	5	0	0	5
		n=21**	n=6	n=10	n=4	n=1

Null hypothesis: Amount of conflicts before and after the plans are the same
*=not significant at 0.05 level **=Total respondents

Appendix 9b: Esilalei*

			Post-plan ratings (%)			
			Increased	Decreased	Same	Don't know
Pre-plan ratings (%)	High	20	7	7	3	3
	Moderate	37	24	10	3	0
	Low	33	23	0	10	0
	Don't know	10	0	0	0	10
		n=19**	n=10	n=3	n=3	n=3

Null hypothesis: Amount of conflicts before and after the plans are the same
*=not significant at 0.05 level **=Total respondents

Appendix 10: Cross-tabulation of land-use conflict and gender (independent) in PLUPs

Land-use conflict	Sangaiwe (%)-n.s.		Vilima Vitatu (%)-n.s		Esilalei (%)-ns	
	Male	Female	Male	Female	Male	Female
Crop/livestock depredation	38	23	33	27	14	0
Land scarcity due to establishment of WMA/TLCT	30	65	17	37	62	100
Boundary conflict with TNP	24	12	28	18	n.r	n.r
Restriction to graze in TLCT	8.	0.	22	18	24	0
	n=56	n=41	n=30	n=20	n=37	n=9

n.s.=not significant at 0.05 level n.r.=not relevant TLCT=Tanzania Lands conservation Trust WMA=Wildlife Management Area.

Appendix 11: Recent conflict situation in PLUP villages (Vilima Vitatu & Sangaiwe)

Hunting firm upsets Manyara villagers

2005-12-25 08:16:38
By Adam Ihucha, Arusha

A number of villagers surrounding Lake Burunge tourist bloc in Nkaiti ward in Babati District, Manyara Region, are up in arms over the prospective e bloc investor allegedly for denying them an opportunity to benefit from the villages' land allocated for forest and wildlife conservation. As a result the villagers mainly from **Vilima Vitatu**, Minjingu, Mwada and **Sangaiwe**, have threatened to evict the company, contending that they are tired of being undermined. According to the villagers, the tourist-hunting firm, which had been exploiting natural resources in Burunge hunting bloc for almost 20 years, had done nothing in terms of development project that the surrounding villages can show the next generation as the firm's symbol even if it will opt to quit.

"Ever since the Northern Hunting Enterprises took over our tourist hunting bloc about 20 years ago, we ended up being beaten and having our farming implements confiscated whenever we are found operating in the bloc," The Vilima Vitatu Village chairman, Belela Erasto, told visiting reporters. With the exception of hunting, Belela said, the law of the land allows the surrounding villagers to undertake any other activities in the hunting bloc, including settlement, grazing and farming. On his part, the Minjingu village Chairman, Israel Saitoti, concurred with his counterpart that the hunting company was not supporting the four villages surrounding Lake Burunge hunting bloc despite the fact that the villages had invested a lot in conserving the bloc.

"We spent most of our time in conserving the Burunge bloc, hoping that one day it would pay us back particularly after acquiring the investor, but to our astonishment, not a single director of the Northern Hunting Enterprises, had ever visited us for the past two decades now" Saitoti explained. He, however, cited services that were badly needed by the four villagers as including health, water, education and road infrastructures, but unfortunately until now the investor does not show interest to support even a single of them. The villagers were also concerned by the move by Northern Hunting employees to block resident hunters from hunting within the bloc, arguing that the decision was further denying the villages a chance to generate revenue from their natural resources.

They further charged the firm allegedly for conspiring with a certain game officer to restrict the resident hunters to hunt in the Burunge Hunting bloc against the 1974 Wildlife Conservation Act number 12. They said the law allowed the resident hunters to access natural resources in controlled and open area, except national Parks, Ngorongoro conservation Area and game reserves. Edina Issa, a member of vilima Vitatu village executive committee, said: "it is high time the investor was evicted to give a room for a co-operative one to work with us."

In his reaction, the **Babati District Game** officer, Nation Makocheka, said he was compelled to prevent the resident hunters from hunting in the tourist blocs because the hunters were applying wild methods that scared away wildlife. Speaking over the phone from Dar es Salaam, the Northern Hunting Director, Mousir Shein, refuted the allegations, terming them "baseless". He said the company had given 10m/- each to Vilima vitatu and Mwanda villages to assist in the construction of office and dispensary buildings.

SOURCE: *SUNDAY OBSERVER* (www.ipp.media.com accessed on 25/12/2005)

Appendix 12: Examples of the post-plan identified problems in PLUPs villages

Village	Year	Type of conflict/pests	Number of cases reported	Extent/estimated loss/crops
Sangaiwe[a]	2003-2004	Crop destruction by wild animals (vervet monkey, buffalo, elephant)	12 (2 cases in 2003 and 10 in 2004)	150 tons of crops (50 in 2003 and 100 in 2004): maize, sunflower, cowpeas, groundnuts)
	2001-2005	Game meat poaching	73	Tshs.17, 388,270 (US $ 17,400)*
	2004-2005	Fire incidences in WMA	10	-
	2003	Illegal grazers caught in WMA	10	-
		Loss of life	1 (1 person killed by elephant	-
Vilima Vitatu[b]	2001-2004	Crop destruction by wild animals (elephant, baboon, buffalo)	-	29 ha of crops (2001) 9 ha of crops (2002) 10 ha of crops (2003) 9 ha of crops (2004)
		Average of people caught doing illegal activities/annum in WMA	-	10 People/annum
		Wildfire incidences in WMAs	-	2 cases/annum
Esilalei[c]	2003-2004	Game meat poaching	8	Tshs. 2,710,258 (US $ 2,700)*
	2004-2005	Crop destruction by wild animals (elephant, buffalo)	10	Maize, beans

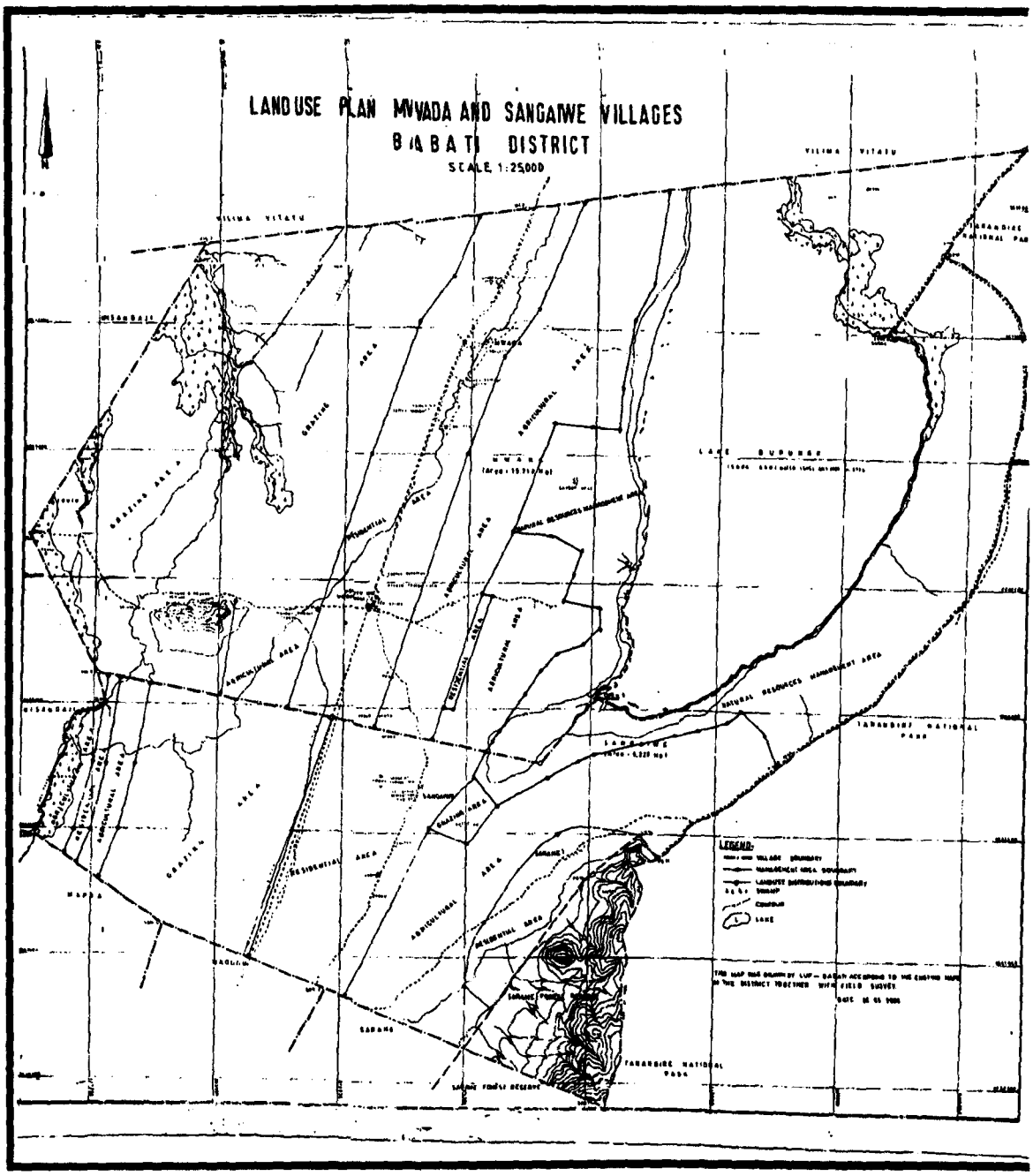
Sources: [a] Sangaiwe Village Office, 2005 [b]=Vilima Vitatu village office & physical field observations, 2005 [c]=Esilalei village office, 2005. Tshs=Tanzania Shillings WMA=Wildlife Management Areas. *=BDC (2004)

Appendix 13: Land-use planning activities and related budget for Sangaiwe and Vilima Vitatu

Major activity	Amount (Tshs)	Duration used	% of time used in land-use preparation
Introduce the objectives of land-use plan to village government	435,000 (Payment for 2 staff and 25 village councillors (86 % of total)	1	4
Reconnaissance By 2 survey staff and 5 village Councillors?	165,000 (2 staff and 5 village Councillors (45 % of total)	3	17
Purchase of materials (drawing/tracing papers in Dar/Arusha	Daily subsistence allowances and materials 98,000	2	10
Presentation of maps and reports to village government in each village	348,000 (drawing pens one set 280,000 and reams of paper: 68,000)	1	4
By-laws preparation and justification of by-laws by 4 District staff (2 DGO/DFO/AFO); 25 village committee members and 2 leaders (WEO/Councillor)	4 District staff (500,000) 2 Leaders (60,000) 25 Councillors (750,000)	10	47
Presentation of by-laws to village council for discussion 25 village committee members, 2 wildlife officers, forest officers, agricultural officer, WEO and Councillor	265,000	1	4
Seminar for village Council (25), traditional leaders (5), policy analysis to leaders and stakeholders	Perdiem leaders (150,000) Fuel/papers (135,000)	2	10
Formation of responsible committees at village level (data analysis, committee training, village scouts formation)	765,000	1	4

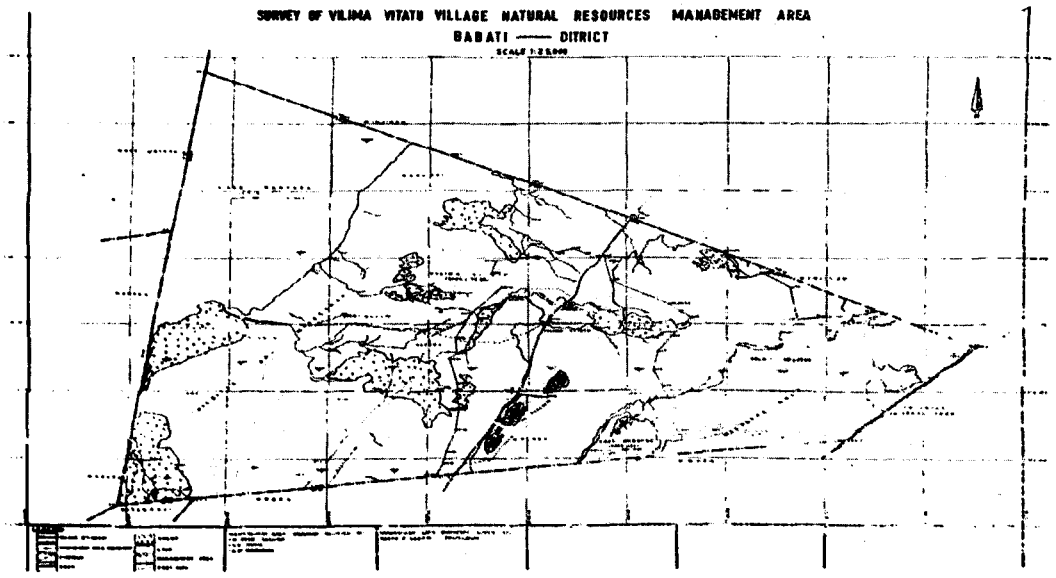
Source: District Game Office, Babati, 2004. n.r.=not related activity

Appendix 14: Sangaiwe village land-use plan



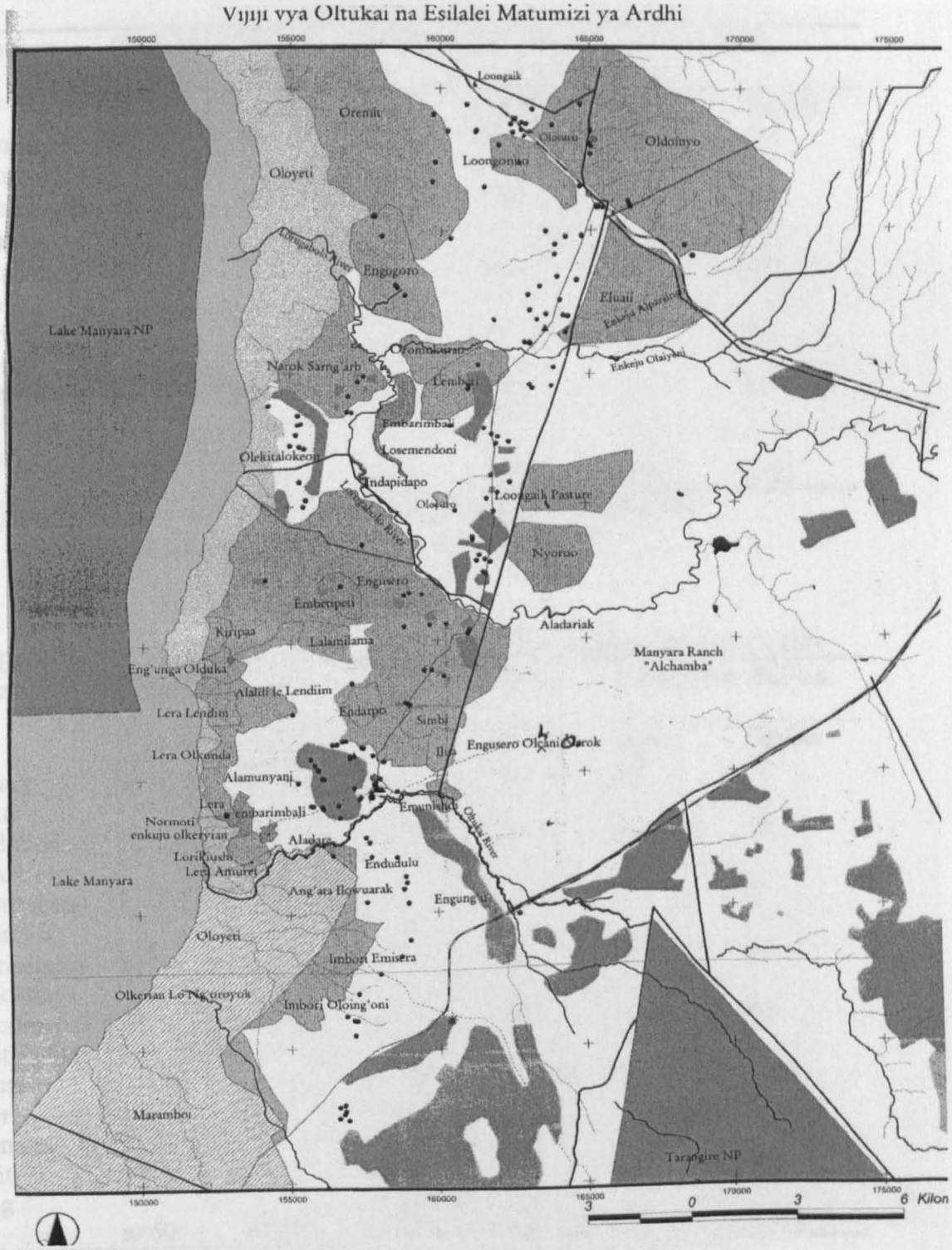
Source: AWF (2005a)

Appendix 15: Vilima Vitatu land-use plan



Source: AWF (2005b)

Appendix 16: Esilalei land-use plan



Source: WWF/TPO (2002)

Appendix 17: Cross-tabulation of household suggestions to minimize conflict and gender in PLUPs

Suggestions	Sangaiwe (%)-n.s		Vilima Vitatu (%)-n.s.		Esilalei (%)-n.s.	
	Male	Female	Male	Female	Male	Female
Economic benefits	67	46	19	10	n.r.	n.r.
Involve people in planning	25	18	27	10	65	29
Compensation scheme	0	27	n.r.	n.r.	n.r.	n.r.
Conservation education	8	9	27	60	n.r.	n.r.
Intensify patrols/fence reserves	n.r.	n.r.	27	20	35	71
	n=43	n=39	n=43	n=40	n=31	n=21

Null hypothesis: There is no relationship between suggestions and gender
n.s.=not significant at 0.05 level n.r. =not relevant

Appendix 18: Cross-tabulation of conflicts and gender (independent) in CLUPs

conflicts	Soitsambu (%)-n.s.		Ololosokwan (%)-n.s.		Chemchem (%)-n.s.	
	Male	Female	Male	Female	Male	Female
Boundary conflicts	56	39	57	52	87	90
Depredation of livestock/crops	24	35	21	16	9	10
Environmental degradation	7	14	6	0	2	0
Indiscriminate game killings	10	3	n.r.	n.r.	n.r.	n.r.
Restrictions to harvest forest products	2	7	12	29	n.r.	n.r.
Ranger harassments	1	0	n.r.	n.r.	2	0
Benefit sharing	0	2	4	3	n.r.	n.r.
Total	n=60	n=30	n=55	n=33	n=56	n=15

Null hypothesis: There is no relationship between conflicts and gender
n.s.=not significant at 0.05 level n.r. =not relevant

Appendix 19: Examples of the post-plan identified problems in CLUPs

Village	Type of conflict/pests	Number of cases reported	Extent/estimate
Soitsambu	Land-use	Protest march of Maasai elders in Dar es Salaam against indiscriminate killing of game by OBC, (Environmental news service of 26/6/2000)	-
		International dispute between Kenya conservationists and Tanzania over indiscriminate hunting in part of Tanzania (East African of 4/4/2002 and 8/12/03)	-
		Fighting between Maasai and Sonjo over grazing land: Sub-machine guns, poisonous spears, machetes used (Majira local news paper of 10/9/2004)	-
Ololosokwan	Land-use	2 fighting incidences between Maasai and Sonjo over grazing area (Mwananchi local newspaper of 19/7/2004; The guardian local newspaper of 30/10/2004)	4 people died and a number of houses set ablaze
		Threats to take Tanzania to international court by Kenya restricting wildlife movements through hunting (East African newspaper of 8/12/2003)	-
		A letter titled stop killing fields of Loliondo with reference no L/32.Pipex.02 sent to the President of the United Republic of Tanzania (MERC, 2003)	-
Chemchem[a]	Crop destruction (vervet monkey, hippopotamus, baboon, wild pig)	-	148 ha of crops (maize, finger millet, beans)
	Poaching for game	69	Tshs. 5.360,000 (US $ 5,360)

Sources:. [a] Chemchem village office, 2005.

Appendix 20: Recent development of conflicts in CLUP villages (Soitsambu and Ololosokwan)-Loliondo

Hunting contracts destroying wild life

2005-10-06 07:11:08
By Karaine Lukumayi

Daily campaigns are made on wild life conservation, but it is amazing to note that some individuals still get hunting contracts through unknown means. AS Tanzanians prepare for the general elections on October 30, this year, many pastoralist families in the country and Loliondo in particular, go to bed hungry. They are also psychologically disturbed because their treasured ancestral pastureland and wildlife are no longer in their hands.

In Loliondo and many other parts of the country endowed with wildlife, foreigners have extended a long hand, all this through contracts some of which are dubious. In fact to many Tanzanians bad memories still linger about the manner in which the Emirates Brig. Mohamed Abdul Rahim Al -Ali, was given an exclusive right to hunt in the area more than ten years ago. The manner raises eyebrows. The contract permits hunting and trapping of animals, some of which are later airlifted to the Emirates, contrary to the wishes of the residents. They were not even consulted on the matter.

Those who happen to go near the companies hunting areas are often harassed and arrested by its security guards. According to reliable sources, the application for the hunting contract did not go through the normal channel. Worse still, its approval did not receive any expert evaluation including Environmental Impact Assessment (EIA). Reliable sources say that a few days before the signing of the contract the emirate leader frequented the ministry of tourism and natural resources headquarters for talks with senior officials.

It is also reported that colleagues who attempted to block the signing of the contact were given verbal warning; while others were transferred or demoted. The tactics were targeted to create a conducive atmosphere to facilitate issuing of the hunting contract. Very reliable sources revealed that the contract was hurriedly approved and hunting licences issued to Brigadier Al Ali. It is sadly recalled that immediately after the contract was signed on November 20, 1992, Loliondo residents, the mass media together with some environmental activists protested in the strongest terms and challenged the government's decision to allow the Emirate man to hunt in the Game Controlled Area, but their views were ignored.

Surely, readers would be interested in knowing what happened after the contract was signed. Since he started hunting, there have been a lot of complaints from the local community. Horror stories on unsustainable hunting and violation of human rights have been appearing frequently in the national press. We should not lose sight, to some people, Loliondo is now a time bomb. The general elections are approaching. But what is disturbing is that since the campaigns were launched on August 21, 2005, not a single political leader has touched the issue of unsustainable hunting in Loliondo. It is high time the issue is made a leading agenda on the 2005 elections campaign programme.

SOURCE: *GUARDIAN (www.ippmedia.com ACCESSED ON 25/12/2005)*

Appendix 21a: Chemchem land-use plan

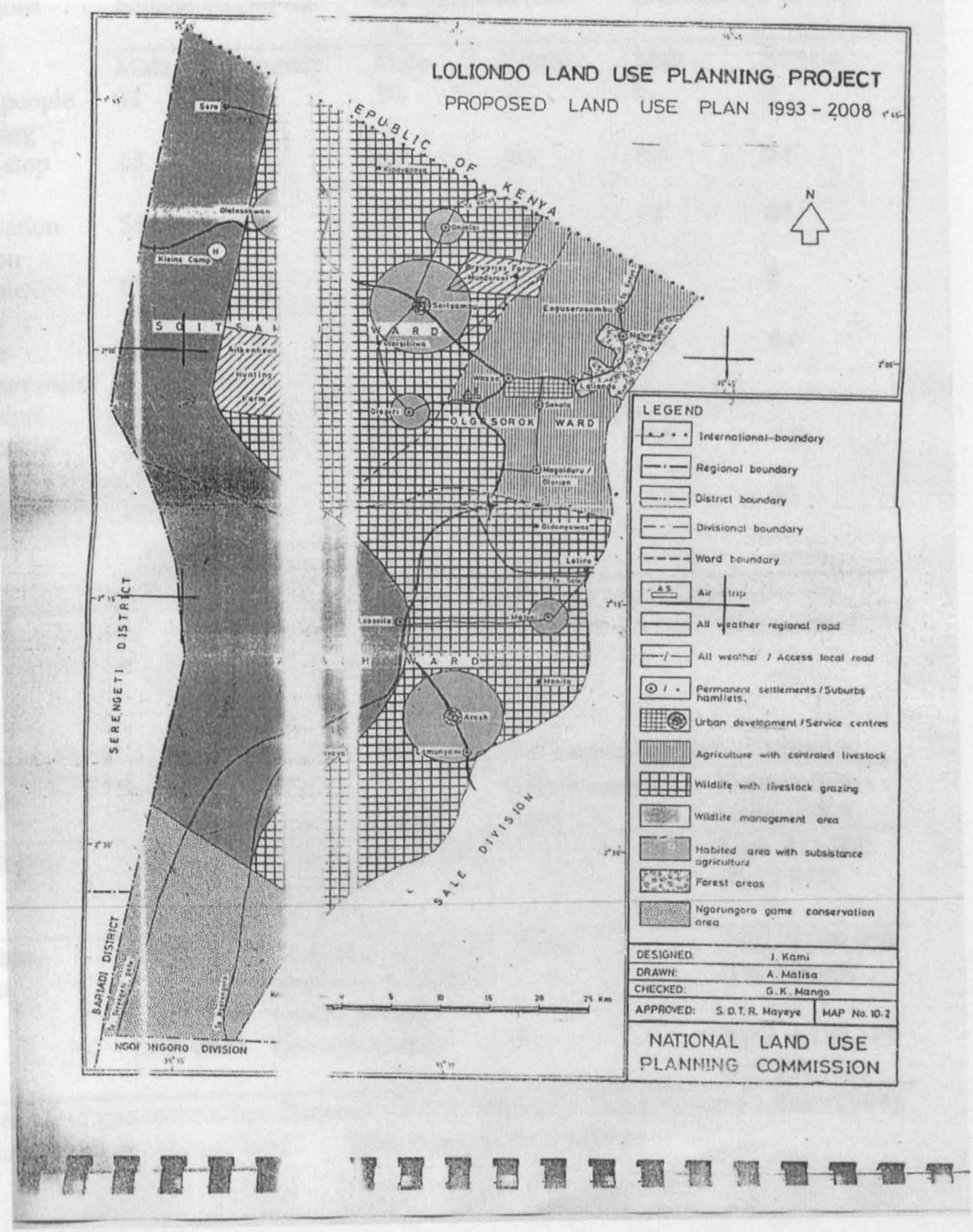
SOURCE: MAGOGO (1990)

Appendix: 21b: Chemchem map legend

LEGEND

Map unit	Area (ha)	PHYSIOGRAPHY	SOILS	LAND SUITABILITY	
				CULTIVATION	EXTENSIVE GRAZING
		Hills and escarpments			
HV3	60	Volcanic hills which rise from the volcanic plain. Slopes over 16%	Rubble land with small pockets of shallow or moderately deep dark reddish brown clays developed in weathering products of basaltic lava.	Not suitable	Not suitable
HG3	135	The gneissic Manusa hill. Slopes over 16%.	Rock outcrops with pockets of undifferentiated deep soil derived mainly from weathering products of acid gneiss with mixtures of volcanic material.	Not suitable	Not suitable
EV3	440	Volcanic escarpments. Slopes 10 to 45%	Rubble land with small pockets of shallow or moderately deep dark reddish brown clays developed in weathering products of basaltic lava.	Not suitable	Not suitable
		Footslopes			
FV0	60	Relatively less eroded parts of the footslopes of the Manusa hill. Slopes about 5%.	Very deep, well drained very dark greyish brown clays overlying dark brown or dark reddish brown clays, developed mainly in colluvium of volcanic nature with admixtures of weathering products of acid gneiss.	suitable	suitable
FV1	50	Footslopes below the escarpments and volcanic hills. Dominant slopes 4 to 16%	Deep or very deep, well drained dark reddish brown clays in places with polygonal cracks over 2 cm wide. Slightly stony or stony on the surface	moderately suitable	suitable
FV2	10	Extremely stony and rocky parts of footslopes below the escarpments. Dominant slopes 4 to 16%	Deep or very deep, well drained dark reddish brown clays; extremely stony and rocky.	marginally suitable	suitable
FX0	60	Lower footslopes of the Manusa hill. Slopes 1 to 2%	Compact, very dark grey loam or clay loam developed in gneissic colluvium overlying very dark grey sandy clay loam or clay loam developed from poorly sorted, mixed alluvium.	moderately suitable	suitable
		Dissected Volcanic Plain			
RV1	680	Broad convex tops of ridges. Slopes 0 to 4%	Very deep, well drained, dark reddish brown clays formed in volcanic material. They are mainly slightly stony on the surface and have cracks in some places.	suitable	suitable
RV2	970	Upper slopes of ridges. Slopes 4 to 10%.	Very deep, well drained, dark reddish brown clays formed in volcanic material. They have a surface pavement of stones.	marginally suitable	suitable
		Bottomlands			
VV3	220	Major valleys and gorges. Slopes 10% to over 25%.	Outcrops of fragmented basaltic rock with small pockets of soil formed in volcanic material.	not suitable	not suitable
GV0	610	Mbuga. Slopes less than 1%	Very deep, poorly drained, very dark grey or very dark greyish brown, calcareous, cracking heavy clays formed in old alluvium.	not suitable	moderately suitat
AX0	170	Alluvial plain. Slopes 0 to 3%	Well drained, moderately thick loamy topsoil overlying layered sandy and loamy material. The soils are developed from mixed alluvium.	moderately suitable	suitable
BX	530	Badlands: minor valleys and erosional complexes and eroded footslopes of Manusa hill. Slopes 4 to 25%.	Undifferentiated moderately deep or deep, gravelly sandy loams and sandy clay loams formed mainly in volcanic material with admixtures of gneissic material. In some parts the soils are compact and cemented	not suitable	not suitable

Appendix 22: Soitsambu and Ololosokwan land-use plan



Source: NLUPC (1994)

Appendix 23: Cross-tabulation of general household suggestions to minimize conflicts and gender in CLUPs

Suggestions	Soitsambu (%)-n.s.		Ololosokwan (%)-n.s.		Chemchem (%)-n.s.	
	Male	Female	Male	Female	Male	Female
Involve people in planning	31	0	50	32	6	0
OBC to stop hunting	13	14	n.r.	n.r.	n.r.	n.r.
Conservation education	56	71	25	37	63	67
Economic benefits	0	14	10	5	19	0
Remove hotels/campsites in corridors	n.r.	n.r.	10	11	n.r.	n.r.
Allow use of buffer	n.r.	n.r.	5	10	n.r.	n.r.
More rangers needed	n.r.	n.r.	0	5	12	33
Total	n=32	n=21	n=48	n=30	n=74	n=14

Null hypothesis: There is no relationship between suggestions to minimize land-use conflicts and gender n.s.=not significant at 0.05 level n.r. =Not relevant
OBC=Ortello Business Company.

Appendix 24: Crop destruction by wild animals in "Comparison Group" villages

Village	Year	Conflict type/crops/pests	Extent/reported cases	Estimated loss (Tshs./ US $)
Barabarani	2003	Crop destruction by elephants (maize/rice)	-	Tshs. 815,000 (US $ 815)
Mkonga-Ijinyu	1999-2003	Crop destruction by elephants & buffalo (maize/beans)	57 ha	Tshs. 9,000,000 (US $ 9000)
	1999-2004	Game poaching	8	Tshs. 4,192,774 (US $ 4,192)

Source: Ward executive office-Barazani (2004); Mkomazi Game Reserve office (2004); Barabarani village office (2004). Tshs. =Tanzanian Shillings.

Appendix 25: Cross-tabulation of conflicts and gender (independent) in CG villages

Land-use conflicts	Barabarani (%)-n.s.		Migombani (%)-n.s.		Mkonga-Ijinyu (%)-n.s.	
	Male	Female	Male	Female	Male	Female
Crop destruction	32	43	14	3	n.r.	n.r.
Land scarcity	32	35	26	24	14	42
Irrigation water distribution problems	4	7	6	0	n.r.	n.r.
Restriction to harvest forest products	2	4	4	0	n.r.	n.r.
Boundary conflicts with reserve/park	30	25	50	73	74	44
Ranger harassments	n.r.	n.r.	n.r.	n.r.	8	9
Insufficient buffer zone	n.r.	n.r.	n.r.	n.r.	4	5
Total	n=56	n=28	n=50	n=29	n=50	n=45

Null hypothesis: There is no relationship between conflicts and gender

n.s.=not significant at 0.05 level n.r. =not relevant n=respondents CG=comparison villages'.

Appendix 26: Cross-tabulation of general household suggestions to minimize conflicts and gender in CG villages

Suggestions	Barabarani (%)-n.s.		Migombani (%)-n.s.		Mkonga-Ijinyu (%)-n.s.	
	Male	Female	Male	Female	Male	Female
Relocate landless people	43	52	43	50	n.r.	n.r.
Fence reserve/intensify patrols	23	9	5	0	10	9
Land-use plan needed	17	30	49	45	6	5
Compensation scheme needed	8	0	n.r.	n.r.	n.r.	n.r.
Build dams in reserve/corridor	n.r.	n.r.	n.r.	n.r.	4	2
Increase reserve buffer zone	n.r.	n.r.	n.r.	n.r.	80	84
Reserve/park to improve relationships	9	9	3	5	n.r.	n.r.
Total	n=53	n=23	n=37	n=22	n=51	n=43

Null hypothesis: There is no relationship between suggestions to minimize land-use conflicts and gender n.s.=not significant at 0.05 level n.r. =Not relevant
n=respondents. CG=comparison villages'.