

**ENVIRONMENTAL CRITERIA ANALYSIS CAN
CONTRIBUTE TO SUSTAINABLE LOCAL LEVEL LAND
USE PLANNING – LINYANTI/KATIMA MULILO
RURAL/KABBE CONSTITUENCIES, CAPRIVI REGION,
NAMIBIA**

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ABSTRACT

The contribution of local knowledge to land use planning and sustainable utilization of natural resources is enormous, yet often overlooked by conventional top-down approaches of regional integrated land use plans. The rich knowledge of local land users contribution to implementation of top-down plans is very important.

The study investigates the importance of environmental criteria analysis in sustainable land management through engaging the community at local level, using Salambala Conservancy in Katima Mulilo Rural, Lusese Village in Kabbe and Mayuni Conservancy in Linyanti constituencies, Caprivi region, North East Namibia as case studies.

Looking at an array of environmental indicators and land use practices which people use, the study investigates the proportional contribution of complex indigenous land use management strategies of the environment. It further revealed that wherever different groups of people use land and its resources, land use is always planned, consciously or subconsciously.

The study uses several methods to capture these issues of interest. Evaluation of environmental sustainability through an appropriate environmental framework is applied as an approach to engage local level land use planning. Pressure State Response Framework (PSR) was found to be useful methodology at local community level for identifying the right indicators for monitoring objectives.

It was also established that Participatory Rural Appraisal (PRA) was an appropriate method for engaging the local community at different levels to participate in activities for land use planning. The PRA exercises could help to generate knowledge and understanding of seemingly logical decisions on land uses through familiarisation with background information on study sites.

The study concludes by demonstrating how the problem of integrating environmental considerations into land use plans can be overcome. One of the main conclusions from the study is that there is an alternative possible way of engaging and integrating local level land use practices (LUP) with regional land use plans. The expectation is that there is a need to integrate bottom-up local level planning with regional planning in order to ensure environmental and development sustainability.



DECLARATION

I declare that *Environmental Criteria Analysis can contribute to Sustainable Local Level Land Use Planning in the, Katima Mulilo Rural, Linyanti and Kabbe Constituencies, Caprivi Region, Namibia* is my own work, that it has not been submitted for any degree or examination in any other university, and that all sources I have used or quoted have been indicated and acknowledged by complete references.

Panduleni Ndiba Hamukwaya

November, 2007

Signed.....



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List of Abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
ASEC	Australian State of the Environment Committee
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resources Management
CDC	Constituency Development Committee
CEARC	Canadian Environmental Assessment Research Council
DEAT	South Africa Department of Environmental Affairs and Tourism
DPSIR	Driving Forces Pressure State Impact Response
EA	Ecosystem Approach
EMIN	Environmental Monitoring and Indicator Network
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
ICEMA	Integrated Community-Based Ecosystem Management
IDC	International Development Consultancy
IECN	Integrated Environmental Consultants Namibia
ILUP	Integrated Land Use Planning
IPBN	Indigenous People's Biodiversity Network
ISLM	Integrated Sustainable Land Management
IUCN	The World Conservation Union
KAZA	Kavango Zambezi
LUPA	Land Use Planning and Allocation
LUP	Land Use Planning
MAWF	Ministry of Agriculture and Forestry
MET	Ministry of Environment and Tourism
MLR	Ministry of Lands and Resettlement
NBSAP	Namibia's Biodiversity and Action Plan
NDP	National Development Plan
NGO	Non-Governmental Organisation
OECD	Organization for Economic Cooperation and Development
PESILUP	Promoting Environmental Sustainability Through Improved Land Use Planning
PLAAS	Programme for Land and Agrarian Studies
PRA	Participatory Rural Appraisal
PSR	Pressure State Response
SAB	Science Advisory Board
SLM	Sustainable Land Management
SoER	State of Environment Report
UME	Ugandan Ministry of Environment
UN	United Nations
UNDP	United nation Development Programme
UNEP	United Nation Environmental Programme
UWC	University of the Western Cape
VDC	Village Development Committee
WRI	United Nation Resource Institute
WHO	World Health Organisation

CHAPTER 1

1.1 INTRODUCTION

This study emanates from the general supposition that most often the rich knowledge of local land users in rural settings is regularly overlooked by conventional top-down approaches of regional Integrated Land Use Planning (ILUP), although their contribution to smooth implementation of top down plans is seen as important. Land Use Planning (LUP) has often had negative connotations because it was traditionally associated with top-down procedures (FAO, 1993). In line with centrally planned economies, land users have been advised or coerced to use their land based on a scientific assessment of its capability (FAO, 1993). However, the definitions have moved in recent years towards using planning in a more advisory capacity and as a mechanism to support the decisions of the land users to attain their objectives¹. Planning has also come to be viewed as one step in land resources management.

According to GTZ (1999), LUP is an iterative process based on the dialogue amongst all stakeholders aiming for the negotiation and decision for a sustainable form of land use in rural areas as well as initiating and monitoring its implementation. It provides the prerequisites for achieving a sustainable form of land use which is acceptable as far as the social and environmental context are concerned and is preferred by the society while creating sound economic sense.

GTZ (1999) emphasised further that participants in LUP are direct and indirect land users, as well as those affected by the consequences of land use activities. These groups include people who often have political or economic influence. This includes authorities, organisations, middlemen and women. Despite this position, the most important target group in LUP is made up of the direct land users. In this regard, the study investigates the importance of environmental criteria analysis in sustainable land management through engaging the community at local level, using Salambala Conservancy in Katima Mulilo Rural, Lusese Village in Kabbe and Mayuni Conservancy in Linyanti constituencies, Caprivi region, North East Namibia as case studies. It therefore serves as the case study areas best suited for this investigation.

¹ FAO (1993), described LUP as the systematic assessment of land and water potential, alternatives for land use and economic and social conditions in order to select and adopt the best land use options.

Looking at an array of environmental indicators and land use practices which people use in these areas, the study investigates the contribution of complex indigenous land use management strategies to environmental sustainability. The study revealed that wherever different groups of people use land and its resources, land use is always planned, consciously or subconsciously.

Agenda 21 (1992) is the results of the UN (United Nations) Conference for Environment and Development in Rio de Janeiro. The post-Rio conventions, such as those dealing with biodiversity and desertification, have called for a more integrated approach to planning and management of land resources.

Since ILUP is intended to provide information and enable stakeholders to select and put into practice those land uses that best meet the needs of the people while safe guarding resources for the current and future generations, there should be a need to adopt an Ecosystem Approach (EA). According to Neufeld *et. al.* (1994), integrating ecosystem considerations into planning will help prevent development decisions from prejudicing future ecosystem and human integrity.

The study recognises the concept of 'ecosystem approach' as a framework that puts people and their natural resource use practices at the centre of decision-making. It is intended to demonstrate the applicability of environmental sustainability as an approach to local level LUP. The EA, which in this context refers to the management of land, water and living resources that promotes conservation and sustainable use in equitable way (Smith & Maltby, 2003), formed the overall guiding principle under which the study methods are formulated for answering the study questions. The approach requires an ecological context for decision making, reflecting the way impact of human activities on the natural environment is assessed and managed. This assumes that land resources management, which is the actual practice of the use of the land by the local human population, has to be considered in EA to LUP activities. The decision makers in government and private sector also have to draw up plans for land use with the objective of incorporating environmental sustainability. Adopting a position on ecosystem planning is part of the contribution to discussions on integrating environmental considerations and priorities into the planning process (Neufeld *et.al.*, 1994). An EA to LUP will help to provide early and systematic guidance on the inter-

relationship between human activities and ecosystem health and integrity over time. This means treating ecological goals equally and simultaneously with economic and social goals.

The challenge that this study wishes to explore is to what extent the study methods will capture these issues of interest, including the concept of EA to LUP. In other words, the study seeks to evaluate environmental sustainability through an appropriate environmental framework to engage local level LUP. Pressure State Response Framework (PSR) [Hammond et al., 1995; Gouzee *et. al.*, 1995], was found to be a useful methodology at local community level for identifying the right indicators, and dealt more specifically with natural environmental issues. The PSR framework has been used extensively in the development of State-Of-The-Environment Reports (SOER) (DEAT, 1999).

The PSR framework also links pressures on the environment as a result of human activities, with changes in the state (condition) of the environment because of pressure on land quality. Society then responds to these changes by instituting environmental and economic programmes and policies, which feed back to mitigate the pressure (OECD, 1993). This study has identified the response mechanism achieved by direct actions of local community themselves and looked at improved land management strategies adopted by the communities in response to pressure and conditions of the land.

The PSR framework was opted for Namibia, making it currently the most widely used framework to identify the right indicators for monitoring objectives (MET, 2000). The objective of this study is to demonstrate that the PSR framework can be used at the local level to identify key sets of indicators to monitor and evaluate environmental conditions, prompted by how resource users plan and utilize their resources. Monitoring of environmental conditions is an essential component of the EA to planning (CEARC *et. al.*, 1986; Horak *et al.*, 1983).

The study has also established that Participatory Rural Appraisal (PRA) is an appropriate method for engaging the local community at different levels to participate in activities for land use planning. The PRA exercises could help to generate

knowledge and understanding of seemingly logical decisions on land uses through familiarisation with background information on study sites.

In considering the importance of these methods, this dissertation is an attempt to show that there is a growing need for evaluations in the role of land uses and their impact on resources utilization. Poor links between top-down regional planning and community level LUP in Caprivi region (IECN, 2005), is also prompted by absence of knowledge of the impact of different land uses. Dewdney (1996) also states that inappropriate land uses and management practices were promoted and applied in the past to the detriment of the environment and sustainable growth. Resultantly, many suitable developmental opportunities have been missed by not exploring environmentally sustainable land use options (Dewdney, 1996; de Klerk, 2004). It therefore made sense, for the study objectives to take account of the LUP and environmental management, especially those practiced at the local level by the community in the case study areas.

The study concludes by demonstrating how the problem of integrating environmental considerations into land use plans can be overcome. One of the main conclusions from the study is that there is an alternative possible way of engaging and integrating local level land use practices (LUP) with regional land use plans. The expectation is that there is a need to integrate bottom-up local level planning with regional planning in order to ensure environmental and development sustainability.

1.2 RESEARCH OBJECTIVES AND KEY RESEARCH QUESTIONS

With the background presented above, the main aim of the study is to address the question of LUP and sustainable resource. In exploring this, it investigates the importance of environmental criteria analysis in sustainable land management with specific reference to the local community level, using Salambala Conservancy, Lusese Village and Mayuni Conservancy in the Caprivi Region as case studies.

Three research objectives are identified and a number of research questions have been formulated under each of these.

A) Objective: Document Caprivi local level land use planning practices using a sampling strategy

Key research questions under objective:-

- A) Are local level land uses planning practices ongoing?
- B) If so, what are these and what procedures do they follow?
- C) Are environmental factors taken into consideration in these practices?

B) Objective: Analyse if environmental considerations are integrated into land use plans?

Key research questions under objective:-

- A) Are local level land use plans explicitly based on availability and sustainable use of environmental/natural resources?
- B) How do resource users think local level land use plans and practices can be practically applied to manage natural resource sustainably?

C) Objective: What are the environmental criteria that are important for consideration in LUP in the study area?

Key research question under objective:-

- A) Which environmental framework is suitable for linking local level land use planning to regional LUP?

1.3 RESEARCH DESIGN

1.3.1 Rationale for the choice of the case study

Operational Links and Arrangements

In carrying out this study, I collaborated with Integrated Environmental Consultants Namibia (IECN), a non-governmental organization, which was contracted to carry out an analysis of the impact of current land use practices on SLM through a project proposal submitted to the World Bank on behalf of the Ministry of Lands and Resettlement (MLR) and the Ministry of Environment and Tourism (MET), Namibia (see www.iecn-namibia.com). The “Promoting Environmental Sustainability through Improved Land Use Planning (PESILUP) project” (Zeidler, 2006) aims to produce information for developing a guide for integrated land use. The guide would serve as a tool for farmers and other land users to plan their investments, taking into account the environmental conditions, long term sustainability aspects and weighting various land use options.

PESILUP has overall three components (i) national assessment that would provide data on environmental sustainability of current land uses, (ii) the development of ILUP Tool Kits for users at the local, regional and national levels, and (iii) the provision of training modules and targeted information on the Tool Kits. IECN conducted a research in the Caprivi to provide input from the key target groups at the local and regional level pertaining to the generation of content for the ILUP Tool Kits (de Azambuga, 2005).

In order to carry out this study properly, make informed decisions about the choice of field sites and generally understand the area before the study started, IECN and the Division of Land Use Planning and Allocation (LUPA) of MLR were consulted. It was intended that we would have a reciprocal relationship for the purposes of sharing information, findings and ideas.

1.3.2 Selection of the case study areas

Caprivi region was identified as the study area, as here a great diversity of land use practices are being applied due to the more tropical climate. Cultivation and livestock are common land use practices. Subsistence farming is thought to be fit for the area, including irrigation. The Namibian government is currently exploring the so-called “Green Scheme”, a large scale irrigated agriculture project that should contribute to agricultural production in Namibia. There is a great potential for further development of the tourism industry on community-based conservancies². The Caprivi region is currently part of various trans-boundary tourism and conservation initiatives such as the Kavango-Zambezi (KAZA) project. Thus, many different ILUP issues are of relevance to this area.

Furthermore, several LUP and Natural Resource Planning activities are taking place in the Caprivi, e.g. facilitated through Community Based Natural Resources (CBNRM) programmes and conservancies (the Integrated Community-Based Ecosystem Management (ICEMA) project. Additionally, MLR had commissioned a regional land use plan for Caprivi and through the Regional Profile (Mendelsohn & Roberts, 1997) that resulted in useful baseline data in support of ILUP being made available.

1.3.3 Location and description of the case study areas

This study explored the importance of environmental criteria analysis for evaluating sustainable land management using the communities at local level in Katima Mulilo Rural, Linyanti and Kabe constituencies in the Caprivi region.

Fieldwork in Katima Mulilo Rural, Linyanti and Kabe constituencies was conducted using multiple methods on two of the conservancies and the community of Lusese village (see figure 1). See chapter 2 for full description of the study methods and data collection.

² A conservancy consists of a group of farms or areas of communal land on which neighbouring landowners or members have pooled natural resources for the purpose of conserving and using wildlife sustainably. Members practice normal farming activities and operations in combination with wildlife use on a sustainable basis.

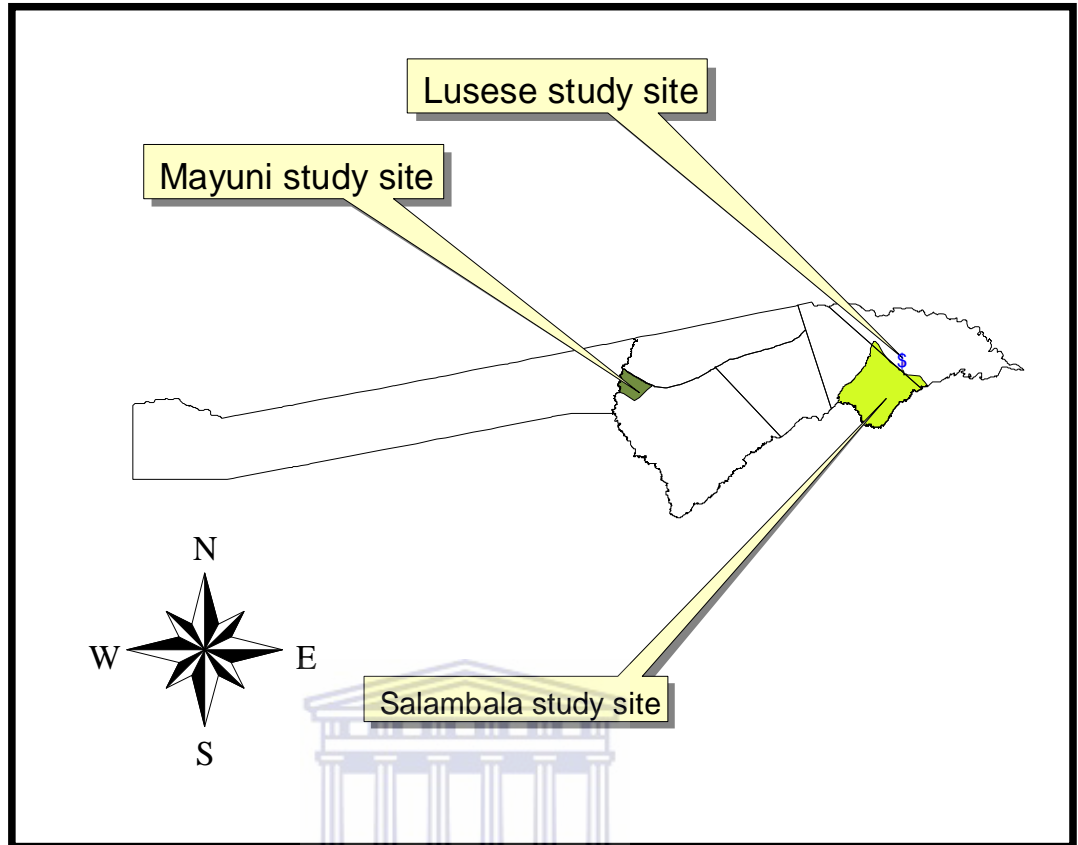


Figure 1: Map showing the three study sites

A) Lusese study site: - is situated in Kabbe constituency which covers the eastern flood plains. It is located some 30 Km east of Bukalo main settlement area and close to Malimina village. Environmental condition is different from the rest of the region due to seasonal floods. This situation has influenced tenure arrangement and land use practices of the study site.

Lusese general information:-

Lusese falls under the administration of Masubia traditional authority. The system of traditional authority is acknowledged to be a very administrative mechanism, especially in land use issues and utilization of the natural resources.

From the participatory rural appraisal (PRA) historical and present land use mapping exercises carried out with the community during this study, it was established that Lusese village is divided into two land use territories, namely: Old Lusese and New

Lusese, the latter having been established in the 1960s. Old Lusese is next to the streams and is part of the village that is normally flooded during rain season. People lived at Old Lusese before they started moving to upper grounds which is less flooded during rain season, now called New Lusese.

People continue to migrate with their animals between these two territories. They also go to Old Lusese to catch and sell fish and cultivate crops on fertile soils. Old Lusese has a large open area with grasses suitable for grazing livestock and enough water for their animals. On the floodplains, old drainage meanders within the large zone of clay-loam which provides rich soils, known as *sitapa*, on which much of the maize in Caprivi is grown. Regular floods of low-lying areas restrict the growth of most woody plants found elsewhere in the region because they cannot withstand having their roots inundated. For this reason, Lusese is dominated by grasslands.

Overgrazing due to higher numbers of livestock has become a problem in these territories. Migration of people and animals between the two territories has been attempted to reduce pressure on the land (see figure 2). However, the strategy seems not to work well because when people and cattle move back into the floodplains in the dry season, the vegetation will have been damaged in the drier upper ground area.



Figure 2: Animal migrating to good pasture in the low lying areas, flood plains, Lusese village.

New Lusese is the opposite of Old Lusese because it is a woodland area at higher ground. New Lusese is also the economic centre of the Lusese people. Schools, clinics

and shops are located here. People migrate to New Lusese to utilize the available services and to avoid floods at low lying ground of Old Lusese.

The historical and present land use mapping showed that the population is dispersed with a small number of households residing in the village. The average household size in the area is four people, which is structured along the lines of an extended family. Lusese people are mainly Sisubia speaking.

The majority of people found in Lusese areas are largely older and unemployed. The reason for this population distribution pattern is due to migration of young people to large towns like Katima Mulilo urban to find employment opportunities. Usually, only the older people remain in the village to look after cultivation fields and livestock farming.

People of Lusese are mostly dependent on rearing livestock and crop farming for their livelihoods. Livestock in Lusese is seen as a sign of wealth. People with large number of livestock are regarded as rich and those with smaller herds are seen as poor.

Inhabitants of Lusese cultivate small crop fields around their homestead, where they plant different type of crops (see figure 3). Some crop cultivation activities take place in the floodplains of old Lusese to produce maize. Maize serves as the staple food for the people of Lusese, but other additional crops such as millet and sorghum are cultivated in New Lusese because they can grow better in sandy soil.

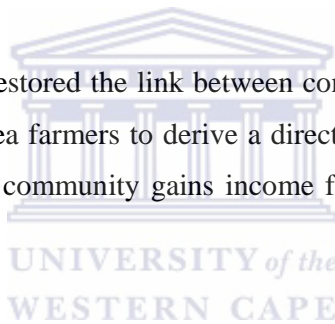


Figure 3: Example of common subsistence vegetable garden in Lusese village.

Other land uses include respected traditional places called 'holy land'. They are places of traditional significance to the Masubia tribe. For example "*Katonsu kezwelo*" is a place where the Masubia tribe used to meet and conduct traditional celebrations. Up to date, these places still remain respected and not used for agricultural activities and development.

B) Salambala study site: - is a community conservancy situated in Katima Mulilo Rural constituency about 30 Km Southeast of Katima Mulilo, the main town in the area. It covers an area of about 931 km² (at least four times larger than the other floodplain conservancies). The conservancy head office is located in Bukalo, a large settlement area. The conservancy was founded in 1994 and registered in June 1998. It was the first to be established in the Caprivi Region and among the first four in Namibia.

The conservancy has restored the link between conservation and rural development by enabling communal area farmers to derive a direct income from the sustainable use of natural resources. The community gains income from the use of wildlife and tourism activities.



It is important to note that conservancies like Salambala are not game reserves because communities can carry on with their usual farming and other economic activities in the area. This study found that Salambala conservancy has added wildlife and tourism to resident's existing land uses. The conservancy sources of tangible benefits are mainly derived through campsites, craft sales, thatching grass sales and trophy hunting.

People found in the conservancy are Masubias falling under the Masubia tribal authority. The conservancy has a population of about 7,135 people. Through PRA historical and present land use mapping exercises it was established that Salambala conservancy consists of 19 villages altogether. These villages are widely distributed within the conservancy areas.

People of Salambala are communal farmers who live on rain fed crop and livestock farming. The produce from crop farming is for own consumption. At times of bumper

harvests extra crops are sold to earn income. Maize and a little bit of millet and sorghum are the main crops grown.

The area has had a higher increase of human population in recent years due to migration of people from rural areas. The expansion of the main town (Katima Mulilo) is also attracting people to come closer to the town and neighbouring areas. Changes in the settlement of people took place after 1982 mainly due to the improvement of roads (IDC, 2000). Further changes have been the growth of Bukalo establishment as a major centre, being the headquarters of the Khutas. The road from Katima Mulilo town which passes through Salambala conservancy to Ngoma border post have also encouraged people to settle along this access road.

From the PRA exercises it was established that Salambala conservancy's population is growing fast. The amount of grazing and agricultural land is declining due to increases in human and livestock populations in the area. Aspects of environmental conditions and human activities had influenced constituency's land use practises.

C) Mayuni study site: - is situated in Linyanti constituency in the southern part of the region. The study site is next to two main game reserves and bordered by two large rivers, namely the Linyanti and Kwando. The size of the conservancy is about 15 100 ha. The conservancy was founded in 1996 and registered in December 1999.

Mayuni conservancy follows similar principle employed by Salambala conservancy. That is to restore the link between conservation and rural development which enable communal area farmers to derive a direct income from the sustainable use of natural resources. The conservancy has also gained income from the use of wildlife where it is applicable, and tourism activities.

This study site also followed the Salambala principle of deriving benefits from wildlife and tourism. The conservancy sources of benefits are similar to that of Salambala conservancy but in Mayuni conservancy additional benefits of income also come from joint venture tourism with private lodges.

People found in the conservancy are Mafwe falling under the Mafwe tribal authority. The conservancy has a population of about 1,741 people. Through PRA historical and present land use mapping exercises it was established that Mayuni conservancy include Kayuwo, Choi, Sikwanyi, Kapako and Kazinzila villages. These villages are widely distributed within the conservancy areas. Each of these villages has a representative in the conservancy committee. Traditional leaders are also represented in the conservancy committee. The household heads and their spouses make most household decisions. This situation helps to understand the rationale behind decision making and management of the natural resources.

Mayuni conservancy traditional authority are less structured, but are similar in that authority range from local village headman to a chief who preside over a large area (Mendelsohn & Roberts, 1997). Not surprisingly, the boundaries and zones of influence are often the subject of considerable competition and dispute.

In comparison with other two study sites, Mayuni Conservancy and in particular the Linyanti constituency has the smallest population. The population is widely distributed over large areas, leaving enough land for animal grazing and crop cultivation. Competition over natural resources is minimal in comparison with Lusese and Salambala conservancy study sites. Despite the fact that the conservancy has been gaining more benefits from tourism activities because it is bordering the two major game reserves, there have been also many incidences of damage to property caused by wild animals.

1.4 THESIS OUTLINE

Chapter One outlines and introduces the context and circumstances in which the study was done. The chapter contains detailed background information about the research question as well as the research design for the study.

Chapter two describes the methodology used to pursue the study.

Chapter three provides a review of environmental and land reform policies in Namibia, by exploring the intricacy of resource utilization and LUP, more specifically

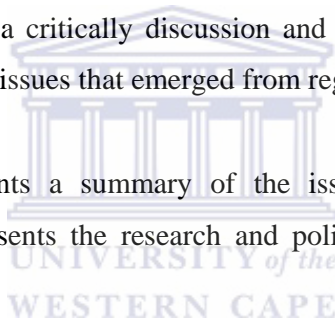
in relation to the issues of social and environment in the Caprivi region, and the locality on which empirical components of the study are based.

Chapter four reviews the literature on the Ecosystem Approach and its Application, Integrated Sustainable Land Management, Environmental Indicators and Frameworks. It provides a critical assessment of environmental framework under which environmental sustainability and LUP can be evaluated.

Chapter five presents findings on the perceptions of regional land use planners and local communities from a perspective of LUP and sustainable use of natural resources. The findings of the study around the key research questions are analysed and presented in this chapter.

Chapter six provides a critically discussion and a detailed insight of the case study areas by looking at the issues that emerged from regional and local level field research.

Chapter seven presents a summary of the issues that emerged from the study conducted. It also presents the research and policy implications emerging from the study.



CHAPTER 2

2.1 METHODOLOGY

The methodologies used in this study aim to answer the research objectives and key research questions (see chapter 1).

2.1.1 Methods of data collection

Data and information was collected from two main distinct groups of resource managers, namely: the decision makers at regional level and communities at local level. Decision makers at regional level consisted of private farmers, Government and Non-governmental officials (NGO). Communities at local level consisted of subsistence farmers in communal land. The subdivision of the study respondents into two groups was done based on differences in knowledge, education levels and land use practices.

Preliminary planning (Desk top study)

- (i) A desktop study was first conducted to identify general land use practices issues in the Caprivi region. It was also done to get data on environmental issues for the region and compare these with similar studies done in other regions and countries through literature reviews. A pilot questionnaire survey was conducted among the relevant people involved in LUP and SLM in Namibia and Caprivi region. The effectiveness of the questionnaire was tested during the pilot phase before the final questionnaire was developed for the study. The refined questionnaire was aligned to the research questions.
- (ii) Regional level respondents (see annex 1) to be interviewed for the survey were identified at the piloting stage.

Method of data collection at regional level

The actual questionnaire survey was then conducted with the selected regional respondents to answer the survey questionnaire (annex 3). The questionnaire was administered to eight government officials, six NGO officials and four private farmers.

Such a qualitative survey enables the researcher to gain a general understanding of the trends in land uses and applicable management types in the region. In addition, one can get information on the types of land use practices and whether LUP is conducted frequently.

The information collected using the questionnaire survey covered issues related to land use types and practices by different land users, understanding of environmental considerations that go into land use plans and the significance of integrated land use plans, particularly in the Caprivi regional plan. The last section of the questionnaire specifically sought information on the land users' knowledge of environmental sustainability and land use practices (see annex 3). The information collected using the questionnaire survey was also intended to investigate how local level land use practices can be practically strengthened and implemented.

2.1.2 Approach to implement the study method at community level (local level)

Caprivi region has six constituencies, which are: Kabbe, Katima Mulilo urban, Katima Mulilo rural, Kongola, Linyanti and Sibinda. There are considerable variations between these constituencies in terms of annual rainfall received which is correspondingly reflected in varied biodiversity and land uses from one constituency to another (see also section 3.2.3). Therefore the study considered the importance of these issues for the PRA exercises at local level to capture and reflect, as much as possible, a sample that is representative of the entire Caprivi region.

Other than representatively, each sampling site was chosen on the basis of population size, traditional authority, range and diversity of land use practices present in such as conservancies (e.g. grazing and floodplain cultivation), as well as the uniqueness of environmental conditions or pressures such as occasional flooding, groundwater quality and soil types.

In Lusese village arrangements for conducting the PRA exercise were done through the *Khuta* councillors. The *Khuta* was responsible for informing members of the community about the exercise as well as soliciting them to participate and share their

knowledge during the workshop. The *Khuta* was encouraged to consider gender balance and different age groups. Gender and age categories are important to make relevant comparison based on indigenous knowledge and experiences. The focus group consisted of nine people of whom two were females and seven males (see annex 2 under Lusese study site).

In the Salambala conservancy, the PRA exercises were carried out with a focus group of eight people. Only this number of people was assembled because most people were too busy with their daily activities and could not find time to come for the PRA exercises. The assembled group consisted of: a community natural resource monitor, a member of the Caprivi communal land board, farmers and members of Salambala conservancy committee. These people came from different villages within Salambala conservancy (see annex 2 under Salambala study site).

The third PRA exercise was carried out with an assembled focus group of 13 people from the Mayuni conservancy (see annex 2 under Mayuni study site). The assembled group comprised of representatives of all the sectors of the community and areas in Mayuni. An exercise similar to the one done in Lusese and Salambala was conducted and a number of environmental problems, causes, indicators and responses to these problems were identified.

2.1.3 Methods of data collection at community level (local level)

Involvement of the local community in this study was important because they know best how their land works, what the management constraints are and strategies are and how to respond to difficulties. Local indigenous knowledge is important when looking for suitable indicators of pressure on land resources (Oba, 1994; Homann *et. al.*, 1996).

Same procedures and methods of data collection were used at all three study sites.

PRA – was a tool used to collect information from the community using participatory methods (see section a, b, c and d). The method was chosen because it is very useful when looking at and analyzing problems (Schonhuth, 1994; Wilde, 1995). The aim was

to get everybody involved in the exercise because the knowledge of the local people and their traditional way of doing things is very useful. Participatory methods are also important as they avoid external consultants building their own one sided picture and interpreting differently the reality of local situation (Amler *et.al.*, 1999).

The PRA exercises were conducted during one day sessions, including detailed discussions. Also it was to ensure that discussion topics are well understood by participants.

In order to conduct the PRA exercises with the communities competently, a local facilitator who speaks the local language assisted in translating English into local language. The facilitator is a regional land use planner, responsible for surveying communal farm land, resolving land disputes and coordinates land use activities for the MLR in Caprivi region. People were comfortable to work with a familiar person from the region.

During the study a number of other participatory research tools and methods were used to solicit information from the study groups, namely:

a) Focus group discussions

Focus group discussions were used especially to solicit the views of the community with regard to issues related to land use practices and the environment at the community level. This technique includes a semi-structured discussion on the issue of land use practices and environment.

b) Historical and present land use mapping

In the PRA sessions, the purpose of the exercise was explained to participants. Information was discussed through brainstorming and analyzed jointly by all participants on the current environmental problems and demographic patterns. This exercise helped to register the existing links between natural resources and human activities. Participants agreed to draw a village resource map depicting the location of

settlements, important natural resources and land uses on the ground using different symbols to construct the map together (see figure 4).



Figure 4: Participants drawing land use map on the ground

Participants were given empty cool drink tins and sticks to use in showing map attributes on the ground. All participants, including elders with low level of education, took part in the exercise with ease. However, drawing the map on the ground using different objects, at an open air space, was not an easy task because of the wintry conditions. This condition disrupted the exercise by blowing objects away and disturbed participant's concentration. A suggestion was made in the session to use a flip chart and use differently coloured marker pens to mark map attributes (see figure 5).



Figure 5: Drawing of land use map on flip chart.

The map shows all important local features, including conservancy management zones, roads, old and new residential areas, livestock concentration, wild animal corridors, school, community forests, arable fields, rivers and boundaries. From the historical

map, participants were asked to indicate the prominent changes in residential area, fields and local rangeland.

1) In addition, participants were asked to indicate the location of essential natural resources on the map which they use and where they think these resources are overexploited, for example through deforestation.

2) Participants were also asked to identify areas with prominent environmental problems such as overgrazing, common veld fires, human density and deforestation. This was important to understand because once the map is finalized, it can serve as the basis for identifying problems, resources and opportunities for action, for developing indicators for land use planning and could be useful as a baseline for monitoring changes over time.

*c) **Pressure State Response Framework (PSR)***

PSR framework - This framework links pressures on the environment as a result of human activities, with changes in the state (condition) of the environment (land, air, water, etc.). Society then responds to these changes by instituting environmental and economic programmes and policies, which feed back to reduce or mitigate the pressures or repair the natural resource (OECD, 1993). Using the PSR framework, we were able to highlight and discuss those elements that society is using on a daily basis for their livelihoods (see table 3).

The purpose was to test the usefulness and practicality of using the method at the local level to identify problems which cause pressure on the land resources, to identify indicators that express change and direct actions taken by land users and by government and NGOs (see table 3)

In the three study sites, pressure on the land resources such as intensification and multiplication of land uses and other environmental related problems were identified.

d) Transect walks (or on-site observation)

Transect walks were used to observe, discuss and help understand environmental and agricultural features such as cultivated land, forests, types of soil and crops as well as evidence of environmental degradation as discussed on land use maps.

A transect walk was taken with a group of volunteers from the participants in the PRA exercises in order for them to talk about the local environment, including the environmental impacts of activities such as veld fires, overgrazing and increases of human settlements. This exercise was also used to verify some of the identified indicators with participants, through direct observation and discussion with key informants and passers-by.

The information captured in the mapping exercise is not all included in data analysis in the study. It helped though to show that it is useful in compiling information from the local community into the environmental framework and development of criteria.

2.1.4 Data handling and processing

A data entry spreadsheet (workbook) was developed using a Microsoft Access Database to assist in entering and storing data collected for this study. The database allows selecting, focusing, simplifying, abstracting and transforming the information from questionnaire data and entering into the spreadsheet as shown by (Reisch & Schubert, 1993).

This database was also used to provide systematic coding to the questionnaires for easy access and interpretation. Further, information entered into the Microsoft Access Database, were linked with Microsoft Excel spreadsheet for detailed analysis and also storage. The results obtained using the spreadsheet helped to provide a picture on environmental consideration and sustainable land use practises in the study sites.

CHAPTER 3

This chapter is aimed at emphasizing the national and local context with regard to issues of SLM, land tenure and reform, land use, natural resource use and environmental challenges. In order to understand the intricacy of resource utilization and LUP, one has first to understand what shaped the current environmental policies in Namibia.

3.1 NATIONAL CONTEXT – POLICY ANALYSIS

3.1.1 Background of Sustainable Land Management (SLM) context in Namibia

Namibia is a young democracy, which gained independence from then apartheid South African rule in 1990. Situated on the south-western coast of Africa, Namibia is the most arid country in sub-Saharan Africa. The country depends on earnings from agriculture, particularly livestock and game production, as well as indirect benefits from wildlife and tourism (Tapscott, 1994). Environmental management systems and uses include conservation areas, nomadic pastoralism, mixed subsistence farming and commercial livestock farming (Tapscott, 1994). The harsh natural conditions of Namibia's environment, which has extremely low and variable rainfall (Hutchinson, 1995), requires that careful and appropriate land use management be practised in order to make best use of natural resources and maintain a healthy environment (Seely *et.al.* , 1994; Tapscott, 1994; Behnke *et.al.*, 1993). The country's low agricultural productivity is attributed to low rainfall, very little arable land and finite ground water resources. Only 816 000 ha (1%) out of a total landmass of 82 329 000 ha is arable. This is situated primarily in the north-eastern parts of Namibia, with the highest annual rainfall and most suitable soils for agriculture.

Despite this, Namibia's formal and informal economies are highly dependent on the natural resource base, mainly livestock farming and more recently, large scale wildlife utilization, fishing, wildlife and nature tourism (Barnard, 1998). Subsistence farming and pastoralism supports the livelihoods of the vast majority of rural Namibians, who comprise approximately 70% of the total population.

One key issue critical to sustainable land management and land reform is that currently it is largely unclear what the effects of various land-uses on environmental sustainability are per se (MAWF, 2004). Consequently, it cannot be stated with any degree of certainty as to which land management practices would impact on environmental sustainability, positively or negatively. It needs to be understood that the maintenance of Namibia's unique natural resource base and the sustainable use thereof is of greatest importance for the productive functioning of the ecosystems e.g. measured through agricultural and ecosystem productivity.

The identification of broad-based and adaptive application of sustainable land management practices is essential for sustained growth in dry-land Namibia.

3.1.2 Overview of Land Tenure and Land Reform in Namibia

Land tenure arrangements are key to SLM and LUP, and influence decision making on all levels. As Namibia had inherited colonial and apartheid driven settings of land ownership rights, management and responsibilities, since independence in 1990 efforts are being made to reverse the unjust and unproductive frame conditions and engage in an enabling land reform process.

Zeidler (2006) argues that land reform is a government driven programme for changes in inequitable land ownership and usage, encompassing access and tenure rights, with the explicit aim of freeing mostly agricultural land from the ownership of a few rich minority and making it available to the majority of poor rural dwellers. The notion of land considered to be a common good which should not be owned privately forms the core of land reform (Zeidler, 2006). In other words, land reform had been motivated by Marxist philosophical ideology that considered land as being universally owned. George (1976) contends that skewed ownership and control of land by a tiny minority to the exclusion of the majority is the '*the most pressing cause of abject poverty*' endured by millions of people in the world. Reforms in the distribution and ownership of land are thus a means of bringing about fair and equitable access and ownership of land and means of production. Contemporary thinking considers land reform as a means of vesting ownership and thus decision-making as well as managerial powers

with the people who use the land and are directly dependant on land resources for their livelihoods.

Land tenure is amongst the most important components of any land use or farming system. The institutional arrangements under which a person gains access to land largely determine, among other things, what crops he/she can grow, how long he/she can till a particular piece of land, the rights over the fruits of his/her labour, and his/her ability to undertake long term improvements on the land (Benneh, 1987). These basic institutional settings of land use are at the heart of rural development with relevance to management, control and rights to land and natural resources. The systems of tenure which control user rights over land and natural resources together with the policies that enable or constrain secure access to land as a livelihood resource for rural people are extremely crucial (Toulmin and Quan, 2000). If security over land is removed, it often results in land disputes among land users.



3.1.3 How Land Reform relates to SLM in Namibia

In adopting a willing-seller/willing-buyer approach through constitutional guarantees that protect property rights, Namibia committed itself to deploying public funds to compensate settlers at market prices (Adams, 2000) in order to transfer land to the landless. The economic and administrative reality of such an approach is that it is cumbersome, expensive to the state, allows for inflation of land prices, and does not always ensure the availability of the best land areas for redistribution (Zeidler, 2006). Few 'willing sellers' will voluntarily part with a profitable farm, meaning that only those farms that are non-viable as economic entities are likely to be offered to the willing buyer (Zeidler, 2006). It is thus more probable that poor rural farmers will be resettled on marginal land instead of prime agricultural land. A weak economic base for the majority of land reform beneficiaries together with inadequate or absent training, support services and subsidies to newly resettled farmers, is liable to result in unsustainable land use practises on resettlement projects.

Rural farmers in communal land also require training and support on basic agricultural techniques. In colonial times and even after independence very little support had

reached farmers in the small scale and subsistence sector. This is attributed largely to the fragmented sectoral approach which left the rural areas without adequate public services (Adams, 2000). A critical need could therefore be triggered by land reform exercises for SLM through appropriate application of an integrated land use planning tool.

Hunter (2004) stressed that the exercise of land reform in Namibia is part and parcel of an overall effort to address gross social economic and political inequalities inherited by the Namibian government after independence. In this regard the government should use the opportunity of land reform to incorporate and mainstream prudent land use planning through ILUP and SLM to promote economic growth and encourage sustainable land use practises.

The redistribution of land targets repossession of mainly white-owned private farms held under freehold tenure for redistribution to black farmers or landless unemployed rural poor as well as the reform of land tenure arrangements in communal areas (MLRR, 2003). Debate on land reform in Namibia has largely been informed by two schools of thought. Advocate of land reform as a tool for addressing historical socio-economic injustice and inequality are pitted against those who advocate for the process to be geared towards increased productivity of the agricultural sector (MLRR, 2002).

SLM paradigm would indicate that these two lines of thinking need not necessarily be antagonistic since sustainable land management is geared towards the complementarities of increased productivity, environmental protection and reduced production risks in an economically viable and socially acceptable manner.

3.2 LOCAL CONTEXT – ENVIRONMENTAL AND SOCIAL ISSUES

The next sections review a small component of findings around the foregoing issues within Caprivi region.

3.2.1 Regional Context – Caprivi region

This study was conducted in the Caprivi, which is one of 13 regions of Namibia. The Caprivi “forms the country’s finger-like projection in the north-east, which extends

Namibia's borders into the centre of Southern Africa" (Mendelsohn & Roberts, 1997). The area shares borders with four countries, namely Botswana to the south, Zimbabwe to the east with Zambia and Angola to the north. Two distinct geographic areas define the Region. Eastern Caprivi comprises the area east of the Kwando River. This part is surrounded by perennial rivers to the west (Kwando), south (Linyanti), south-east (Chobe) and north (Zambezi). The second distinct geographical area is formed by part of the so-called Caprivi Strip or West Caprivi to the west of the Kwando River, stretching up to the Okavango River (Mendelsohn & Roberts, 1997).

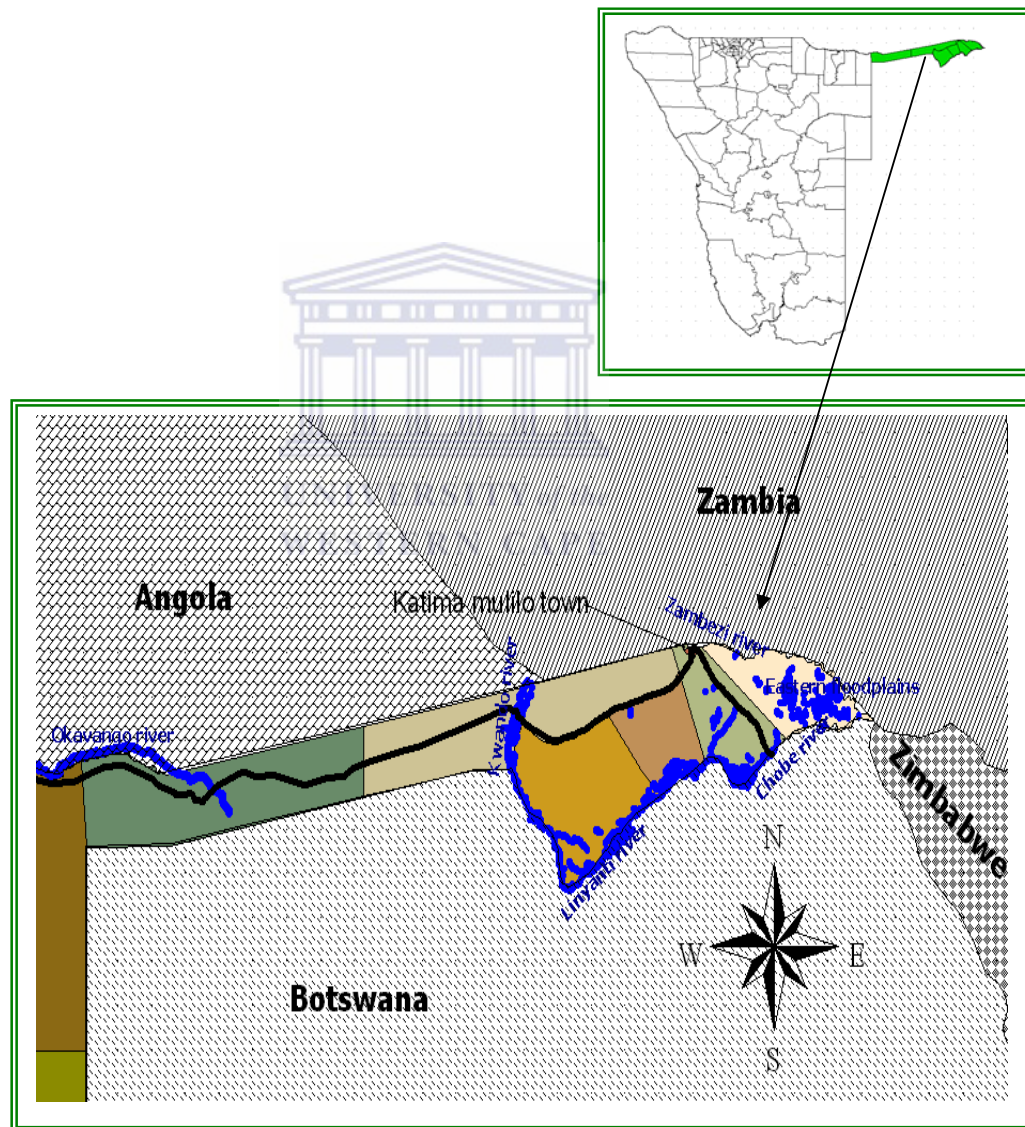


Figure 6: Map of Namibia showing Caprivi region

3.2.2 Settlement patterns and land use

72 % of its population lives in rural areas, making the Caprivi region one of the most predominantly rural areas in the country (Regional Poverty Profile, 2004). 74% of the households live in traditional dwellings (Regional Poverty Profile, 2004).

Katima Mulilo is the only town in the region and serves as its commercial and administrative capital. Six settlement areas serve as local administrative centres. These are Bukalo, Chinchimani, Linyanti, Mafuta, Ngoma and Omega III (RoN/EU, 2001).

The land in Caprivi is either under State or communal administration, with few commercial concessions given out. State controlled areas consist mainly of game reserves and national parks, the State forests and agricultural projects (Mendelsohn & Roberts, 1997). The prevailing form of land use under communal areas is subsistence farming. However, since 1998 the development of communal conservancies has emerged as new form of land use. To date, five conservancies, covering 9 778 km² (67%), in the region have been registered.

The traditional leaders control land under the communal administration. In reality, the region is divided into four areas of customary jurisdiction over land, each headed by a *Khuta* or traditional court. Traditional chiefs are the head of *Khutas*. Each area of jurisdiction is in turn subdivided into several *silalos*, which refer to a constellation of villages that make up a tribal district or ward. Indunas are the heads of *silalos*. Headmen or *Induna wa munzi* head villages. Villages form the lowest level of the customary administrative system. Most decisions affecting the everyday lives of rural people are taken at the village level, and village authorities are the most accessible structures through which external development agents can directly reach and mobilize people. They also play a crucial role in mediating access to and use of all forms of common property in local communities (Werner, 2002a).

Some members of the communities hold rights to land zoned for cultivation (Regional Poverty Profile, 2004). Residential rights and rights to cultivate are permanent. Most cropping occurs along rivers and in areas that are flooded occasionally (Mendelsohn & Roberts, 1997).

Land zoned as grazing land belongs to the entire *silalo* community and is administered by the *silalo induna* with his Khuta. Although villagers have clear ideas of the boundaries of their grazing areas, grazing land is regarded as a communal resource, providing all members of a village with access to grazing (Werner, 2002b).

3.2.3 Climate and Rainfall

In comparison to the other regions of Namibia, Caprivi region has a more tropical climate. In September, October and November, summer temperatures peak between 32°C and 35°C. Average daily minimum temperatures vary between about 20°C in summer and 5°C in winter (July). According to Mendelsohn & Roberts (1997), frost is unusual, but does occur from time to time in low-lying areas.

The Caprivi region receives its rain during the summer months (Regional Poverty Profile, 2004). Minimal rainfalls are received in September and October, while November usually supplies sufficient rain for farmers to start cultivating their fields. The rainfall hits the highest point in January and February, gradually decreasing towards April, when the rainy season comes to an end. The Caprivi region has an average rainfall of between 348 mm and 871 mm per year, which increases gradually from south to north. Despite the fact that these figures represent high rainfall in Namibian terms, its impact is reduced by variability between and within seasons (Barnard, 1998). Variability is not uniform across the region, being more pronounced in the southernmost parts. In the eastern areas of the region rainfall is more predictable. Intermittent and unpredictable rainfall patterns may impact negatively on crops production and livestock farming. Crops may get off to a good start but wither away in a subsequent periods of low rainfall. Also, evaporation is higher, with some 2 500 mm of water evaporating in an average year in Caprivi. Thus evaporation is over four times the volume of water normally received as rain (Mendelsohn & Roberts, 1997). Further more, evaporation rates increase during dry years, when a lack of cloud cover contributes to higher temperatures.

3.2.4 General Livelihoods in Caprivi region

Livelihoods in the Caprivi region are primed on several income entry points. However, of all economic and livelihood activities in the region, agriculture is the most important. People spend more time farming than on any other economic activity (Mendelsohn & Roberts, 1997). About 50% of the employed population is involved in subsistence agriculture (National Population Census, 2001). Moreover, agriculture provides the majority of the people with most of their income and food security. Farming activities have the greatest impact on the region's natural environment. Large areas have been cleared to plant crops, great numbers of cattle graze the region's natural pastures, and much of the area is burnt each year, apparently to stimulate the growth of new grass. These negative impacts on the environment can adversely affect livelihoods.

The utilization of natural resources such as fish and wildlife plays an important role in the livelihoods of people in the Caprivi. Access to fuel wood, timber and thatching grass satisfy some basic subsistence needs such as providing fuel for cooking, brewing beer and firing pottery. Thatching grass and timber are used for the construction of dwellings (Regional Poverty Profile, 2004).

Wildlife promotes tourism in the region and provides a significant amount of income. However, opportunities to benefit from this resource are distributed unevenly across the region. Areas along the rivers and those adjacent to parks and reserves have the highest potential to be developed for tourism and trophy hunting. The establishment of conservancies has enabled community members to earn income generated from wildlife base tourism activities (NASCO, 2004; Namibia Environment, 1997). These income-generating opportunities come at a cost to villagers though in the form of damages caused by wildlife to crops and livestock. Between 1996 and 2001, 764 ha of cropland was damaged, with increasing numbers of incidents being reported (Regional Poverty Profile, 2004). During the same period 694 livestock equivalents were lost to predation. The various land use practices amongst different land users prompt the requirement for concerted effort to establish ILUP to ensure SLM.

3.2.5 Demographic Characteristic

According to the Regional Poverty Profile of (2004), the Caprivi had a population of 79 826 in 2001, representing 4.4% of Namibia's total. The region's land surface area amounts to 14 528 km². Population density is 5.5 people per km² which, although higher than the national average of 2.1 people per km², is relatively lower than Ohangwena (21.3 people per km²) and Oshana (18.7 people per km²), the regions with the highest population densities.

Mendelsohn and Roberts (1997) indicate that population densities reach more than 100 people per km² around Katima Mulilo, but range between 5 and 50 people per km² along the Trans-Caprivi Highway from Kongola to Katima Mulilo and from Chinchimane – Sangwali – Kongola. Similar densities can be observed around large settlements in the eastern parts of the region. Increase in population density has put pressure on the land resources. The Trans-Caprivi Highway to the Botswana border and the section between Katima Mulilo-Sangwali-Kongola have low population densities of less than one person per km² (Mendelsohn & Roberts, 1997). The main reason for these low population densities is that the latter areas have insufficient permanent water, and that there is a proclaimed forest, which restricts permanent settlement. The issue of LUP is relevant here as this would influence developmental planning and Natural resource management.

CHAPTER 4

4.1 THEORETICAL FRAMEWORK

Chapter 4 provides a theoretical review of some of the concepts to be used in the study. The purpose of this chapter is to have a conceptual framework for the analysis that follows. Issues that are included in this chapter fall into the broad categories of Ecosystems Approach to Environmental Management, Integrated Sustainable Land Management and Environmental Indicators and Frameworks. The thesis investigates all these issues in relations to the land use practices and environmental considerations at both regional and local level planning.

4.1.1 Ecosystem Approach (EA)

Land use decisions that satisfy both economic and environmental aspirations at the same time must be based on science, monitoring, economics, and stakeholder's involvement (McNeely, 1999). By implication, the EA, as adopted by the fifth Conference of the parties to the Convention on Biological Diversity (CBD) in Kenya, in May 2000, become a strategy for management of land, water and living resources in a manner that promotes conservation and sustainable use in an equitable manner (Smith & Maltby, 2003). Earlier, before the above definition, the United Nations Environmental Programme [(UNEP), 1998] had already defined the EA as 'the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes and interactions among organisms and their environment, including humans as an integral part of the ecosystem.

The EA was generally considered as an important overall component under which LUP and conservation of natural resources is practiced in the study area. The concept is reviewed here because of its significance to the management of natural resources. Generally, the approach was relevant in the study because it was followed in conjunction with introduced environmental framework and applied participatory methodologies with the community. The PSR framework was practically conducted in the study to generate results relevant for discussion.

Smith and Maltby (2003) state that the EA puts people and their natural resource use practices squarely at centre of the decision-making framework. As a result of this, this approach can be adopted by any entity, public or private involved in the use and management of natural resources. It is for this reason that this study recognizes the EA significance based on its principles (see table 1), particularly principle (2) and operational guidance (4)³. According to Smith and Maltby (2003), when applying the (12) principles of the EA, the operational guidance have to be followed. Realizing this principle and operational guidance is relevant because the study objectives explored the level of different land use practices, involving the local level community. Also, principle (12) and operational guidance (5) were regarded as important, because the study objectives further tried to understand the linkage between local level land use practices and regional plans. Principle (2) reads that management should be decentralized to the lowest possible level. Operation guidance (4), used when applying principle (2) stipulates that management actions should be carried out at the scale appropriate for the issue being addressed, with decentralization to lowest level as being most appropriate. Principle (1)2 says that the EA should involve all relevant sectors of society and scientific disciplines and operation guidance (5) is also relevant as it proposes inter-sectoral cooperation. Furthermore, the (12) principles are complementary and interlinked. EA approach does not preclude management of natural resources and other conservation approaches such as protected areas and conservancies, but will integrate all these approaches and other methodologies to deal with complex situations (Smith & Maltby, 2003).

³ **CBD points of operational guidance followed when applying the 12 principles of the EA (Smith & Maltby, 2003; CBD, 2003a). The following are the five proposed operational guidance:**

1. Focus on the functional relationships and processes within ecosystems
2. Enhance benefit sharing
3. Use adaptive management practices
4. Carry out management actions at the scale appropriate for the issue being addressed, with decentralization to lowest level, as appropriate
5. Ensure intersectoral cooperation

Table 1: CBD EA principles and their rationale (Smith & Maltby, 2003; CBD, 2003a)

Principle	Description and Elaboration
Principle 1:	The objectives of management of land, water and living resources are a matter of societal choice
	Different sectors of society view ecosystems in terms of their own economic, cultural and societal needs. Indigenous peoples and other local communities living on the land are important stakeholders and their rights and interests should be recognized. Both cultural and biological diversity are central components of the ecosystem approach, and management should take this into account. Societal choices should be expressed as clearly as possible. Ecosystems should be managed for their intrinsic values and for the tangible or intangible benefits for humans, in a fair and equitable way.
Principle 2:	Management should be decentralized to the lowest appropriate level.
	Decentralized systems may lead to greater efficiency, effectiveness and equity. Management should involve all stakeholders and balance local interests with the wider public interest. The closer management is to the ecosystem, the greater the responsibility, ownership, accountability, participation, and use of local knowledge.
Principle 3:	Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
	Management interventions in ecosystems often have unknown or unpredictable effects on other ecosystems; therefore, possible impacts need careful consideration and analysis. This may require new arrangements or ways of organization for institutions involved in decision-making to make, if necessary, appropriate compromises.
Principle 4:	Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: (a) Reduce those market distortions that adversely affect biological diversity; (b) Align incentives to promote biodiversity conservation and sustainable use; (c) Internalize costs and benefits in the given ecosystem to the extent feasible.
	The greatest threat to biological diversity lies in its replacement by alternative systems of land use. This often arises through market distortions, which undervalue natural systems and populations and provide perverse incentives and subsidies to favour the conversion of land to less diverse systems. Often those who benefit from conservation do not pay the costs associated with conservation and, similarly, those who generate environmental costs (e.g. pollution) escape responsibility. Alignment of incentives allows those who control the resource to benefit and ensures that those who generate environmental costs will pay.
Principle 5:	Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach.
	Ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species
Principle 6:	Ecosystems must be managed within the limits of their functioning.
	In considering the likelihood or ease of attaining the management objectives, attention should be given to the environmental conditions that limit natural productivity, ecosystem structure, functioning and diversity. The limits to ecosystem functioning may be affected to different degrees by temporary, unpredictable or artificially maintained conditions and, accordingly, management should be appropriately cautious.
Principle 7:	The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
	The approach should be bounded by spatial and temporal scales that are appropriate to the objectives. Boundaries for management will be defined operationally by users, managers, scientists and indigenous and local peoples. Connectivity between areas should be promoted where necessary. The ecosystem approach is based upon the hierarchical nature of biological diversity characterized by the interaction and integration of genes, species and ecosystems.
Principle 8:	Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
	Ecosystem processes are characterized by varying temporal scales and lag-effects. This inherently conflicts with the tendency of humans to favour short-term gains and immediate benefits over future ones.
Principle 9	Management must recognize that change is inevitable.
	Ecosystems change, including species composition and population abundance. Hence, management should adapt to the changes. Apart from their inherent dynamics of change, ecosystems are beset by a complex of uncertainties and potential "surprises" in the human, biological and environmental realms. Traditional disturbance regimes may be important for ecosystem structure and functioning, and may need to be maintained or restored. The ecosystem approach must utilize adaptive management in order to anticipate and cater for such changes and events and should be cautious in making any decision that may foreclose options, but, at the same time, consider mitigating actions to cope with long-term changes such as climate change.

Principle	Description and Elaboration
Principle 10:	The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
	Biological diversity is critical both for its intrinsic value and because of the key role it plays in providing the ecosystem and other services upon which we all ultimately depend. There has been a tendency in the past to manage components of biological diversity either as protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in context and the full range of measures is applied in a continuum from strictly protected to human-made ecosystems.
Principle 11:	The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
	Information from all sources is critical to arriving at effective ecosystem management strategies. A much better knowledge of ecosystem functions and the impact of human use is desirable. All relevant information from any concerned area should be shared with all stakeholders and actors, taking into account, inter-alia, any decision to be taken under Article 8 of the Convention on Biological Diversity. Assumptions behind proposed management decisions should be made explicit and checked against available knowledge and views of stakeholders.
Principle 12:	The ecosystem approach should involve all relevant sectors of society and scientific disciplines.
	Most problems of biological-diversity management are complex, with many interactions, side-effects and implications, and therefore should involve the necessary expertise and stakeholders at the local, national, regional and international level, as appropriate.

World Resource Institute (WRI)/United Nation Development Programme (UNDP)/UNEP/World Bank (2000) argued for an EA framework for planning and decision-making, bridging the barriers between economic, social, and environmental considerations. By doing so, it places people firmly within the context of ecosystem management [The World Conservation Union (IUCN) & Indigenous People's Biodiversity Network (IPBN), 2003].

There is however, some concern that the EA as currently described is too complex to be widely disseminated and used. A shorter, concise and more user-friendly summary description would greatly help its wider communication and use by different sectors (Smith & Maltby, 2003). Targeted training and education efforts are also needed for integration of the EA into natural resource sectors such as water resources, agriculture and fisheries.

The EA can be applied at any scale, from a single farm to an ecologically defined, transnational region (de Marconi, 2000). As with the ecosystem concept, the area over which the Ecosystem Approach is applied can be defined according to the issue at hand. This means that the flexibility of the EA can even be applied at the scale of planet Earth. The Lowest appropriate level (Principle 2, Operational Guidance 4) may differ widely depending on the problems that the EA is being used to address. It can also be interpreted that while management of activities is primarily at the

local/village/community/farmer level, local level actions need not meet all the specifications of the EA, so long as at the larger scale they contribute to delivering the balance that the EA vision for an area requires (IUCN & IPBN, 2003). Even though the EA can be applied at the landscape scale, however, its implementation cannot be fully decentralized to the local level, making it problematic to engage local level participants. This is attributed to lack of local capacity, including skilled labour as well as institutional weakness.

However, McNeely (1999) found that it is important to keep in mind that many of the most fundamental challenges to biodiversity come not from local communities but from policies determined at the national level. This is supported by Tamar's (2000) argument that sectoral structure of government is another major obstacle to implementation of the EA (Operational Guidance 5). The mandates of government and non-governmental institutions typically reflect a fragmentation of responsibilities, supporting legislation and resource allocations. This disjointed approach to decision-making can cause confusion because each institution typically has its own priorities, message and associated jargon.

Harmonization of policies, institutional mandates and laws to remove inconsistencies and obstacles to the EA is probably more feasible and therefore more likely to have an impact than far reaching institutional changes. The gap between sectoral policies can be eliminated by combining bottom-up and top-down approaches which are often the best way to identify the most appropriate mechanism for engaging people at local level when applying the EA.

Most contemporary, discussion on traditional knowledge has been oriented towards property rights regimes (Rivera, 1999). However, this is not necessarily what local communities and ethnic groups are asking for. In EA there are opportunities to go beyond this idea to incorporate strategies, which conserve lifestyle diversity and recognize and value other forms of knowledge in addition to scientific and technical knowledge (Rivera, 1999; Neufeld *et.al.*, 1994). An EA also regards humanity as part of an interconnected, interdependent global ecosystem in which changes to one part may affect other parts in unexpected ways Science Advisory Board [(SAB), 1990].

Therefore, the EA provides a useful standard for sustainable land management from an environmental sustainability perspective through a procedural approach of systematically assessing sustainable land management in Namibia. Applying these principle approaches, relevant scientific information on environmental sustainable land management criteria and indicators at the local and regional levels could be provided.

Therefore, methods used in this study will provide useful findings from the local level which can be readily integrated into regional and national development plans through the application of EA.

4.1.2 Integrated Sustainable Land Management

Integrated sustainable land management (ISLM) is one type of approach to address environmental and developmental challenges facing Namibia. Lack of ILUP though has been identified as a key barrier to ISLM (MET, 2005).

LUP as a tool for SLM, according to FAO (1993), is an interactive process based on the dialogue amongst all stakeholders. It aims at the negotiation and joint decision-making for sustainable forms of land use in rural areas, as well as initiating and monitoring its implementation. It gives the fundamentals for getting sustainable form of land use, which is satisfactory as far as the social and environmental contexts are concerned and is preferred by the society while creating sound economic sense (FAO, 1990).

Krugmann (2001) pointed out that there is a need to promote land use planning, to determine most appropriate land uses, based on economic, social and ecological criteria. To date, economically and ecologically inappropriate uses have been promoted through subsidies. Good land use practices may face disincentives because of high taxes. For example, in Namibia, there are long-standing subsidies for livestock keeping and disincentives for wildlife and tourism (Barnes *et.al.* 2001). Nevertheless, wildlife tenure reform to grant exclusive wildlife use rights on communal and private land, declining farm subsidies and diminishing farm productivity have combined to usher in this form of land diversification. The new form of wildlife use through community conservancies is shown as evidence in this study.

LUP related activities are taking place at various levels in Namibia, including on the local community, natural resources users, farmers level, and the regional level. This happens because of multi-faceted nature characteristics of land, with several government line Ministries dealing with the land issue from different perspectives. In Namibia, it is mainly the MLR, which is responsible for the preparation of regional and integrated land use plans. It has been recognized that there is a disconnection between top-down regional planning and community-level land use planning (IECN, 2005). This gap ought to be overcome by bringing and harmonizing the approaches to LUP at local, regional, and national levels (e.g. villages/conservancies plans need to be harmonized with regional plans).

Namibia is the most arid country in sub-Saharan Africa and there are natural limitations to productivity. Environmental sustainability of land use practices are particularly important and such practices need to be well adapted to the environmental conditions whilst being innovative. The concept of sustainability includes notions of limits to resource availability, environmental impact, economic viability, biodiversity and social justice (Dumanski *et.al.*, 1991; Harmsen & Kelly, 1992).

If forms of agriculture that achieve increased production are to be sustainable, they must be based on sound agronomic principles. They must also embrace an understanding of the constraints and interactions of all other dimensions of sustainable land management (Dumanski & Smith, 1993). Land management practices, in large measure, control processes of land degradation and their efficiency in this respect will largely govern the sustainability of given land use. However, institutional, political, social and economic pressure and structures can also cause environmental problems.

4.1.3 Environmental Indicators and Frameworks

Indicators

Indicators are the ideal means by which progress towards sustainable development can be measured. Indicators have been used for many years by economists to explain economic trends, a typical example being Gross National Products. These have only fairly recently been introduced to determine the sustainability of environmental systems as required by Agenda 21 (e.g. OECD, 1993; MacGillivray, 1994; Gouzee *et.al.*, 1995; Hamond *et.al.*, 1995; Trzyna, 1995; World Bank, 1995; Bakkes *et.al.*, 1994; Moldan & Billharz, 1997). Whitford *et.al.* (1998) defined an indicator as any variable that can be measured and monitored to reveal something of relevance to a particular issue. An indicator should be easier and cheaper to monitor than the underlying process (es) with which it correlates.

Furthermore, in a real practical context, if sustainable development means changing the ways in which decisions are made to allocate resources, information is essential and indicators play a fundamental role by acting as pointers to reveal conditions and trends in the development of a household, community and a country (Tschirley, 1996). Indicators are a means to an end. They guide planners in making decisions about using their nation's resources. Traditional economic indicators (consumption, savings and investment) by themselves provide a distorted picture of progress and must be complemented by environmental and social measures. Planners of regional integrated land uses, particularly in the Namibian context, require applying these concepts in order to design environmental criteria necessary to implement land use plans in the various regions.

According to a paper published by FAO (1995), it is essential that all countries, particularly developing countries, take into account and closely monitor their natural assets through the use of indicators on land, water, forestry and fisheries. This study established that indicators identified at the local level can be refined into measurable environmental criteria for LUP purposes. In this study, this was achieved through PRA to engage the local communities in the decisions concerning resource partitioning and land use decision. In sustainable agriculture and rural development the integration of

environmental information into planning and decision making translates into integrating statistics on net land productivity with measures of the natural and human resources in agricultural projects and their off-site environmental trends.

To date, most indicator initiatives have been aimed at providing information at a national level for state-of-the-environment reporting (e.g. Ward, 1990; OECD, 1991; ANZECC, 1998; GRID-Arendal, 2001) or for answering specific policy questions at national and international levels (e.g. UNEP and WHO, 1998; FAO, 1992; Eeronheimo *et.al.*, 1997).

Few initiatives have been aimed at developing sectoral indicators, although some attempt has been made to develop these for land uses such as agriculture, forestry, transport and energy (Obst, 2000). In Namibia, indicators are currently being developed for national state-of-the environment reporting (Nakanuku *et.al.*, 2001). It is uncertain as to what extent an attempt has been made to develop indicators for land use planning and sustainable land management in Namibia. Despite a lack of understanding and existing gaps, the main objective of the Namibian SoER is to provide pertinent, up-to-date environmental information to all its relevant stakeholders on the trends and health of Namibia's fragile environment. The SoER uses simple but rigorous indicators for long-term tracking and monitoring of the resource base and changes in the condition of the environment (MET, 1997; MET, 2001). Relevant stakeholders in the development of indicators are decision makers, technocrats, politicians, students, communities, conservancy committees, farmers and other resource managers.

This study presents the results of fieldwork with local communities to establish the range of indicators being used or perceived as important in mitigating pressure on land resources. However, these indicators might not be appropriate indicators that would give a broad picture of what is happening in the environment because they are not refined at any platform. Nakanuku *et.al.* (2001) mention that Environmental Monitoring and Indicators Network (EMIN) is a platform where indicators are reported on, discussed and data-sharing is encouraged. Therefore, appropriate indicators are selected and a monitoring programme based on these is designed.

Frameworks

Walmesley (2002) has shown that one method of having a clear understanding of the physical environmental interactions and their socio-economic importance is through the use of indicators frameworks such as the PSR (Hammond *et.al.*, 1995; Gouzee *et.al.*, 1995) (see figure 5) or the Driving Forces Pressure State Impact Response (DPSIR) framework (see figure 6) (Smeets & Weterings, 1999). Both the PSR and DPSIR frameworks have been used extensively in the development of state of the environment reports [South African South African Department of Environmental Affairs and Tourism (DEAT), 1999]. The DPSIR monitoring framework was introduced to explain how the socio-economic and environmental factors relate to each other (Delbaere, 2002). Drivers are natural phenomenon, human activities and patterns, which affect the environment and its biodiversity. These in turn lead to pressures on the environment and its biodiversity, such as overexploitation of natural resources (Parris, 2001; CBD, 2003b; FAO, 1999). The pressures sequentially affect the state of the environment and its biodiversity, such as change in abundance of species and biological communities. Assessments of these factors are then used to identify responses to reduce environmental impacts.

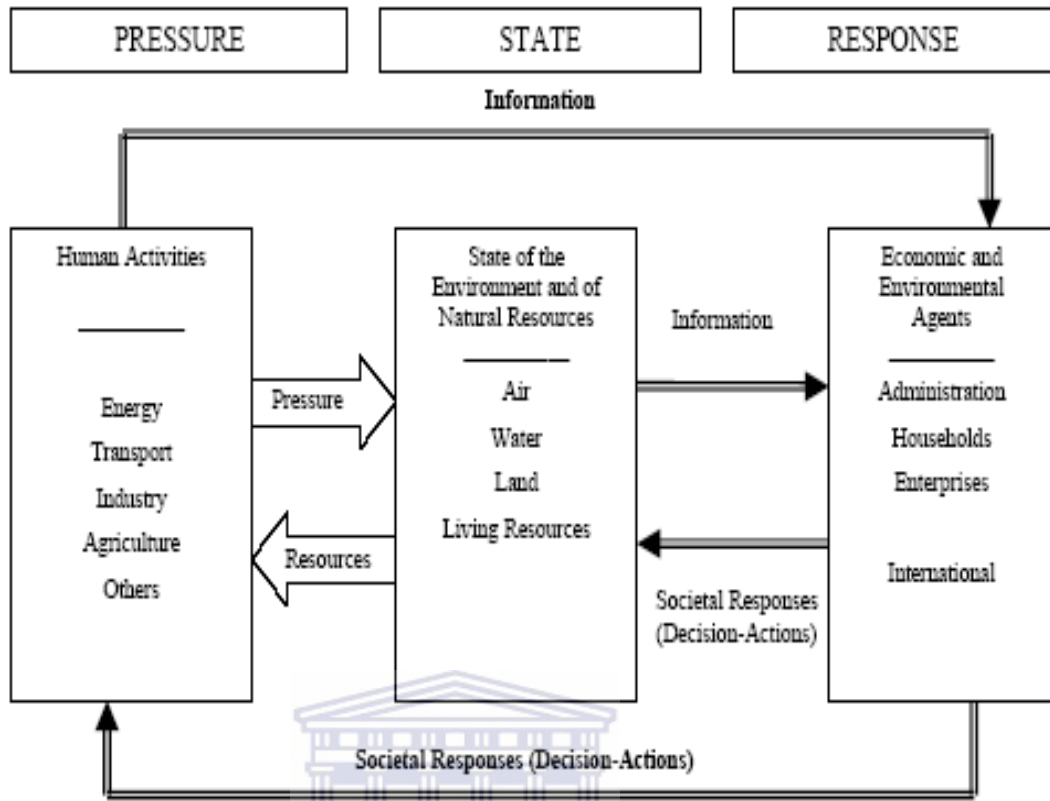


Figure 7: The Pressure-State-Response framework (Organization for Economic Cooperation and Development, 1993).

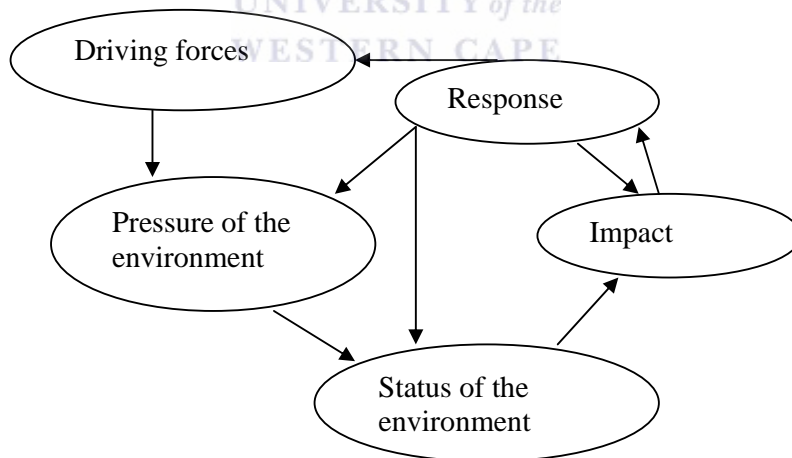
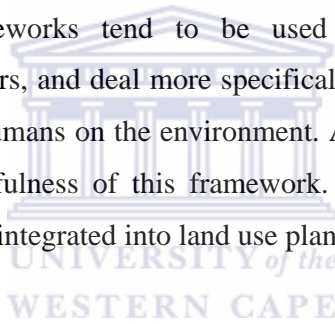


Figure 8: The Driver-Pressure-State-Impact-Response Framework (Garcia and Staples, 2000).

The difference between the Driver-Pressure and the State-Response-Impact types are often ambiguous and many countries such as Australia, New Zealand, South Africa, Uganda and Namibia have opted for the more simplified Pressure-State-Response (P-S-R) framework, making it currently the most widely used to identify the right indicators for monitoring objectives (Australian State of the Environment Committee, 2001; Froude, 2002; DEAT, 2001; Ugandan Ministry of Environment (UME), 2000; MET, 2000).

The PSR framework was developed by the OECD. The framework reports on human activities (pressures) that impact on the condition of the environment (state) and the societal response to those changes (UNEP/DEIA, 1996; Steiner *et.al.*, 2000; FAO, 1999; Parris, 2001).

These physical frameworks tend to be used most often for identification of environmental indicators, and deal more specifically with natural environmental issues and the influence of humans on the environment. An attempt was made in the study in order to establish usefulness of this framework. Refining these indicators could be useful if they are to be integrated into land use plans, both at local and regional level.



CHAPTER 5

This chapter presents the findings of the study around the key research questions. It also looks at land user's perception on the issues of LUP and sustainable natural resource, and the implications of engaging and integrating local level LUP with regional plans. It reveals the expectations of land users on the importance of integrating bottom up local level planning with regional planning in order to ensure environmental and sustainability. The findings include also the PRA exercises with the community in the case study areas. The results and analysis of the findings are presented systematically under each research objective and research questions. The following are findings:

5.1 RESULTS OF QUESTIONNAIRE SURVEY AT REGIONAL LEVEL

Questions were posed on how local experts at regional level view land use practices and environmental issues. The results are shown in figures 9-14.

A) Are local level land use planning practices ongoing?

80% of respondents from government departments (see figure 9) cited that they were familiar with the issue of LUP while only 20% were not familiar with the term. 90% of NGO respondents indicated that they were familiar with LUP and 10% were not familiar (see figure 9). 70% of private farmers interviewed were also familiar with the term LUP and 30% said that they are not familiar (see figure 9).

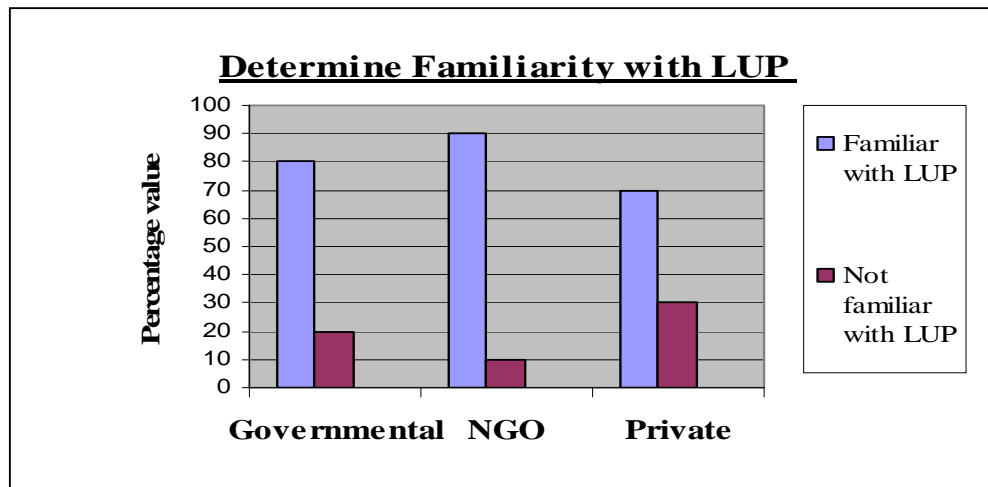


Figure 9: Familiarity with the term LUP.

Not all land use planning practices that take place in the region were ascertained to achieve long-term solutions because they are conducted only occasionally when problems arose. As shown in figure 10, 70% of government respondents said that their departments conducted LUP practices occasionally and 30% planned always. Figure 10, also shows that 50% of private farmers considered planning occasionally depending on the needs while another 50% said that they always considered planning. 80% of NGO respondents answered that they conducted LUP practices occasionally and 20% planned always (see figure 10).

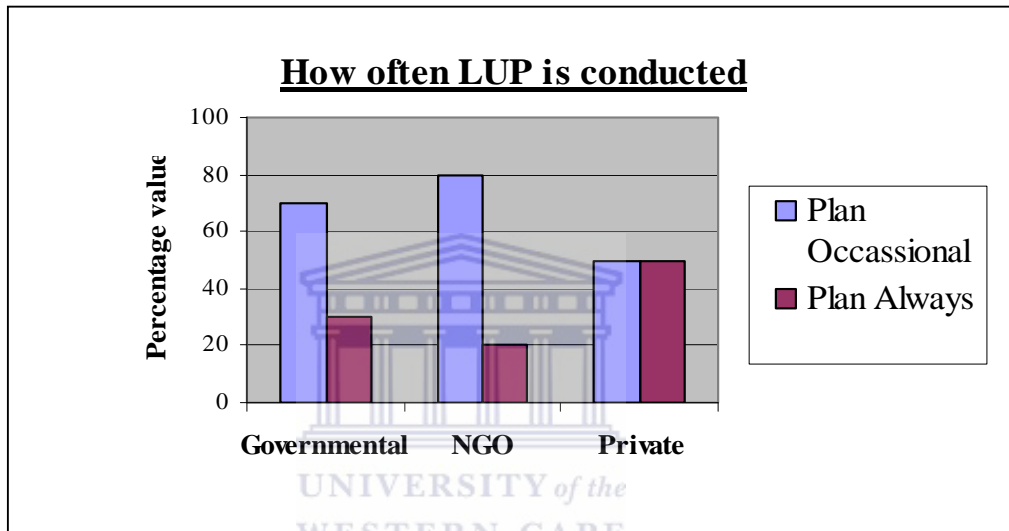


Figure 10: If LUP took place occasionally or always.

B) Procedures followed when conducting land use planning practices

36% of respondents from government departments said that they followed their institution policy while 35% said that they followed scientific methods⁴. 29% of respondents from government departments also said that they use traditional methods to conduct LUP practices (see figure 11a).

Respondents from NGO were asked if they used scientific methods when conducting LUP practices. 09% preferred to follow scientific methods while 27% followed their

⁴ Scientific methods concerns using scientific instruments or methods to collect data and interpret it carefully.

institution policy. 27% considered land use guidelines or steps⁵ while the majority 37% applied traditional methods (see figure 11b).

25% of private farmers interviewed mentioned that they use resources available⁶ to plan how to use the land for agricultural purpose. 75% said that they applied traditional methods into their planning (see figure 11c). No private farmers had indicated the importance of applying land use guidelines and scientific methods.



⁵ LUP steps refer to the LUP process as developed by FAO (FAO, 1993). The sequence of 10 steps serves as guideline and checklist of LUP activities. Some steps are not needed in certain situations. The following is the list of 10 for LUP in sequential order:

1. Define LUP goals and Terms of Reference
2. Organise the work required to conduct LUP
3. Analyse the problems (e.g. assess land use problems and their causes with land users)
4. Identify and describe land use options that may achieve the goals of step 1 and that will reduce the problems identified in step 3
5. Evaluate land suitability
6. Appraise land use options
7. Chose the best options
8. Prepare land use plan
9. Implement the land use plan
10. Monitor and revise the plan

⁶ Private farmers planned how many hectares to cultivate depending on availability of resources such as: inputs, implements, financial resources, rainfall, land available for cultivation.

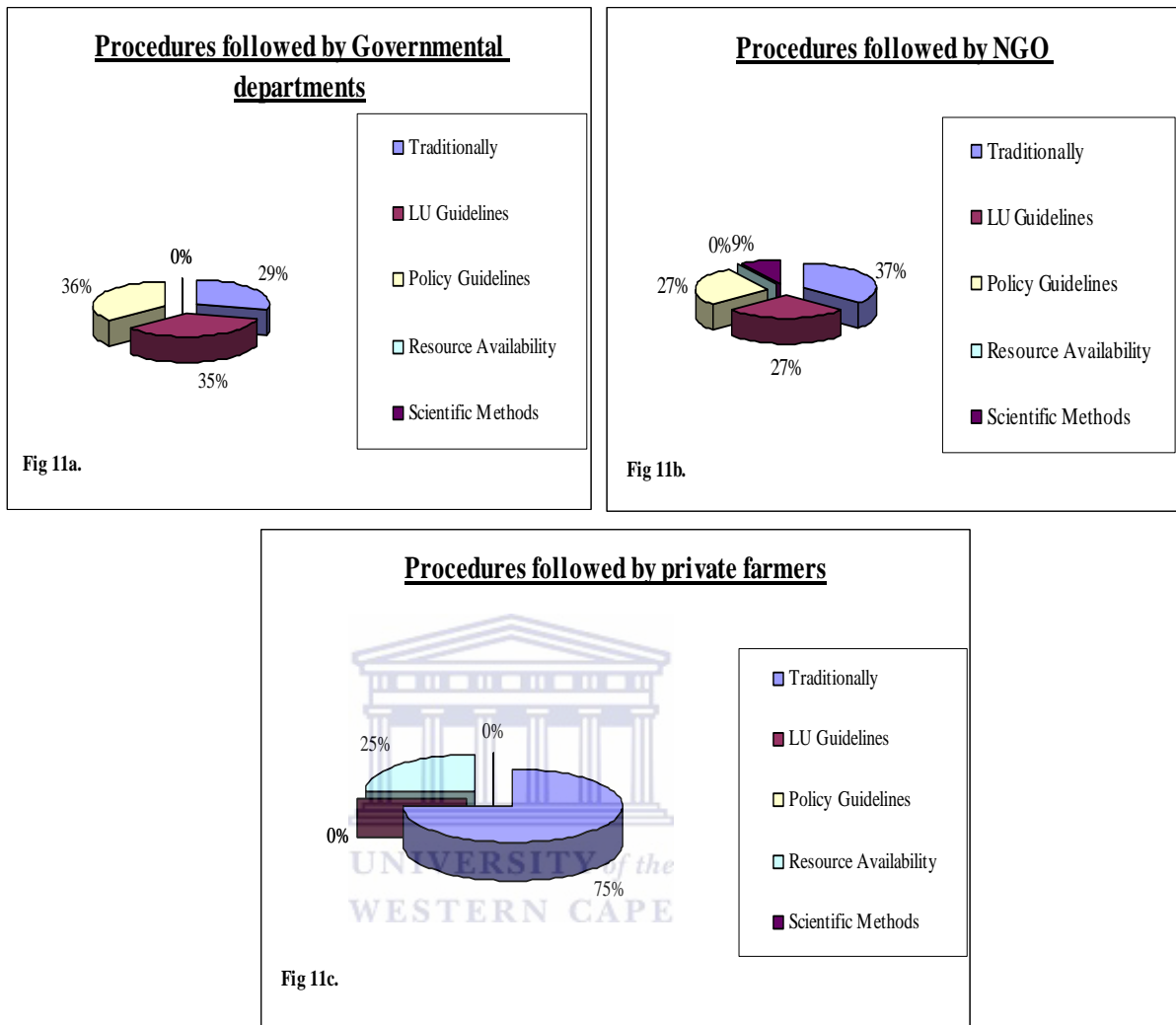


Figure 11: Procedures followed by three institutions when conducting LUP practices.

C) Whether environmental considerations are well integrated into LUP

The main thrust of this question was to look at environmental considerations and whether these were integrated into LUP. Environmental considerations into land use practices are achieved through answers from the research questionnaire and application of environmental framework applied at local level.

D) Are local level land use planning practices explicitly based on availability and sustainable use of environmental/natural resources

80% respondents from government departments stated that they considered the sustainability of natural and environmental resources in LUP practices. 20% thought that consideration of this is not important. 100% of respondents from NGOs said that they always included environmental issues in LUP practices. 50% of private farmers mentioned that they included environmental issues in LUP practices while also 50% indicated that they don't consider environmental issue in LUP practices (see figure 12).

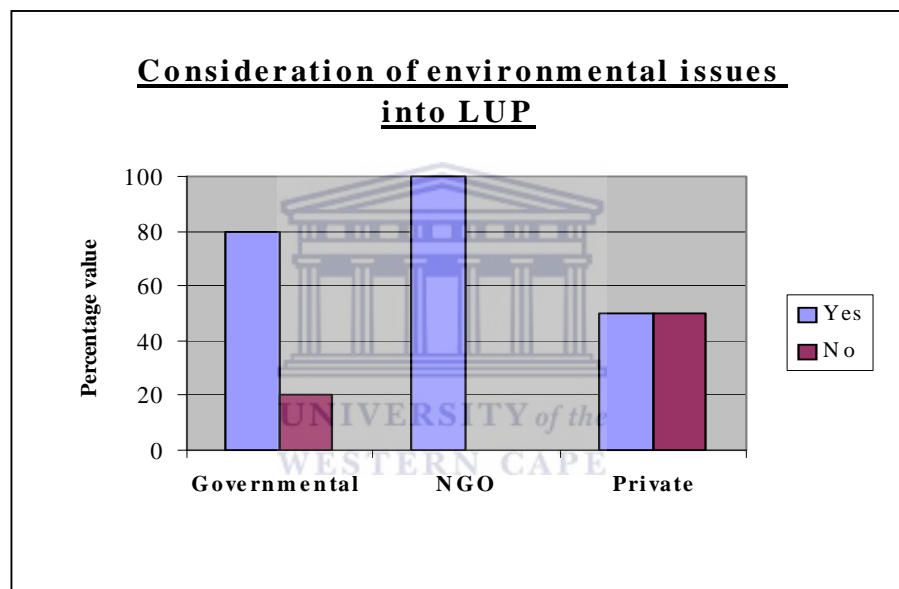


Figure 12: Whether institutions considered the sustainability of natural resources and environmental issues when planning.

E) How do resource users think local level land use plans and practices can be applied practically to manage natural resource sustainably?

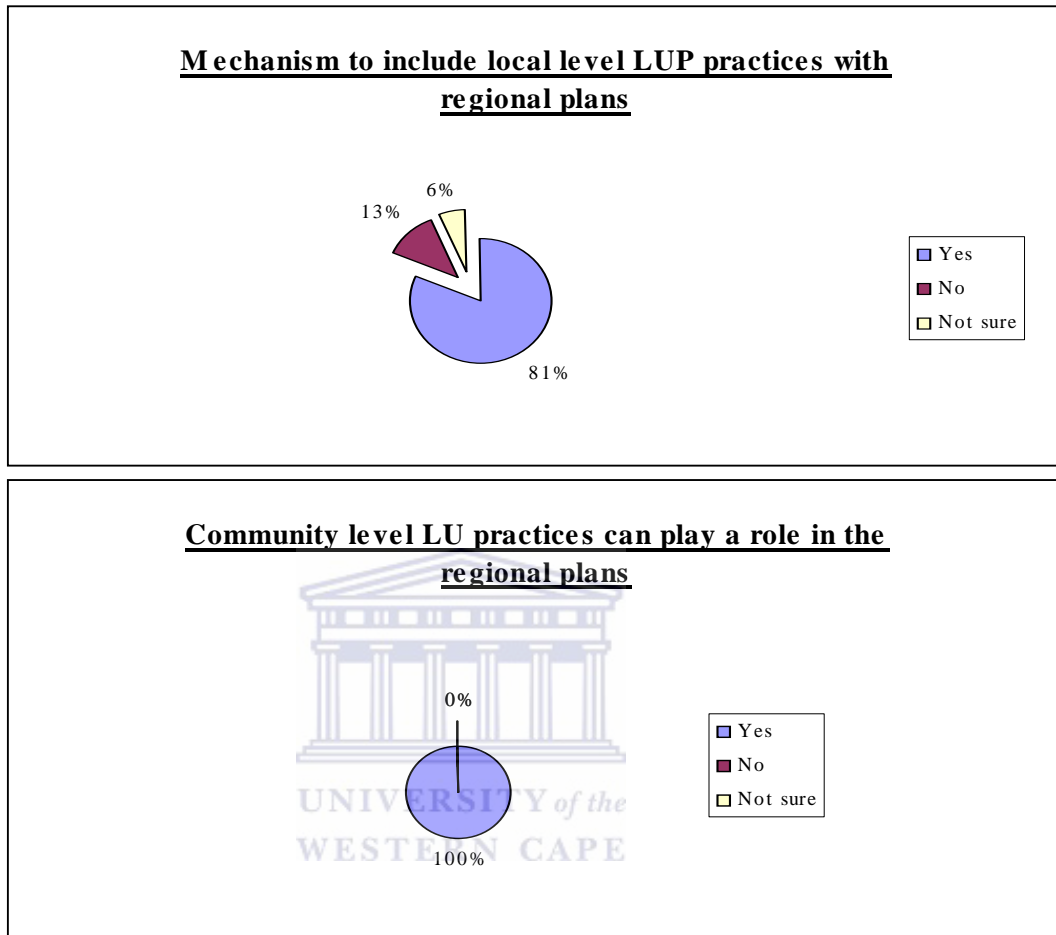


Figure 13a -13b: Perception of respondents on how they think local level LUP practices can be applied practically to manage natural resource sustainably.

Amongst all respondents interviewed, 81% thought that the establishment of a functional communication forum could contribute significantly to the success of mainstreaming SLM. From the results, 13% of respondents however did not see the establishment of such mechanisms as being important for mainstreaming SLM while 6% were not sure whether it is important to form such forums to link regional and local land use plans and practices (figure 13a). 100% of respondents interviewed thought that the community local level LU practices can play a role in the regional plans (figure 13b).

52% of all respondents interviewed mentioned that there was no involvement or participation of stakeholders during the Caprivi ILUP and other related LUP practices, with the remainder of respondents being equally split between those with the view that it was participatory (24%) and those who were not sure (24%) (see figure 14).

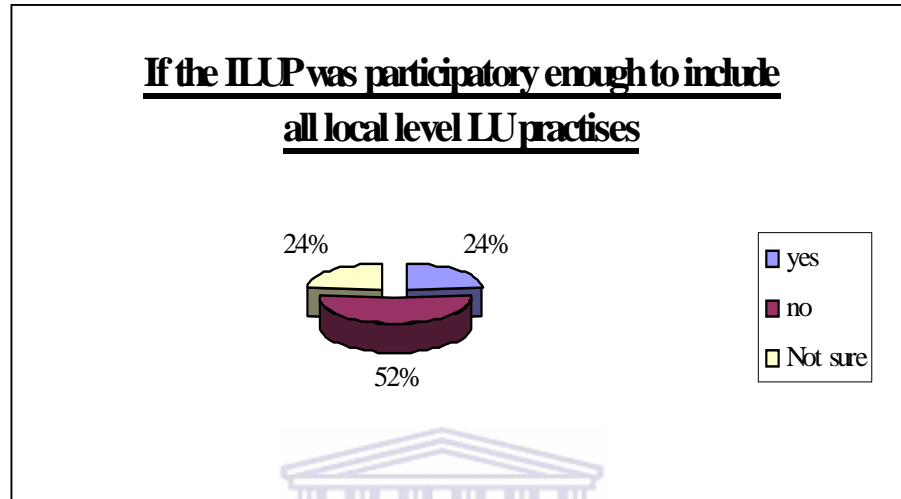


Figure 14: Perception on how participatory was the ILUP.

94% of interviewees agreed that environmental problems and land use conflicts are related to poor coordination among stakeholders while 6% thought that this was not related to poor coordination (see figure 15).

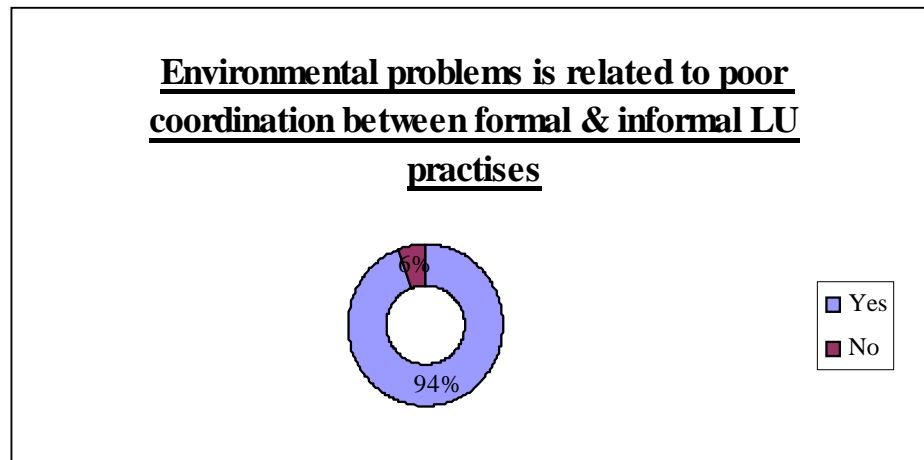


Figure 15: Relationship between environmental problems and coordination between regional and local level LUP practices.

5.2 Results of community PRA exercises at local level

The PRA exercises with the community at the local level were aimed at answering the research question under objective 3 of the study. A holistic approach through a consideration of an EA was taken to answer to this question. The results obtained through the application of PRA methodologies and PSR framework qualified with the context of EA principles. The subsequent paragraphs outline how the community participated in answering to this objective and key question.

In Lusese village the focus group consisted of 9 people, which include farmers and village's headmen. Among the 9 people whom participated, 2 were females and 7 males.

In the Salambala conservancy, the PRA exercises were carried out with a focus group of 8 people. The assembled group consisted of a community natural resource monitor, a member of the Caprivi communal land board, farmers, and members of Salambala conservancy and committee. Of the 8 people that formed the focus group, 3 were females and 5 males.

In the Mayuni conservancy, the PRA exercises were carried out with a focus group of 13 people comprised of 3 females and 10 males.

A) *What are the environmental criteria that are important for consideration in LUP practices in the study areas?*

Table 2 is a synthesis of the state of land quality indicators used to indicate the state of pressure on land resources by local community from Lusese, Salambala and Mayuni. The set of relevant indicators identified by the communities at local level are a useful measure and observation of the complexity of SLM. These indicators were also identified at this level to define environmental criteria that are important for consideration in LUP practices.

Table 2: Summary of indicators used to assess the state of pressure on land resources by local community from Lusese, Salambala and Mayuni

Land Quality & Pressures	Local Level Indicator		
	<i>Lusese Village</i>	<i>Salambala Conservancy</i>	<i>Mayuni Conservancy</i>
<i>Drought</i>	Low rainfall		Hot weather More wild fruits – Entente Wind Direction
<i>Poor Soil Quality</i>	Sandy Soils Saline (brackish) soils Low crop yields	Soil colour Crop sizes. Large crops indicate good soils Low crop yields	Sandy soil Soil colour (brown =good, white = poor) Crop Sizes and sizes of crop produce Low crop yields Plant Species. <i>Kalilolilo</i> -grows on poor soils
<i>Floods</i>	High rains in catchment	Higher rainfall	High rains in catchment Number of dams in rivers
<i>Veld Fires</i>	Moribund grass in area		Community rather listed causes and not indicators: Grass cutters, cigarette smoking, clearing of fields and absence of fire -breaks
<i>Human/Animal conflict</i>	Game in grazing areas Crocodiles at waterpoints		Increased number of elephants and other game Crop loss
<i>Livestock Loss</i>			Predator in grazing areas Loss of livestock Tsetse flies Increased tick infestation o Lump skin in animals
<i>Livestock Pressure</i>	Veterinary animal counts	Veterinary animal counts Increased wealth in area (the rich buy more livestock)	
<i>Overgrazing</i>	Poor animal conditions Low milk production Low birth rate in animals Increase of unpalatable shrubs/bushes (<i>Mwange</i>)	Poor livestock condition Bare ground Decrease in palatable grasses (<i>Insangani, Mufiyezo, Mushonosi</i>) Increase of unpalatable grass	
<i>Human Population Pressure</i>		Increase in number of fields for cultivation	Reduced size of available land Increase in human population numbers
<i>Deforestation</i>		Trees are cut down High numbers of elephants	Disappearance of good timber trees (<i>Mushono</i>) Thick forest changes to open forest

			Increased human numbers Village expansion
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* Mushono trees are used for construction of huts, kraals and homestead fences

C) Which environmental framework is suitable for linking local level LUP practices to regional LUP practices?

Considerations of environmental issues are useful because a framework can be developed to assemble a meaningful set of indicators that reflect all aspect of sustainability, including ecological, economic and social, and thus reveal a trend in land management (Dumanski, 1997).

The PSR framework was useful in this study as it was easily related to identified and defined indicators at study sites. This framework is relevant because it can describe the societal response from the community perspective and outside experts. Societal responses are types of actions taken after realizing pressure on land resources (see table 3).

Table 3: Summary of types of Societal responses after realizing pressure on land resources.

Land Quality & Pressures	Societal Responses: Local Community (corresponding to identified pressure on land)	Societal Responses: Government/NGO (corresponding to identified pressure on land)
<i>Drought</i>	<u>Salambala</u> 1. Engage in business enterprise: e.g. selling fish & other goods <u>Lusese Village</u> 1. Migrate animals to higher ground	<u>Mayuni</u> 1. Land use Diversification e.g. conservation
<i>Poor Soil Quality</i>	<u>Salambala</u> 1. Apply cattle manure 2. Mixed crop cultivation <u>Mayuni</u> 1. Crop rotation 2. Cattle manure 3. Rest old cultivation fields & clear new cultivation fields <u>Lusese</u> 1. Cattle manure	<u>Salambala</u> 1. Agricultural practices advice e.g crop rotation
<i>Floods</i>	<u>Salambala</u> 1. Move to higher ground 2. Cultivate early	<u>Salambala</u> 1. Drought relief food 2. Veterinary services

	<u>Lusese</u> 1. More fishing 2. Move to higher ground	3. Camping equipments <u>Lusese</u> 1. Drought relief food 2. Veterinary services 3. Camping equipments
Veld Fires	<u>Lusese</u> 1. Community awareness supervised by the Khuta 2. Traditional control e.g. early burning before rainfall 3. Enforce traditional rules (punishment)	<u>Mayuni</u> 1. Establish fire breaks 2. Community forestry 3. Conservancy awareness <u>Mayuni</u> 1. Government Awareness <u>Lusese</u> 1. Government Awareness
Human/Animal conflict	<u>Lusese</u> 1. Chilli “bombs” used as elephant deterrent 2. Traditional methods e.g. beat drums & make noise to scare away birds from cultivation fields	<u>Salambala</u> 1. Fencing of the core wildlife area 2. Compensation e.g. funeral cover or payments
Livestock Loss	<u>Mayuni</u> 1. Community game guard 2. Community law enforcement 3. Compensation by conservancy	<u>Mayuni</u> 1. Conservancy
Livestock Pressure	<u>Mayuni</u> 1. Sell cattle to MeatCo butchery	
Overgrazing	<u>Mayuni</u> 1. Migrate animals to better grazing areas 2. Sell cattle to MeatCo butchery <u>Lusese</u> 1. Migrate animals to better grazing areas	<u>Mayuni</u> 1. Government Drought relief food
Human Population Pressure		<u>Salambala</u> 1. Government family planning initiative 2. HIV/AIDS awareness campaign
Deforestation	<u>Mayuni</u> 1. Community Awareness	<u>Mayuni</u> 1. Government establish fire breaks 2. Government/NGOs facilitate establishment of community forestry

CHAPTER 6

This chapter provides a critically discussion and a detailed insight of the case study areas by looking at the issues that emerged from regional and local level field research. The following sections present the discussion of the findings of the study under each research objectives and research questions.

6.1 DISCUSSIONS OF RESULTS BASED ON RESPONDENT'S QUESTIONNAIRE AT REGIONAL LEVEL

6.1.1 Documenting Caprivi regional local level LUP practices

A) Are local LUP practices ongoing? And (B) procedures followed when conducting LUP

There are various land use practices prevalent in Caprivi region. The dominant form of land use practices is subsistence farming, with heavy emphasis on livestock production and crops cultivation. Furthermore, there are others land uses such as freshwater fisheries which form an essential component of rural people's livelihoods. Environment-centred tourism is another significant and rapidly increasing land use practice in the region. Communal land conservancies are also being developed within the rural community areas. Conservancy management is a land use which diversifies land use options and does not necessarily exclude traditional farming. There are seven registered conservancies and new emerging ones. Barnes (1995) mentioned that this land use practice has enabled diversification of people's livelihoods, broaden their resources dependence as a means of coping with drought, and potentially doubled household incomes. In Caprivi, the land is also allocated to State owned game parks and urban development.

The observations made from the previous discussed sections which concerns the land use practices in Caprivi, illustrate that the issue of LUP options is vested in a number of different government, NGO and private sector institutions. This is particularly true because different land users from these sectors viewed land use practices differently based on their institutional policies (see figure 9 & 10). Their different views are based

on the extent to which land use planning can actually contribute to solving perceived and actual problems, depending on many prerequisites and conditions. A prerequisite for realistic land use planning is the detailed analysis of the various interests of stakeholders in the region. This means that land users and resource managers implement LUP in their own specific ways in order to address particular issues associated with land use through specific solutions tailored to the identified problems. These problems varied from land degradation, soil erosion and insufficient agricultural production.

Judging from the study results, LUP practices in the region are difficult to implement because each set of stakeholders created and preferred to follow their own policy and land use guidelines. This is an indication that participation in and implementation of LUP practices are governed and conducted within a set framework of institutional policy and guidelines. This scenario suggests that the existence of current policies and guidelines are not uniformly applied by all sectors because they are not standardized and applicable at all levels. The MLR is given the mandate by the central government to develop and coordinate the functions of LUP and sustainable resource management activities at the national level, but is also responsible for regional and local activities.

Because these policy guidelines are viewed differently by land users, institutions continued to conduct their own sectoral planning. This study found that the principles and sources of planning regimes in Caprivi are not democratic, but coercive. They have been formulated by technocrats at central government level in a top-down manner without having consulted most land users. This is particularly true for the local communal areas which are prescriptively planned. During this study one respondent clearly mentioned that *“the consultant firm (IDC) contracted by the MLR did not delineate different land uses. There is too much conflict between conservation and agricultural activities”*. This shows that the current sources of statutory LUP are poorly coordinated and conflictual as they originate from a multiplicity of sources. Such planning is implemented by numerous authorities with scattered responsibilities and conflicting powers located at both regional and local level.

For example, the Ministry of Agriculture, Water and Forestry (MAWF) and the Ministry of Environment and Tourism (MET) are responsible for lending support for

the devolution of natural resources management to the local level. These plans are often conducted occasionally through project based interventions. There is a good reason to believe that about 70% of government departments and 80% of NGOs LUP activities are carried out occasionally because they are specifically aimed to solve specific problems through project based interventions. These interventions are designed to help communities develop their own plans in certain cases. A good example is that of conservancy committees supported by MET, often carried out in collaboration with NGOs and development partners to undertake local level planning. However, these plans are subordinate to and can be overlooked by regional land plans. Local level plans are often overlooked because the powers are not transferred to lower administrative levels. Land use guidelines supporting the devolution of natural resources management rights and responsibilities to the communities will also be understood and implemented easily if agreed to by the land users themselves. The prerequisite for this is that the stakeholders should have the capacity to cooperate and create suitable coordination mechanisms related to land use.

Many sectoral organizations, regional and local authorities and NGOs often compete for responsibilities and work in the same area in an uncoordinated manner (Kwakernaak, 1995). Mendelsohn and Roberts (1997) are also of the opinion that largely, land use practices in many parts of Caprivi are often uncoordinated.

This often results in an inefficient overlapping of activities, confusion among stakeholders and unnecessary expenses. The reasons for this situation is lack of guidelines on implementation of existing laws, absence of political interest and lack of mutual LUP.

Generally, the results of LUP and implementation of measures can only be sustainable if planning efforts by institutions are negotiated by all stakeholders, which also includes the interests of rural dwellers.

The tendency of private farmers' not to use policy and land use guidelines (see figure.11c), may suggest that this group is excluded from LUP. It should be recognized that the most important target group in LUP is made up of the direct land users such as farmers at local level. The involvement of land users at the local level is generally

appreciated because they know best how their systems work and what the management constraints are while local and indigenous knowledge may be a rich source of information for LUP (Oba, 1994; Hommann *et. al.*, 1996)

One respondent during this study succinctly surmised the decline of traditional authority and loss of respect of customary systems of natural resource management as follows: “*the traditional system through local authority used to be respected, but currently the traditional system is violated as people followed their own ways. There are no official systems followed to direct people’s land use practices*”. This is an argument that is firmly supported and confirmed to be the findings of this study as discussed in preceding sections.

The significance of indigenous knowledge amongst private farmers is important when planning for allocation of land uses. 75% of interviewees supported the idea of traditional methods when planning. The acquired traditional skills and knowledge of the local situation can be useful for the development of technical aspects and decisions on land use. However, one respondent cautioned during the interview that: “*there is a danger with indigenous knowledge because it does not take formal LUP into consideration. For example settlement patterns in rural areas can be haphazardous as they are not properly demarcated on the basis of land use practices. There are no consultation between indigenous land use planners and formal ones*”

An important observation also made during this study is that the majority of government departments (29%) and NGOs (37%) applied traditional knowledge in their LUP. Some of the respondents during this study supported the application of indigenous knowledge in the following ways a): “*the local needs, customs and values are important but not properly or seriously considered in all planning phases and decisions taken, and b) local people’s knowledge is important. Without considering this false information will be given about rural dwellers*”

These critical opinions were found by this study to be important and significant for LUP purpose. Local people’s participation and knowledge can be a starting point in consideration of linking local level planning with the formal ones advocated at regional level.

6.1.2 Analysis if environmental considerations are well integrated into LUP

A) *Are local level land use planning practices explicitly based on availability and sustainable use of environmental/natural resources?*

Local understanding of SLM may help to address both process of resource degradation and underlying causes of unsustainability, as well as indicate possible solutions. This, in turn, requires understanding the main driving forces that operate at each level of community, local, regional, national and the interconnection between these. Though, the procedure of applying SLM is not one of identifying the best choice. But when participatory processes are applied with all major stakeholders, SLM becomes a tool for gaining insights and providing direction on how best to effect the necessary changes (Dumanski & Smith, 1993). When different land users in Caprivi understand and appreciate that appropriate land management, regional planning and policy framework complement one another in a purposeful way, in accordance with the principles of SLM, natural resources can potentially be used in a sustainable way. SLM should also be understood as a system of planning that aims to integrate ecological with socio-economic and political principles in the management of land for agriculture and other purposes. This study argues that this understanding applies to decision makers as well who are in a position to create an enabling environment to enhance and create awareness on the manner in which LUP practices can be implemented. For instance, the MLR, which is the main actor in coordinating the formulation of regional LUP, should have a clear understanding to include the concepts of sustainable utilization of environment on land use plans.

Yet, as discovered by this study, the understanding of SLM would not automatically be implemented in a workable programme since the issue of an integrated approach to planning use and management of land resources did not provide for local participation and inclusion of all stakeholders in the planning of activities, which should have been negotiated by common agreement. The challenges facing SLM in Caprivi region as identified in the study concern the majority of institutions addressing environmental issues in their own different manner. The results obtained from the informants interviewed indicate that local level LUP practices were based on the availability and sustainable use of environment. The majority of informants supporting the importance

of SLM were from government departments (80%). 100% of informants interviewed from NGOs were of the opinion that they have always included environmental issues in LUP.

Even though environmental aspects are considered, it is the finding of this study that few indicators were developed at individual level by stakeholders and were not standardized for regional and local level application. An essential component of the SLM and EA to planning is monitoring of ecosystem changes (CEARC *et.al.*, 1986; Horak *et.al.*, 1983). A monitoring system should provide information on whether ILUP objectives are being met and should assess the effectiveness of the planning decisions and process. Table 4 show indicators or environmental issues that are considered by stakeholders interviewed at regional level.

Table 4: Environmental issue or indicators considered by different institutions at regional level.

Institutions	Environmental issues/indicators
Government departments	Vegetation cover Deforestation Plant diversity Degree of soil erosion Human/animal conflict Veld condition Animal condition Poverty trends and malnutrition Household incomes Economic activities Education results Tree harvested (number of permits given to people) Shift in crop cultivation
NGOs	Livestock population Human population Number of trees used for fencing and as a source of fuel Rainfall figures Crops damaged Crops yield Human/Animal conflict Shift in crop cultivation Land use practices
Private farmers	Stocking rate

	Rate of veld fires Number of offenders punished for causing fire
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It is necessary for the selected indicators to be combined into a single index of ecosystem integrity to detect environmental degradation and its causes and to assess whether certain actions result in improvements (Karr, 1991). In the end, it is very important to reformulate standards and requirements in order to prevent further environmental problems.

This study found that the recurrent environmental problems and land use conflicts highlighted by de Ambudja (2005) and Mendelsohn and Roberts (1997) can easily be attributed to the fragmented work of different institutions. The emphasis here is that the consideration of environmental issues by these stakeholders may not have a significant impact on both regional and local level LUP practices because there is no clear integrated approach across different institutions to harmonise their work.

In Caprivi region, development of environmental criteria analysis is required because much of the environmental problems and land use conflicts were identified to be related to poor coordination of land use plans and lack of environmental indicators (see figure 15). Existing land use plans seem to proof this finding. Caprivi ILUP (IDC, 2000) and Ecosurv (2003/2004) Tourism Development Plan had a focus on physical infrastructural developments and environmental features. They lacked environmental procedures which help to assess impact of these plans on human well-being and environment.

In line with the findings of IDC (2000), ILUP is regarded by respondents interviewed as having failed to include relevant stakeholders in the decision-making and formulating of the final plan (see figure 14).

The study results show that respondents interviewed think that the formulation of regional and local level land use plans will be meaningful for future long-term SLM if these incorporates methods to monitor and evaluate the chosen set of indicators in order to mitigate environmental related problems.

The study managed to garner the views of different communities at local level. These views were an important instrument to gain understanding of land users and obtain practical fixed indicators that can be integrated into land use plans (see Tables 2). The current problem of poor linkage between regional and local level land use plans can be overcome if regional and local level LUP practices are harmonised. This can be overcome also through monitoring the state of the environment using standardised and commonly identified indicators.

The perception of the majority of land users interviewed indicates that the establishment of a mechanism to harmonize local level land use plans with regional land use plans will help to manage the natural resources and minimize land use conflicts. It could also serve as a strategy to join together regional and local level LUP.

B) *How do resource users think local level land use plans and practices can be applied practically to manage natural resource sustainably?*

Local level LUP practices can be applied practically to manage environmental related problems if there are universally selected and adopted specific land use options to integrate social, economic and environmental sustainability in the planning and formulation assessment of policies to guide land use as well as the subsequent implementation of land use types.

In the context of this study the investigation conducted with respondents from the government departments, NGOs and private farmers proposed guidelines on how to address the issue of environmental problems. This investigation was necessary for the purpose of knowing the key mechanism important to address the ranges of inappropriate land use and management practices.

The results from participatory work with the communities at local level indicated that land use practices are not integrated with regional plans. Sometimes when attempts are made by land users to harmonize activities, feedback is not received (Lusese and Mayuni participatory work). Through PRA exercises the suggestion was made to use the *Khuta* and Village Development Committee (VDC) and Constituency Development Committee (CDC) as existing structures to form links with regional plans.

This indication reflected the reality of people's perception, which revealed that the work conducted by IDC (2000) to formulate an ILUP for Caprivi did not consider the importance of stakeholder's participation in order to include local level land use practices.

Therefore, there is a need to support the thinking of land users, which suggested that regional and local level land use practices should be harmonized in order to sustainably manage land resources. Moves to combat environmental related problems and solve land use conflicts are needed which exist due to poor coordination between LUP practices.

This kind of situation is also evident from the results presented here. The results from institutions indicate that institutions in Caprivi conduct their own LUP with limited coordination and participation of different stakeholders (see figure 14 and 15). What is perhaps surprising is that 94% of interviewees agree about the acute lack of proper coordination amongst stakeholders as leading to environmental problems and land use conflict, yet only 81% recognised the need for a representative forum to coordinate land use planning.

It therefore becomes equally important to identify SLM practices that can lead and contribute to informed decision making about appropriate land uses. Policy and programme interventions should in a comprehensive manner try to understand the impact of different land uses on environmental sustainability. The then established multidisciplinary approach of functional institutions in the region should facilitate and coordinates the undertaking on all encompassing assessments at both regional and local level, and subsequent feed of the results into national assessment. The recommendations made by MET (NBSAP, 2002; GRN, 2000) point out that the national assessment is significant because the study of land use impacts on the environment is conducted according to key ecological zones in Namibia and compares some of the major current land uses.

The results of research activities carried out at the regional and the local level generate data, information and insights that can be used to feed into and inform a national scale

analysis of impacts of various land uses. Impact of land use on environmental sustainability would provide the relevant analytical framework for decision making.

Policy interventions should ensure that a multi-disciplinary approach to secure sustainable development and reduce land related conflicts is encouraged. It is normally accepted that each role player in the development process of the region has their own priorities but coordination plays a vital role in the implementation and re-evaluation of priorities.

6.2 DISCUSSION OF RESULTS BASED ON PRA EXERCISES BY THE COMMUNITIES AT LOCAL LEVEL

6.2.1 What are the environmental criteria that are important for consideration in LUP in the study areas?

To assess environmental sustainability is a complex process that manifests itself at different levels of resolution and extent in terms of both the temporal and spatial dimensions. The development of a core set of indicators allows for a practical and consistent approach to assess and monitor environmental sustainability. This study highlights the possible standards at local level for defining the criterion and indicators. Indicators of environmental change can be used to determine the state of the environment, the magnitude of the drivers (pressure) of change and human response to mitigate undesirable changes in the environment (Dumanski, 1997).

The proposed PSR framework as a criterion under this study was formulated to describe the desired state and dynamics of the environmental and social systems at local level. The criterion was formulated in the form of indicators identified by the communities at the local level (table 2). Criteria and indicators together form the mechanism that would enable an assessment of whether the set objective is being met (Poschen, 2000; Segnestam, 2002; Henninger & Hammod, 2002).

The identification of indicators in this study was done in a participatory manner in order to include all views of the communities at the local level. The local communities

who participated in the PRA exercises showed differences knowledge about the types of indicators they used to assess pressure on land resources.

Local communities prefer to use known traditional methods which are slightly different from the scientifically applied methods. This study tried to capture what local level land users observe in the veld and what they know about their surroundings and management options. According to Mascarenhas (1996) and Rigby *et.al.*, (2000) the value of local knowledge has long been underestimated by most researchers and development workers, thus depriving both science and development projects of highly valuable information. It is therefore of paramount importance when planning for land uses at the local level that both scientists and development workers try to capture as much as possible from the local information base. Without listening to people's own account of livelihood conditions and environmental challenges, local development may fail.

As shown in table 2, the local community who participated in the PRA exercises had identified a great diversity of indicators for qualitative assessment of pressure on land resources. Local level indicators have been defined as measures or signals of environmental quality or change formulated by individuals, households and communities and derive from their local systems of observation, practice and indigenous knowledge (Hambly, 1996). For the local communities directly dependent on their immediate physical environment, local land users develop local level indicators. In reality, local people make decisions using, at least in part, their own tools for monitoring and measuring problems such as land degradation, and therefore they interpret and act on their own understanding of sustainable development (Hambly 1996).

Table 2 also shows examples of local level indicators. It appears that vegetation related indicators are extensively used to reflect soil quality and grazing intensity. The study results also showed the different indicators perceived by different communities in the study sites. Plant specie such as *Kalilolilo* is used by the community of Mayuni to describe the quality of the soil. The community at Mayuni indicated the number of good quality trees disappearing due to mismanagement and over-utilization. At Salambala, the community frequently mentioned the disappearance of palatable grass

e.g. *Insangani, Mufiyezo and Mushonosi* as a measure of the extent of overgrazing. Unpalatable species were mentioned as replacing good grass in overgrazed areas.

The knowledge and use of vegetation related species was also different at the three study sites. The vast reduction in the number of *Terminalia sericea* (*Muhonono*) trees was described by the community at Mayuni as a measure of the increase of deforestation. These trees are threatened because they are highly favoured for constructing traditional homesteads.

The human population in the area is expected to grow by 75% by the year 2010 (IDC, 2000). Human population increase was mentioned by the Salambala community as an indicator that led to an increase in shifting cultivation fields. Salambala's human population had increased and continues to grow faster than the other two study sites. As the human population continues to grow, more pressure is put on available land and natural resources. There is a problem if the population continue to grow beyond the available resources and without careful planning and resource management. It is also a problem because it may result in further serious destruction of these resources.

An increase in number of cultivation fields usually informs the community of Salambala about the human population pressure. Along these trends, the wealth and consumption levels of cattle owners have increased and draught power increased enabling farmers to clear and cultivate more land. As more land is cleared for cultivation, land needed for the growing population has also become minimal. The local community in Salambala felt that the reduced size of available land is a testimony to human population pressure.

Furthermore, in Lusese village and Salambala conservancy there was a common understanding that the presence of higher numbers of livestock is contributing to overgrazing. Cattle are the dominant stock farming in the study areas. Cattle are highly prized for their value as a tangible resource providing benefits such as draught power, milk, and hides, meat and cash income. The biggest value attached to cattle is that they are a parameter of the generation of wealth of communal farmers. This traditional view, together with the reluctance of cattle owners to sell cattle and uneconomical farming practices, contribute to the build up of livestock numbers. This higher number of

livestock will lead further to overgrazing. The foregoing points tell us that livestock can be a good indicator to reveal issues of environmental problems in a different ways.

A good example of a livestock related indicator was observed from the Lusese community. They traditionally use low milk production and long periods in between calving as an indicator of overgrazing and less nutritional fodder. They mentioned that when there is not enough grazing for the livestock, their health condition deteriorates and subsequently leading to low milk production. Low birth rate in animals is also related to poor grazing. The community interviewed from the Salambala conservancy mentioned that poor livestock condition is attributed to poor grazing and land quality.

In Salambala and Mayuni Conservancy, the interviewed local community mentioned that the harvesting of forest products had contributed immensely to deforestation. Forests in these areas provide numerous products to individuals and communities at large. Individual farms normally use firewood from the forest as a source of energy for cooking. Wild food is also collected from the forest as a source of nutrition for good health. This study shows that individual farmers will continue to use forest products unsustainably if there are no interventions to provide alternative means such as solar energy to replace firewood as the only source of energy. Interventions should include also a strategic policy guideline to ensure the sustainable utilization of the forest.

Climatic conditions, especially rainfall, were related to drought and flood events. The geographical location of Lusese in the flood plain meant that the area is more prone to seasonal floods.

The geographic situation, environment characteristics and land uses at the study sites were identified as important for determining other types of pressure on land and other valuable resources. For example, the Mayuni community said that the establishment of Game Parks and conservancies contributed to a high number of wild animals in the area. High numbers of wild animals in the area were related to common incidents of crop and livestock loss. In addition, the prevalence of Tsetse fly (*Glossina*) was mentioned as a contributing factor to loss of livestock by the Mayuni community.

In Lusese, the community mentioned that crocodiles and a high numbers of grazing wild animals can be used as good indicators to evaluate the conflict between wildlife,

humans and livestock. In Salambala the community pointed out that there are no indicators to evaluate the problem caused by wild animals.

Veld fire is a common problem in the three study sites but the community mentioned that they could not define any significant indicators to assess the degree of damage and pattern of fire occurrence. Subjectively, in Mayuni, the community were able to identify grass cutters, cigarette smokers and clearing of new cultivation field as the main causes of fire. Under utilized land can also contribute to more fires as grass can accumulate and grow tall over a long time, providing fuel for the burning fires.

It is important that identified indicators at the local level be broken down and refined to be more compatible with regional differences of ecosystems. For instance, at the regional level, indicators for the loss of woody plants could be measured as a change in the percentage of woody vegetation cover by using scientific techniques such as remote sensing. In this regard, the end product would be compatible indicators which include local knowledge and scientific principles.

A) Which environmental framework is suitable for linking local level land use planning practices to regional LUP practices?

Practical and cost effective methods are preferred because they remain more applicable than costly and sophisticated methods. de Azambuga (2005) suggested an ILUP tool kit to be useful in facilitating the mainstreaming of environmental sustainability considerations throughout choices and implementation of land management practices and land use options.

In this study use was made of the participatory approach and the PSR framework at the local level to generate perceived and used indicators by the communities (Table 2). Indicators identified at the local level through practical methods, will be useful to complement the implementation of a suggested ILUP tool kit and current regional ILUP. Indicators identified can also have a good chance to be explored further to strengthen the link between sectoral approaches at regional and local levels. Once indicators are properly refined and structured they will help to assist with monitoring and evaluation of land use plan

B) Societal responses to pressure on natural resources

The study results show that Government, NGO institutions and community members respond differently to pressure on land resources in accordance with their abilities and understanding of the pressures (see table 3).

Governmental departments mostly responded by providing aid during drought and flooding, and helped to relocate people to safer places (see table 3). NGOs responded by facilitating the establishment of community projects such as conservancies (see table 3). Salambala and Mayuni conservancies were established as a response to high unemployment rates in an attempt to improve the economic situations in the rural areas. Conservancies were also established to diversify land use options available to the local inhabitants because agricultural farming sometimes fails due to climatic conditions like drought and floods

The communities largely followed the traditional ways of managing land, such as transhumance involving the migration of animals and people to higher ground not flooded or areas with better grazing during drought. Poor soil quality was often mentioned by the community in study sites as a problem. Customarily, this problem ought to be addressed through traditional mitigations such as applying livestock manure.

One villager (Charles Musohwa) mentioned that in the past people used to clear new land and shift but this trend had changed because of human population and virgin land being scarce. In contrast, the community at Mayuni continued to practice this old method of shifting to new land. It is a method regarded by the community to have brought about ownership and boundary disputes. Shifting to new land was mentioned to have involved encroaching on lands occupied by people from different tribes. The response to solve land ownership and border disputes is through intervention by the tribal authorities. The study found that the problem regarding conflicts over resources might not always be solved because of misunderstandings and disagreements, which may in turn point to declining influence and power of the tribal authorities.

CHAPTER 7

7.1 SUMMARY AND CONCLUSION

The widely accepted basic understanding of LUP is that it is an iterative process based on dialogue amongst all stakeholders aimed at the negotiation and decision for sustainable forms of land use in local areas as well as initiating and monitoring its implementation (Dumanski, 1997). This study revealed that wherever different groups of people use land and its resources, land use is always planned, consciously or subconsciously. However, the difference which exists between different land use practices is that there is a lack of coordination and integration of plans between the regional and local level groups concerned with land use practices. The difficulties further include exclusion by regional land use plans of local level land users and their concerns, which often provide complex indigenous land use management strategies of the environment. In addition, the current regional land use plans for Caprivi did not consider the use of environmental indicators, which make monitoring of land resources through environmental changes difficult.

This study demonstrates that it is possible to include local level land users in the regional land use plans through active involvement in PRA. Application of PRA makes it possible for regional land use planners to integrate the local level views and norms. The presentations of PRA methodology in this study does not claim to be complete, as development potential which depends very much on the political, policy, power relations and economic structures of the regional and national levels were not covered.

In any case, the study revealed that it is important to know the comprehensive land use practices in order to recommend future ILUP measures which are based on stakeholder participations. If this study was to be applied to ILUP in the area, it would be of great importance to explore in detail the processes, tools and techniques not covered by this study. Such techniques will enable the relevant people, groups and organizations to actively participate.

This study further showed that the application of PRA methodology is not conclusive on its own. Beyond PRA, the study considered an environmental criteria analysis as an approach to determine perceived indicators by communities at the local level for consideration into LUP. In the context of this study, the PSR environmental framework was tested to structure and classify information. The framework was also used to identify perceived indicators that best described how local level users are managing their lands and the impact of response management. Using the PSR framework, a representation of the linkages among the pressure exerted on the land by human activities and attempted response to changes by the governmental officers, NGOs and communities were elucidated. However, the study could not conclude that the perceived commonly identified indicators by the community can establish the interchanges which form a continuous feedback mechanism that can be monitored through ILUP. In this case, the study concludes that PSR framework is essentially useful to engage the community in identifying possible indicators, but these remain to be tested and refined at regional level and also at national level. Testing and refining the perceived indicators would be the only way of knowing if an indicator is revealing underlying processes and can be used to deal with specific environmental issues.

This study is a first attempt to engage local level participation into regional land use plans in Caprivi region. The application of PSR is proved to be significantly well understood by the community at the local level. It also showed that there is need for the commonly perceived and identified indicators to be reviewed for integration into regional land use plans. Linking the PRA methodology and PSR framework indicators into regional land use plans and other relevant developmental initiatives was not investigated in this current study.

Based on the findings and interpretation of results, this study recommends the following:

a) *Improved land use planning*

- o An integrated approach to planning the use and management of land resources entails the involvement of all stakeholders, particularly local level land users.

- All land use activities should follow a standardized land use policy and guidelines. The inclusion of traditional and scientific methods should be pursued to complement policy guidelines.
- b) *Environmental consideration into land use plans*
- To strengthen communication, decision making and power relations in the chain of command in land related decentralized sectors at different levels of government. The findings from PRA methodology and application of PSR framework should be linked through the existing institutional structures.
 - All regional land use plans should work through the proposed and existing institutional structures.
 - Testing of all indicators perceived by the local community and those recommended at regional and national level. However, the perceived indicators by the community should be considered in any development of land use plans while designing more practical indicators that could be monitored.
- c) *Guidelines for mainstreaming environmental sustainability*
- Future investigations should establish standards for SLM for equitable assessment of SLM in Caprivi and Namibia at large. Thus, it is important to develop the framework for establishing standards for SLM. These hierarchical frameworks for the development of SLM standards should be underpinned by associated principles, criteria, indicators and norms/baselines and threshold.
 - The ecosystem approach should be studied thoroughly and applied at local, regional and national levels as an existing framework towards achieving environmental sustainability.
 - The application of participatory methodology and PSR framework will add more value to LUP and natural resource management if expanded to consider the detailed principles of an ecosystems approach.

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APPENDICES

ANNEX 1

Table 5: List of Institutional Respondents.

Name	Occupation
Mubita Cletius	Government
Simataa Joseph	Government
Mwilima Clints	Government
Busihu Bennety	NGO
Nheta Daisy	NGO
Kamwi John	NGO
Muyatwa Calvin	NGO
Shozi Maurice	NGO
Mainza	NGO
Pastor Semi	Private Farmer
Sisamu Beaven Kamwi	Government
Sitwala Leonard Wamuwi	Government
Sibea Francis Abel	Private Farmer
Mwilima Elvis Simba	Government
Sanjahi Martin	Government
Majakube M.	Government
Damian Nchindo	Private Farmer
Alfred Sikopo	Private Farmer

ANNEX 2

Table 6: List of Local level respondents.

Study site: Salambala Conservancy

First Name	Surname	Gender
Mazinza	Ngulwa	Female
Florence	Siambango	Female
Matilda	Maswhu	Female
Chunga	Regean	Male
Gift		Male
Siblatani	Imeebo	
Sakutuka	Phagon	Male

Study Site: Lusese Village

Charles	Musohwa	Male
Afred	Siseho	Male
Simon Nyambe	Maimbelo	Male
Bernard	Simata	Male
Albinus Chunga	Mwilima	Male
Muzamai	Annety	Female
Edina	Chunga	Female
Born-well	Lifasi	Male
Sinvula	Sabita	Male



Study Site: Mayuni Conservancy

Kulobone	Rector	Male
Makutela	Mary	Female
Lulatelo	Bester	Male
Kumanina	Victor	Male
Sasipita	John	Male
Tuhume	Adrias	Male
Mutakati	Esnaty	Female
Mashangu	Mary	Female
Makabi	Sanny	Male
Pikinini	Driver	Male
Likando	Erick	Male
Mafati	Mishake	Male
Munembo	Barnard	Male

ANNEX 3

Survey Questionnaire

This survey forms part of an MPhil minithesis at the University of the Western Cape, Programme for Land and Agrarian Studies (PLAAS), South Africa. The study investigates the importance of environmental criteria analysis in sustainable land management through engaging the community at local level, using Katima Mulilo Rural, Kabbe and Linyanti constituencies, Caprivi region, North East Namibia as case studies.

Date:/...../.....2006 Data Captured by:.....Duration.....hrs

A. GENERAL INFORMATION

1. LAND USER'S CHARACTERISTIC

Institution/Organisation/Department/Conservancies/village:.....

Type of Institution (Tick where Appropriate):

Governmental: Private: NGO: Parastatal: Union:

Sex of respondent: Female: Male:

B. GENERAL QUESTIONS

Answer **N/A** if it is not applicable to you

2. LAND USE PLANNING

2.1 What Kind of Land use practises are you involved with?

- i.
- ii.
- iii.
- iv.
- v.

2.2 Do you or your Institution/Organisation/Department/Directorate familiar with the following term?

- i. Land use planning Yes No

2.3 If so, what exactly do you plan for?

- i.
- ii.
- iii.
- iv.
- v.

Please elaborate on your answer/s:.....

.....

.....

.....

2.3 Do you follow any specific indigenous procedures when planning?

If yes, Please

explain:.....

.....

.....

.....

.....

.....

.....



If no, what procedures do you follow when establishing your

plan?.....

.....

.....

.....

.....

.....

2.4 Do you use environmental or any other indicators when planning?

 Yes No

If so, prioritise as from the most important to the least important:

- i.
- ii.
- iii.
- iv.
- v.

How do you value or rate your indicators when planning? Please tick one.

Extremely
Important

Partly
Important

Not
Important

Please

explain:.....

.....

.....

.....

.....

Indicate constraints you are encountering when practising land uses planning?

Yes

No

Not sure

Please explain:.....

.....

.....

.....

.....

.....

.....

.....



Did your land use planning help you to prevent natural resources degradation?

Yes

No

Not well

Not sure

3. ENVIRONMENTAL SUSTAINABILITY

PSR FRAMEWORK – (when applied at early stage of planning future implementation and monitoring can be early conducted)

1. Land Tenure (of land uses)
2. Constraints on practising land uses
3. Role and participation on regional land uses
4. Application of the PSR framework for development of LQIs at local level – additional key land issues identified for each cluster of indicators

5. Land practises (also indigenous) – management systems & their impacts

6. Application of PSR

1. PRESSURE ON THE LAND RESOURCES e.g:

intensification & diversification of land uses

socio-demographic factors – e.i. population pressure, land tenure

land practises

etc..

2. STATE OF LAND QUALITY

2.1 Indictors (identified with community) that express change – could be negative with poor management or positive with good management

2.2 If Possible, verify with community (TRANSECT WALK)

3. SOCIETAL RESPONSE

3.1 direction actions by the land users

3.2 environmental regulations (regional or national level)

3.3 improved land management practises

3.4 Complementary activities – e.g. conservancies, irrigation scheme etc..

3.5 Distinguish response indicators – e.g. by government, community, NGOs etc.

Additional: (Pressure LQIs) – existing report data will be used as a baseline study – e.g. ILUP Caprivi or Caprivi Tourism Development Plan

Additional: (State LQIs) – existing information on ASSESSMENT FOR ILUP