Small-Scale Commercial Farms and Sobbe Conservancy in Caprivi, Namibia

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February, 2009

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Thesis submitted to the International Institute for Geo-information Science and Earth Observation in partial fulfilment of the requirements for the degree of Master of Science in Geo-information Science and Earth Observation -Natural Resources Management

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ENSCHEDE, THE NETHERLANDS

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This Thesis is dedicated to my children

Winnie Ngutuna and Vezembouua Katataiza,
Mbirimuje and Undjakuje Muvangua

Mommy loves you all!

Abstract

Small-Scale Commercial Farms (SSCF) has been established in many parts of the communal areas in Namibia. However in the Caprivi region the proposed SSCF appear to be incompatible with the recently established Sobbe Nature Conservancy. The study aimed to develop spatial information for use by stakeholders that can help to avoid the incompatibility of land uses and to prevent conflict. Structured and semi structured interviews were the main means of data collection, SPSS software was used for qualitative analysis. A PGIS type approach was used to collect the local knowledge and to visualize the community's perception related to land use resources. Sketch mapping of the community resources was supported by using a GPS to geo-code resource locations. GIS then was used to produce a community resource map and analyze the current and the potential conflicts in the study area. The spatial overlap of the SSCF with pre-existing land uses has been determined and it was assessed that the SSCF are incompatible with these uses and may result in conflict. Therefore the majority of the conservancy and Non-conservancy farmers are opposed to the development of SSCF. The respondents claim that they were not appropriately informed. It is recommended that the procedure should be resumed and consultation for legal advice to be considered. Then also a social-impact and environmental impact assessment should be carried out to avoid or minimize negative impacts and/or to determine mitigation measures. The lack of spatial information sharing in the context of land use planning leads to conflicts between stakeholders.

Keywords: Small Scale Commercial Farms, Nature Conservancy, Incompatibility of land use, Participatory GIS, Spatial information sharing

Acknowledgements

First of all I would like to give thanks to our Almighty Father and creator for guiding and giving me strength for surviving 18 months of studying.

I would like to thank my Government of Republic of Namibia and the Dutch Government for granting me the fellowship to pursue my studies. Without that I would not have made it to the Netherlands and ITC in particular. I would like also thanks Ministry of Lands and Resettlement and Land Use Planning Division to release me to further my study. My sincere thanks go to Martin Sanjahi, Mr Silverster, Majakube and Mr Elvis Mwilima for their logistics support during field survey.

My sincere and deepest gratitude goes to my supervisor Dr. Hein van Gils for his guidance and positive criticism as supervisor. Special thanks to my second supervisor Walter de Vries for his endeavour guidance and support and close supervision.

Dr. Michael Weir NRM Programme Director, thank you for not only teaching but a father to everyone in the NRM Department. Dr. Dick van Zee you were always pleasant to talk to me I shall remember you for your patience and valuable support. And to all my lecturers of ITC, thanks for the knowledge and skills acquired from you.

My dearest spouse nothing on this world, not even words can explain how thankful I am to have you. Thank you for being a father and mother to our lovely children throughout the 18 months of my MSc study. My heartfelt gratitude goes to my wonderful young sister for taking responsibility to look after my children. "*Tuamana"* I will never forget you in my life.

Last but most important, I would like to express my heart felt gratitude's to my parents, brothers and sisters for their moral support. I would be unfair to my conscience if I fail to acknowledge my congregation for spiritual support.

To all NRM classmates from around the globe I appreciate the wonderful and difficult moments we shared together. Finally I wish to all those who assisted me in one way or other but who could not mentioned by name.

God bless you all!

List of Acronyms and Abbreviations

CBNRM	Community Based Natural Resource Management
CLB	Communal Land Board
CR	Community Rangers
CBO	Community Based Organisation
EIA	Environmental Impact Assessment
GPS	Global Positioning System
GIS	Geographical Information System
FMD	Foot and Mouth Disease
IDC	International Development Consultancy Ltd.
HWC	Human Wildlife Conflict
MET	Ministry of Environment and Tourism
MLR	Ministry of Lands and Resettlement
MAWF	Ministry of Agriculture Water and Forestry
MRLHRD	Ministry of Regional, Local Government Housing and Rural Development
NPC	National Planning Commission
NP	National Park
NC	Nature Conservancy
NGO	Non-Governmental Organisation
NACSO	Namibian Association of CBNRM Support Organisation
PGIS	Participatory Geographical Information System
SSCF	Small-Scale Commercial Farms

Glossary

Commercial farm	Freehold farm (2000 ha – 24 000 hectares)
Cattle post	The traditional system of unenclosed communal grazing area. Cattle are kraaled at night when are near cultivated areas and when there are dangers of stock losses from predator
Conservancy	Conservancy is a common property resource management institution consists of a defined community within a defined geographical area that jointly manages, conserve and use wildlife and other resources
Land Board	A corporate body administer and allocate customary land rights in communal areas
Communal farm	Communal farm land that belongs to the public/state but may have customary land rights or rights of leasehold with regard to certain areas of land.
Freehold tenure	The form of ownership under which a farmer holds commercial farm or legal entity. This means that the owner can sell the property or use it for his/her own benefit.
Leasehold tenure	The form of land tenure under which leased land is held, in terms of which he or she has the right to use the land for the purposes for which the land was leased.
Participatory-GIS	Refers to the integration of local knowledge and stakeholder's perspective in GIS
State Land	Land that belongs to the State as provided for in the Namibian Constitution
Small-Scale Commercial Farms	A block of (2000 ha) farms demarcated in the Communal Land Reform context
Traditional Authority	The Chief or head of a traditional community appointed as the Traditional Authority under the Traditional Authority Act.

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1. Introduction

1.1 Background

Namibia, like many other previously colonized African countries, is characterized by a dual and unequal land ownership since 43% is owned by (predominantly) white freehold farmers and only 37% is in communal land allocated to non-freehold farmers. At independence in 1990 the Government of Namibia embarked upon a programme to purchase land from the freehold farmers to release the pressure from overcrowded communal areas. These communal areas supported 70% of Namibia's rural population and are under intensive use in terms of agricultural production. Therefore, in addition to the government efforts to redress the imbalances in land ownership the government decided to develop unutilized communal land into Small-Scale Commercial Farms (SSCF).

The SSCF project aims to improve the livelihood potential of livestock farming and crop production. To achieve this the government, through the Ministry of Lands and Resettlement (MLR), decided to commission a study in 1999 -2000 to identify unutilized areas in all communal areas of Namibia that are suitable for development and to make it available for resettlement. The International Development Consultancy (IDC) in 2002 was granted the tender to carry out this study. The identified areas, however, are not necessarily without people or land use. The IDC only looked at the density of the population and livestock per square kilometre in these areas and did not consider other land use utilization types.

The identified areas had the potential for development of agricultural production. To commence with the development of Small-Scale Commercial Farms (SSCF) in the identified areas the Government had to consult the Traditional Authorities and the Land Boards for their consent (MLR, 2002). The development of SSCF was consented by the Traditional Authorities and the Land Board in the major part of Namibia (Elifas, 2008; Sisamu, 2008). However, in the Caprivi and Ondjozondjupa regions, identified areas for SSCF were found to overlap with other land uses. This overlap could be attributed to lack of proper consultation of and or lack of information to the relevant stakeholders. There is no proper insight in the degree in which the various land uses concerned are compatible or not, nor in which cases conflicts may arise. There is also not insight in the perceptions of stakeholders involved.

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In the Caprivi region, an area selected for SSCF was found to overlap with a Nature Conservancy (NC). This spatial overlap of the two projects has resulted in conflicts among stakeholders in the area. The case of Caprivi appears to be a serious problem because there is no solution found by the MLR and MET on the issue of overlap. That is why this area was selected for the study. The proposed areas for SSCF measures 187 500 hectares, and was demarcated into 75 farms of about 2500 ha each in 2004. The area was delineated and surveyed and the first boreholes were drilled. Overlapping of the NC and SSCF may create human-wildlife conflict in the area. Other potential conflicts concern the fuel wood use rights of the conservancy denied or prevented by SSCF farmers and decrease in wildlife in case the SSCF are fenced.

Land uses in areas close to protected areas may have a high impact on biodiversity (Kamaljit et al., 2007) or that reason the Conservancy areas are used as buffer along National Park. A NC may increase benefits and change local people's attitude to wildlife as valuable commodities rather than destroying them. Currently in the Caprivi region agriculture practices are low in input and generate low yields because of limited soil fertility, small crop fields and limited availability of labour. The development of SSCF may pose a threat of biodiversity loss because it may reduce population size of various plants and animals. Issues related to the planning and management of land is receiving increasing attention in the face of growing human-wildlife conflicts (Saeed, 2000). The imbalance between unequal access unresolved land redistribution matter and conservation problems are normally referred to as important primary reasons for such conflicts. In order to develop an encompassing understanding of and find sustainable solutions to biodiversity loss one requires interdisciplinary integration (Baumgärtner et al., 2006). For example in the Namibian context lack of land use planning as a framework for decision making to deal with incompatible land uses requires a multidisciplinary stakeholders approach to integrate different land use options and them to complement each other rather than to be in conflict. Land uses can be called compatible when there is not conflict with other land uses and incompatible when the land use considered partly covers the extent of other land uses and thus results in conflict. The problem is that there is overlap between land use claims by different groups of stakeholders on the same piece of land. The overlap as such may not be a big problem when land uses are compatible, but when land uses are incompatible it may lead to land use conflicts.

1.2 Research Problem

Conflicts between wildlife conservation and agriculture may have a tremendous impact on the lives and livelihood of local inhabitants. Conflicts over natural resources arise when several interest groups see or use resources differently in the same natural system or geographical location (Mbaiwa, 2005). The conflict between agriculture and nature conservation is probably a serious problem adjacent to the National Park (Okello and D'Amour, 2008). Current land use conflict studies in similar areas are insufficiently taking the spatial dimension into account.

The problem is very sensitive as some stakeholders in the Caprivi region want a Nature Conservancy, while others prefer the SSCF. A Nature Conservancy may result in an increase of damage by wildlife to properties in adjacent areas. The destruction of properties by wildlife in Namibia is not compensated by law, unlike in the neighbouring country Botswana. It is difficult for the Conservancies and Farms to co-exist along the unfenced Mudumu National Park (NP). Wildlife, particularly elephants, may damage crops and/or fences and buffalo may infect cattle with foot- and-mouth disease (FMD).

The research problem in this study is therefore to analyse the types and locations of conflicts between the local communities and the perceptions of stakeholders with regard to the SSCF plans in order to come with suggestions and to prevent the potential conflicts. The knowledge generated from this study is meant to be useful to planners and decision makers and may contribute to both the development of the communal land and the conservation and management of the natural resources in the future.

1.3 Research Objectives and Questions

The general objective of this study is:

- To develop relevant spatial information for use by stakeholders that can help to avoid incompatibility of land use and to prevent conflict.

- To compare the land utilisations types and identify the actual and potential land use (in) compatibility with regard to SSCF.

1.4 Specific Objectives and Research Questions

The general objective was achieved through the following specific objectives and research questions:

Specific Objectives	Research Questions
1. To identify the current and potential land use conflicts in the area	1.1 What are the current and potential land use conflicts observed in the area? 1.2 Where are the current and potential conflict areas?
2. To identify the type of conflict between wildlife conservation, livestock and crop occurring in the area	2.1 What type of conflicts between wildlife conservation, livestock and crop occurs in the area?
3. To analyse the perceptions and attitudes of stakeholders in relation to resource-use conflicts	3.1What are the resource-use conflicts experienced by which stakeholders?
4. To produce local knowledge-based spatial information for use by Stakeholders	4.1 What spatial information was used by which stakeholders for the establishment of the SSCF and Conservancy respectively? 4.2 What spatial and non-spatial data was commonly used by the stakeholders during the preparation for establishment of the two projects? 4.3 What kind of information was different and or not used?

1.5 Research Approach

The research activities were divided in three phases, namely pre-field, field work and post field as shown in the diagram below.

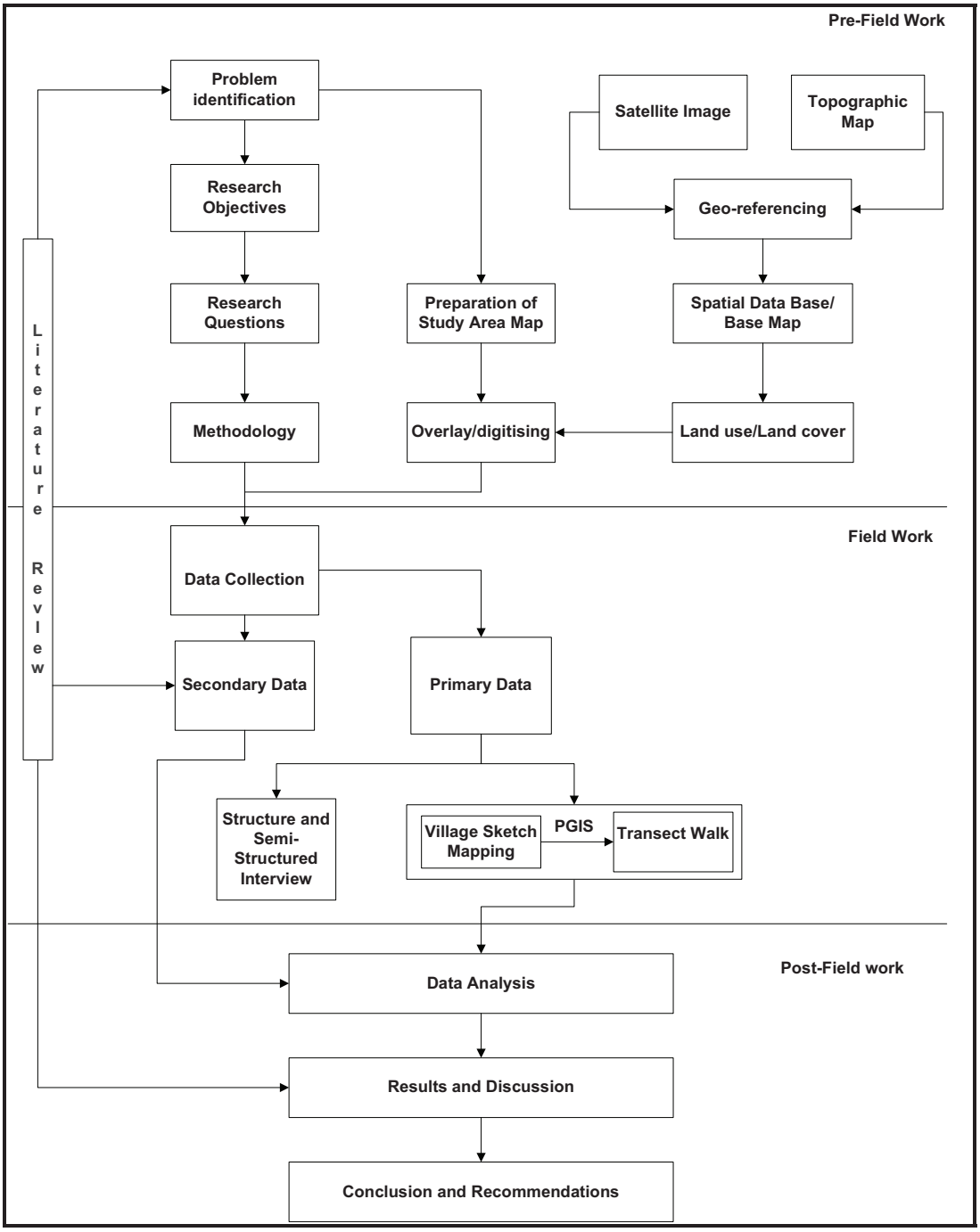

Figure 1*:* Research approach and steps

1.6 Thesis Structure

Chapter 2
Following this introduction, chapter two discusses the location and characteristics of study area

Chapter 3
Discuss the overlap and (in) compatibility of land uses

Chapter 4
This chapter discuss the laws and regulations in communal areas

Chapter 5
This chapter data collection approach

Chapter 6
This chapter discusses the results of the current and potential situation on land use (in) compatibility

Chapter 7
This chapter will discuss the interpretation of field findings

Chapter 8
This chapter finally presents the conclusions and recommendations of the research

2. Description of the Study area

2.1 Introduction

This chapter highlights the general introduction of the study area. It discusses the choice of the study area, physical location and it socio-economic characteristics.

2.2 Choice and location of the study area

The Sobbe conservancy is the selected location to study land use incompatibilities. The identification and delineation of the study area has been agreed with the key stakeholders in the Caprivi region. The "under-utilized" land in the Linyanti and Sibbinda constituencies is the area between the trans-Caprivi highway and the gravel road from Kongola via Sangwali, Linyanti and Chichimane to Katima Mulilo. A strip of about 10 km adjacent to the main road is populated and therefore excluded from the study area. The study area is approximately 12 000 km^2.

The Sobbe conservancy is situated adjacent to the Mudumu National Park (Figure 2) in east Caprivi region in the North-east of Namibia and has diverse resources, particularly wildlife. It is a newly established communal conservancy and legally gazetted in the Government Gazette No. 3726 of 2006. The total area is 404 square kilometres, with a registered member of approximately 570 (NACSO, 2007). The Sobbe Conservancy is administered by a conservancy management committee of seven men and seven women. Twelve staff members are employed of which four are women. The local language in this area is the Mafwe. "Sobbe" means *"that which one owns cannot be taken away from you"*. This area was chosen because the proposed SSCF overlap with Conservancy but have not yet been established. Therefore the study of this area may result in resolving or avoiding a potential conflict.

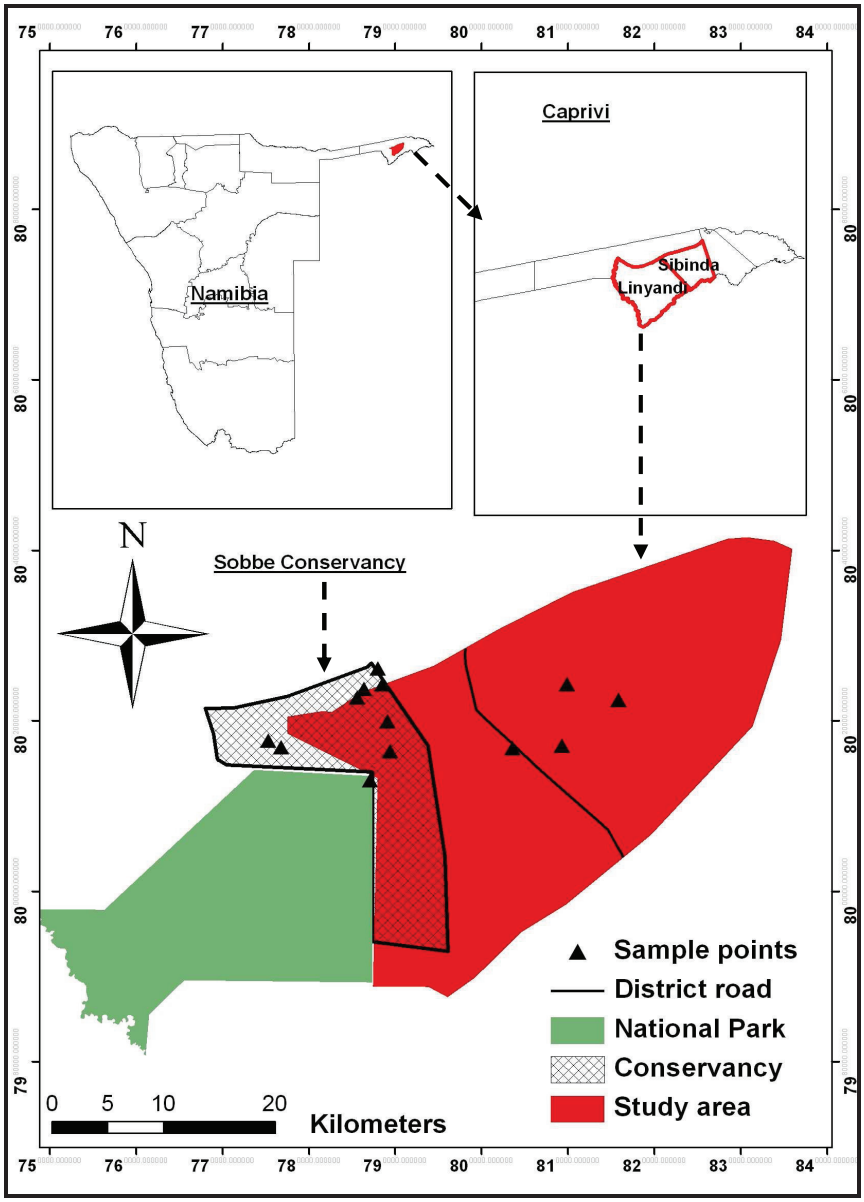

Figure 2: Show the location of the study area and the sample points taken during field work

2.3 Bio-physical characteristics of the study area

The Caprivi region receives the highest rainfall in Namibia, approximately 600-700 mm of rain a year, and most of Namibia's perennial rivers run through Caprivi, making it the region of greatest potential for high wildlife densities and diversity. It contains many plant species that are used for various purposes by the inhabitants. Because forest products are one of the main sources of livelihood in this area it was necessary to look at the vegetation composition. Especially the mopane vegetation is one of the resources on which people of this region depend on for their livelihood. The mopane is commonly used as communal grazing area.

Mopane woodland consisting of two main categories namely Mopane-*Burkea* woodland and Mopane-*Aristida* woodland represents one of the most important vegetation units in the study area. Figure 3 shows the map of the major vegetation types and Figure 4 gives an impression of the dominant vegetation type. Smaller patches of Mopane-*Terminalia* woodland and Mudumu Mulapo woodland are found to the west and the north of study area (Mendelssohn and Roberts, 1997). The dominant species Mopane-Burkea woodland is characterised by a mosaic of heavy clay-loam soils and pockets of deep sands. Soils are generally heavy clay-loams, which are unsuitable for arable agriculture because of salinisation.

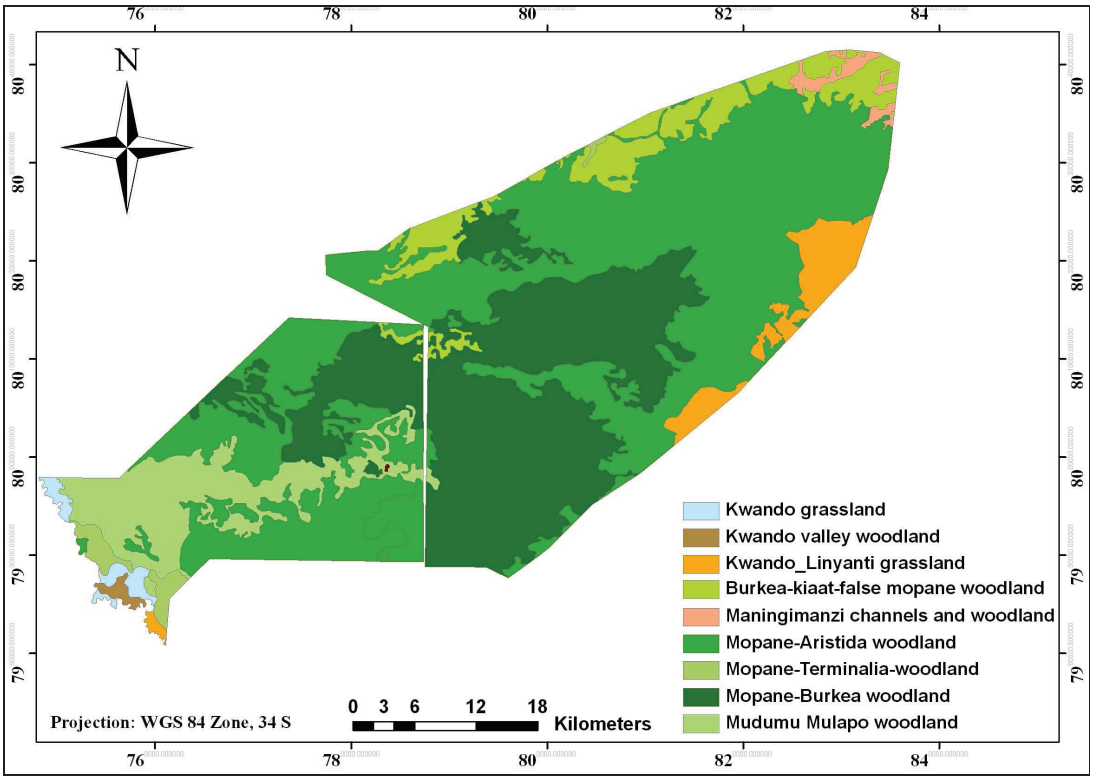

Figure 3: Vegetation types in the study area ***(Mendelssohn, 1997)***

Figure 4: Mopane woodland; the dominant vegetation type in the overlap area

The climate of the Caprivi Region can briefly be described as mild sub-arid to sub-arid with hot summers and cool to warm winters. The topography of the study area is characterized by flatness. There is no significant drainage system to either the Kwando or Linyanti rivers. The flat topography excludes the potential for deep erosion by water, as well as the possibility for major dams.

2.4 Socio-economic characteristics

The inhabitants of the studied villages are mainly farmers who live on rainfed crops and livestock farming. The product from crop farming (maize, millet and some sorghum) is for own consumption. At times of bumper harvests surpluses are sold to some cash income.

All grazing land in the Caprivi is communal or group grazing rights and individual grazing are generally not recognized. About 70% of rural households own cattle with an average number of 6 per household (IDC, 2002). It is important to note that the Sobbe conservancy is not a game reserve because communities can carry on with their usual farming together with other economic activities in the area. In the conservancy a few people who never owned livestock depend on tangible benefits through crafts sales, thatch grass sales and trophy hunting for their livelihood. The conservancy added wildlife and tourism as source of livelihood to the local residents.

3. Overlap and (in)compatibility of land uses

3.1 Introduction

The basic aim of this chapter is to understand how it could happen that the two land uses were made to overlap and to what extent these land uses are (in) compatible. To do so requires a conceptual framework to understand their interaction and relationship between them. This chapter also introduces the main issues related to land use (in) compatibility and the social geographic and biophysical dimensions are discussed.

3.2 Conceptual Frame work

This study will identify the land utilization types with regard to land use (in) compatibility (Figure 5) gives a schematic overview of this framework. Further the sources of the overlap include the land use (in) compatibility of SSCF and NC and SSCF with NP and cattle post without overlap.

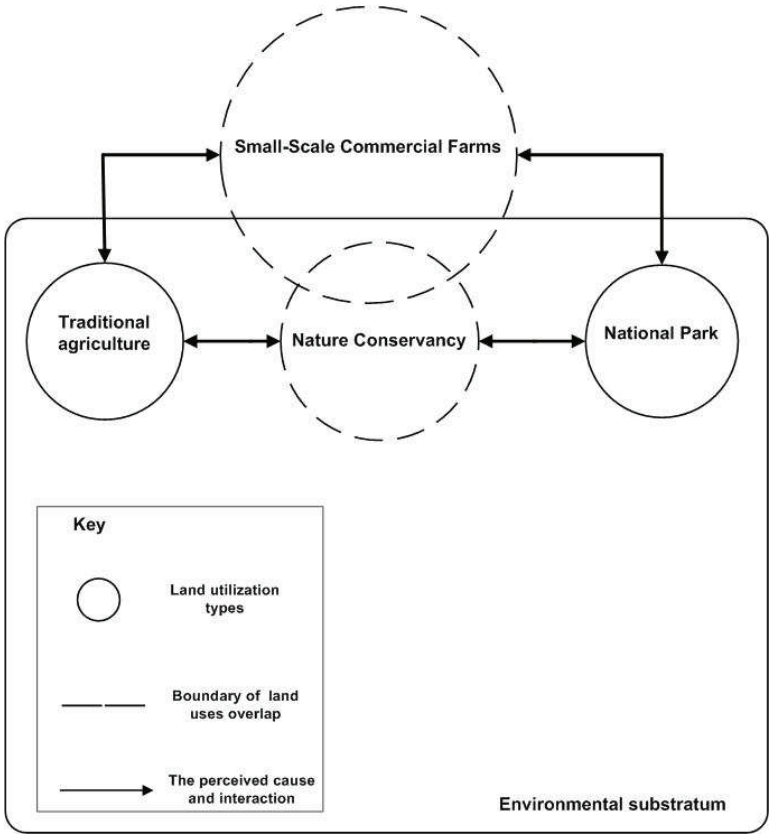

Figure 5: Conceptual diagram of the land use (in) compatibility

3.3 The environmental biophysical substratum

Caprivi region is a part of broader landscape of mopane woodland. The major types of mopane vegetation is a highly value sources of wildlife habitat. It provides material for building houses by rural residents and is commonly used as grazing areas.

3.4 Traditional Agriculture

The traditional agriculture together with the wildlife utilization is the dominant form of land use livelihood. The two land uses co-existed without interference with each other. All are based in the semi- arid and dry sub humid on one environmental substratum. Small scale rain fed crop millet and some maize provide food security together with livestock farming.

3.5 Nature Conservancies in Namibia

The Nature Conservancy introduced as buffer between traditional agricultural use and NP. The NC promotes the integration of traditional products and livelihood of rural residents. In Namibia, the communal conservancy is a basis for Community Based Natural Resource Management (CBNRM). Namibia is one of the first countries in the world to incorporate the protection of its environment into its Constitution. For example, "*Article 95 (1) of the Constitution states that the State shall actively promote and maintain the welfare of the people by adopting, 0inter alia, policies aimed at the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future".* In 1996, the Ministry of Environment and Tourism amended the legislation and developed CBNRM to promote sustainable natural resource management by empowering communities with legal user rights for the management of wildlife and natural resources. The Legislation was established through the Nature Conservation Amendment Act of 1996 (MET, 1996)

A "Conservancy" in the communal land tenure areas of Namibia is a common property resource management institution. Nature Conservancies' (NC) are located within buffer zones of protected areas. It consists of a group of farms or areas of communal land on which landowners or members within a defined geographical area jointly manage, conserve and use wildlife and other resources sustainably. 'Community' in this study refers to the local residents both inside and outside conservancy boundary that practice livestock and crop farming. They are all under the Mafwe tribal authority and fall under the same administrative unit. In Sobbe Conservancy the main activities are trophy hunting of non-resident hunters for a fee payable to the NC, own-use hunting for meat by Conservancy members and crafts for sale to tourist. In the case of Sobbe Conservancy wildlife utilization (both hunting and tourism) are additional development options to livestock farming.

3.6 Small Scale Commercial Farms (SSCF) in Namibia

In this study, the development of Small-Scale Commercial Farms (SSCF) in communal area is refers to the planned project under the MLR which aims to enhance food production through agriculture and alleviate poverty among rural residents. The SSCF surveyed demarcated and the first boreholes for the SSCF have been drilled and overlap with Sobbe Conservancy. The location of the boreholes in the Conservancy is incompatible with the land uses in the Conservancy such as hunting, tourism and mixed farming activities the Conservancy acts as a buffer along the Mudumu National Park.

The boreholes are located in the buffer zone of the NP. If the SSCF are fenced off this would interfere with the wildlife species especially elephant. Grazing pressure and wildlife damages will increase particularly in areas of the established Conservancy. However, the increase of livestock by the SSCF may lead to habitat loss and fragmentation of biodiversity in the adjacent conservation areas.

Several studies have indicated that land use change, habitat loss and fragmentation are a major threat to biodiversity. Environmental impact assessment and strategic environmental assessment are essential instruments used in physical planning to prevent such problems (Gontier et al., 2006; Reidsma et al., 2006; Sattler and Nagel, 2008). The environmental impact assessment (EIA) and strategic environmental assessment was not taking into consideration in this case and contributes to the land use incompatibility. Sisamu (2008) observed that the development of SSCF may have impacts on the social, cultural, economic and biophysical environment and that therefore EIA is compulsory in providing information on such matter. These land use incompatibility of the NC, SSCF and the NP may results in potential conflicts. Although, that there is a potential incompatibility between NC and the planned SSCF bordering the NP.

3.7 Overlap of land uses

In the Caprivi region of Namibia there is incompatibility between NC and planned SSCF. These two land uses were established by different government ministries and both are registered as legal entities. The process of identification of unutilized land by the MLR for resettlement purposes considers only traditional agriculture (livestock and crops) as livelihood option in a SSCF area. But the land can possibly suitable for several other options as well, such as wildlife utilization and tourism. When looking at the land uses and the establishment of the proposed area for SSCF the IDC did not sufficiently verify the secondary data with the actual situation on the ground (IDC, 2002). In addition, plans of sector Ministries are not always well coordinated.

For example the same area identified by the MLR for the development of SSCF might have been earmarked for other land uses for example, by the MET for the development of the NC. Although there are conflicts among stakeholders IDC research did not take the social connotation into account but concentrated on the biophysical dimension.

The struggle of inhabitants for recognition of their rights and interests in land and natural resources has been recorded over a number of decades (Lane, 2006). Lane (2006) describes furthermore that land use planning has considerable potential for resolving land conflicts when involving the inhabitants because they are directly affected by any new development. The areas which are not permanently inhabited are not by definition unused, they might be used seasonally as grazing areas by the local inhabitants. The local inhabitants have not been invited to attend the consultative meetings facilitated by IDC. In the case of the SSCF project preparation consultations with the local people did not involve most of the communities who are directly going to be affected by the SSCF development, except for some leaders and excluded many of the communities who might be the future beneficiaries of the project. If these would have been consulted then the incompatibility between SSCF and NC could have been noted. The land use overlap is may be the result of lack of proper consultation with relevant stakeholders. An overlap of land use may not be a serious problem if the land uses are compatible. But are they? The stakeholders could have told that.

3.8 Human Wildlife Conflict

Human-wildlife conflicts (HWC) occur when there is an interaction of humans and wildlife. The co-existence of wildlife, livestock and crops is a common phenomenon in many parts of Africa (Voeten, 1999). HWC pose a major global threat to endangered species that is not restricted to any geographical region all areas where human and wildlife co-exist (Harcourt and Parks, 2003) The high density of humans and wildlife depending on the same water and land resources in parts of Caprivi is one of the reasons why a region has a high potential for human-wildlife conflict. Livestock and human activities related to water points negatively affect the distribution of wildlife (De Leeuw et al., 2001). The Caprivi region is one of the areas in Namibia where rural people practice crop and livestock farming, which has experienced losses of crop and livestock due to wildlife. Especially elephants cause destruction or damage to crop and infrastructure. Caprivi is a key area for elephant moving freely between Namibia and Botswana (Barnes, 2006). Previous studies conducted along the Kwando River in Caprivi region reported 80-100 cases of elephant damage to crops each year between 1991 and 1995 (Mendelssohn and Roberts, 1997).

In the past decades the expansion of agricultural areas as well as the increase in number of wild animals caused an increase in HWC (O'Connell-Rodwell et al., 2000). Campell et al., (2000) and Jama et al., (2008) explore territories of wildlife with a mix of livestock and wildlife grazing together. De Leeuw et al., (2001) reported cases of wildlife avoiding heavily grazed areas close to settlements (around villages and water points) because of forage removal. Thus the development of SSCF along the NP may have direct impact on wildlife movement. The formation of Conservancies in communal areas through CBNRM is one of the innovative mechanisms created to reduce HWC and to protect wildlife inside protected areas.

The major activities taking place in the study area are grazing and wildlife conservation. Resource use conflicts arise along the interface of different land uses that may appear to be incompatible. The resource use conflict currently experienced in the area is the destruction of crop and livestock loss caused by wildlife. In addition to that, the study observed that water resources and bush fires present potential resource use conflicts. It is also possible that SSCF will deny access to resources such as fuel wood collection. The new boreholes drilled in the vicinity of wildlife distribution might result in conflict as well. Therefore NC and SSCF may have negative impacts on each other. Other spatial incompatibilities such as between NP and local farmers outside the conservancy area may also result in conflict although all of these are not directly overlapping.

4. Laws and regulations in land administration in Communal areas

4.1 Introduction

This chapter reviews existing policy and relevant laws related to land and natural resources management in Namibia. The factors that are related to spatial information sharing between stakeholders are demonstrated in the institutions that are discussed in this chapter, which will be used to understand the situation of land use overlap.

4.2 The role of Traditional Authorities

"Before the creation of the contemporary nation states, land in most parts of Africa was governed by traditional procedures"(Kalabamu, 2000). Until the establishment of the conservancies' legislative amendment in 1996 of the ordinance 4 of 1975, all wildlife on communal land was the property and responsibility of the state. Traditional Authorities have the mandate for the allocation of customary land rights in the communal areas. The Caprivi region has a very strong traditional authority system which should be acknowledged and consulted in land use issues. Traditional Authority has the power to approve land for crop, livestock farming and grant a grazing right to an individual in the area under their jurisdiction (MLR, 2002).

The duties of Traditional Authorities are to assist and cooperate with the Government, Regional Council and Local Authority Councils in the execution of their policies and to keep the members of the traditional community informed of development projects in their area. In addition they have to ensure that the members of the traditional community use the natural resources at their disposal on a sustainable basis and in the manner that conserves the environment and maintains ecosystem for the benefit of all people in Namibia.

4.3 The role of Communal Land Board

Land use in communal land is managed by Communal Land Board (CLB) and Traditional Authorities. The Land Board in communal land of Namibia has been established in accordance with the provisions of Sections 2 of the Communal Land Reform Act (Act 5 of 2002). CLB performing the following functions creating and maintaining a register where all land allocations, transfers and cancellations are recorded to avoid double allocation of land, and giving advice to the Minister of Lands and Resettlement on regulations and actions needed to meet the objectives of the Act. At present there are 12 Regional Land Boards in the whole of the country except in one region where there are no communal areas. Kalabamu (2000) notes that this land type of tenure reform does not redistribute land, it merely changes the process of administration access, utilization and transfer of land rights.

In administrating the land the CLB and Traditional Authorities work together as a team to perform the tasks of land allocation and administration as stipulated in the Act. Regarding the customary land rights the CLB has the power to ratify allocation, if it is satisfied that the allocation was properly made. It has the right to cancel or refer the matter back to the chief or Traditional Authority to reconsider the case in the light of the Board's comments. The Board can reject the allocation if it concerns an area of land to which another person already has vested right; if the size of the land allocated exceeds the prescribed maximum, or if the right has been allocated for land reserved for common usage or for any purpose in the public interest. The rights of leasehold are granted by the CLB in communal areas with respect to activities such as approved trophy hunting, other tourism activities, joint ventures in conservancies, community forest and water points. The Board may grant this right if the Traditional Authority of the particular area gives consent to do so.

In the case of land situated in the conservancy the management and utilization plan of the conservancy committee should be considered and the right of leasehold must be in accordance with the management plan. Land allocation alone cannot ensure that the result will be sustainable and optimal land use. Other institutions such as MLR, NPC and Regional Council need to carry out their related functions such as land use planning and development planning before the CLB can allocate land. In Botswana management of Land Board activities are carried out by experts headed by the Land Board Secretary. But, in Namibia civil servants serve as Land Board Secretary.

Composition of Land Board in Caprivi region

The Caprivi CLB consists of fifteen (15) members (eleven men and four women) including the Board Secretary who represented different institutions in land related matters. There are no academic qualifications or experience required to become a Land Board members. Members are selected from the residents living within the jurisdiction of the respective Land Board.

Section 4 of the Communal Land Reform Act provides that a CLB will have the following members;

- Four members representing Traditional Authorities
- Four members representing women engaged in farming, two of which must have experience relevant to the functions of the board (expertise)
- One member representing the organised farming Community (Likwama Regional Farmers Union)
- Four Public Service staff members, one each from the Ministries representing regional government (MRLHRD), land matters (MLR), environmental matters (MET) and agriculture (MAWF).
- One member representing the Conservancies, which must jointly nominate a member to represent them (MLR, 2002).

4.4 Land Policy Framework

Land is considered as fundamental resource to the poor, a key to rural people's survival and one of the primary resources for any human kind (Bogale et al., 2006). The overlap of the planned Small Scale Commercial Farms (SSCF) area with Conservancy resources may give rise to legal conflicts on resource use. In our study both the SSCF and Conservancy are legally registered. Therefore this section attempts to highlight the laws and regulations that related to communal land administration, allocation and natural resource management.

4.4.1 The Nature Conservation Amendment Act 6 (5 Act of 1996)

The Nature Conservation Amendment Act (Act of 5 of 1996) forms the basis for the Community Based Natural Resource Management (CBNRM) policy of the Ministry of Environment and Tourism (MET). The Act gives provision for the establishment of Conservancies and provides the resource use rights and responsibilities for natural resource management to a rural community through the registration of NC. A registered NC on behalf of the community it represents acquires new rights and responsibilities with regard to the consumptive and non-consumptive use and management of wildlife.

The consumptive use includes the use of game for trophy hunting, for consumption and commercial sale of meat. The non-consumptive use includes tourism ventures such as community-based tourism enterprises and joint venture agreements with private sector entrepreneurs. The powers to withdraw or amend a Communal Conservancy are enshrined in Section (1) of Nature Conservation Amendment Act.

4.4.2 Formation of CBNRM

The formation of Community Based Natural Resource Management (CBNRM) in Namibia resulted in the increase of NC in communal land. Since the establishment of CBNRM currently there are fifty-two (52) registered NC in the whole of Namibia as illustrated in (Appendix 7), and (concession areas for tourism and protected areas). The formation of an NC in communal areas is a community initiative. Some Conservancies were established because of the recognition that wildlife and other natural resources had disappeared and that the livelihoods of communities could be improved if these losses were reversed (NACSO, 2007).

The sustainable use of wildlife through ecotourism in Conservancies, provide benefits to communities to off-set the cost of living with wildlife rural communities generally have a positive attitude towards wildlife (Sekhar, 2002). It has been assumed that the establishment of conservancies may increase wildlife and lead to increase of human-wildlife conflict (Jones, 2000). Despite the assumption that living with wildlife may bear a cost due to conflicts between people and wild animals, NC through CBNRM could play a role in creating employment through tourism and generate income through other spin-off activities such as trophy hunting, craft sales, meat supply, collection of fuel wood and thatch grass for residents (MET, 1995). Conservancies establish under the legislation to enable local communities to manage wildlife, Conservancies face a number of constraints with regard to human wildlife conflict (HWC).

The National Land Policy (1998) makes provision for groups of people such as cooperatives and conservancies to become land holders but this approach is not strongly backed up in the Communal Land Reform Act. Thus Conservancies have no rights over land in communal areas but only have power over wildlife (game) management. Another problem faced by Conservancies is the lack of secure land tenure. Currently the majority of communal farmers outside Conservancies do not have the same institutional platform for dealing with HWC, neither do they have access to the benefits that comes from Conservancies. Therefore it is assumed that these farmers have negative attitudes towards wildlife conservation, and may kill wild animals that attack their crops and livestock.

The implementation of CBNRM in Southern Africa does not necessary mean that all the projects are successful in achieving natural resources conservation and economic benefits to local people. These strategies were designed to help motivate people in rural areas to protect wildlife resource outside protected areas to discourage illegal hunting (poaching) inside protected areas and to return benefits from wildlife to rural communities (Lewis, 1995). In Botswana, the programme has been perceived as a strategy that addresses the problem of land use conflicts and reduce tension over access to wildlife resources and the use of such resources among rural communities (Mbaiwa, 2005). Mbaiwa (2005) quoted that the success rate differs from one project to another and from one country to another. CBNRM has different names, for example the programme is called the Communal Area Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe, the Administrative Design for Game Management Areas (ADMADE) in Zambia, the Living a Finite Environment (LIFE) programme in Namibia. In conclusion conservancy is not a tool to divide rural people and community members, but is a vehicle towards rural economic emancipation.

In this study although that there is an evidence of land use overlap of SSCF and Conservancy. With the intention to withdraw or amend any condition attached to a conservancy must be accompanied by sufficient reasons for the intentions. In this regard, the SSCF beneficiaries or leaseholder would then imply that, and must have the membership to the conservancy. One of the criteria to be a member of the Conservancy is that the person must be a resident in the area and fall under the jurisdiction of the Conservancy concerned. This implies that leaseholder to the envisaged SSCF must meet the minimum requirements for membership to Sobbe Conservancy. Although that there are mitigation measures on HWC in Conservancy. Whenever decision is reached mitigation measures on resource user rights must be considered.

4.4.3 The role of Governmental and Non-governmental (NGO) policy in CBNRM

After independence the national development policy formulation was initiated and driven by the government. Due to the establishment of democratic principles and practices and the freedom of association, Namibia became a favoured country of international donor agencies. NGOs became key actors in supporting the civic society sector and were available for partnership in development. NGO tend to be the primary facilitators of CBNRM. In the Namibia case Integrated Rural Development and Nature Conservation (IRDNC) is a key player which is considered to have facilitated conservancy registration and development (Sullivan, 2001). NGO's in Namibia have been active in all major development sectors such as gender issues, education and training, agriculture and rural development.

Community Based Organisations (CBO's) has been established with the assistance of NGO's under this policy and operates at grass roots level. For example conservancies, water point committees, farmer's organisation have been constituted under CBO's in communal areas.

Many sector/line ministries embarked on community participation in their policies and strategies through planning, management and implementation. But because this approach is relatively new in Namibia many organisations need to obtain the necessary skills for developing community capacity in order to identify and implement programmes and projects. A Non-governmental organisation (NGO) is an intermediary organisation between local communities and other actors, Government, International Partners and the Private sector. NGO are coordinated a national development agency to ensure cooperation and to reinforce their effectiveness as actors in the implementation of sustainable development. They operate in more than one local community and in more than one field and have independent boards of trustees. The policies and legislations mentioned are some of the legal provisions pertaining to communal land administration, allocation and environmental management.

4.4.4 Forest Act

The Forest Act No 12 of 2001 provides for the establishment of Forestry Councils relating to the management and use of forest and forest products. The Act gives provision for the protection of the environment and the control and management of forest fires. With regard to community forest the Act confers rights to the community to manage and use forest products, to graze animals, and other natural resource provided. The community forests are legal entities and registered under the auspices of the MAWF.

4.4.5 Communal Land Reform Act

The Communal Land Reform Act deals with access to rural land in communal areas. The Communal Land Reform Act regulates the allocation of land rights and the establishment of CLB in all communal areas in Namibia. Section 31 (4) of the Communal Land Reform Act (Act 5 of 2002) prohibits the CLB from granting right of leaseholds if the purpose would defeat the object of the Conservancy management plan. The Act makes provisions for compensation for loss of user rights on communal land. In the Act stated that when there is loss of land use rights such as grazing rights, settlement or residential due to development in the public interest an alternative land for resettlement must be arranged. The successful implementation of the Communal Land Reform Act will improve development in communal areas and enhance food security for rural residents.

4.5 Information sharing between stakeholders

To make the legal constructs work optimally sharing (spatial) information within and between government sectors and other parties concerned is essential.

4.5.1 Definition of spatial data sharing

Spatial data sharing has been defined as "*making the digital spatial data used in GIS accessible to, or from, other parties. These exchanges may or may not include barter, financial payment or payment in kind"* (Wehn de Montalvo, 2003).

4.5.2 Data sharing between organisations

The lack of an organisational model to promote cooperation between departments often limits the degree of data exchange (Onsrud and Rushton, 1995). Data sharing success is due to the presence of a strong advocate of GIS, or similar technology at a high level within an organisation. The information is mostly shared between institutions or organisations and individuals based in the Head Office because of their proximity. The use of GIS was tested as appropriate technology (Lewis, 1995) in improving the capacity of rural communities in managing their resources and other practical applications in land management. (Bekkers and Moody, 2006) stated that the factors affecting the potential uses of GIS to an optimal degree in institutions are instrumental and institutional. A reason for this is that sharing of information between line ministries does not always occur because of lack of data quality and technical knowledge (capacity). Another problem which contributes to information sharing is the availability of data.

Besides, because of the incompatibility of data sets it will be difficult for institutions to share information if there are no standardized systems available withholds GIS to be optimally used. However in Namibia there is still a problem of integrate GIS data different organisations involved in natural resource management collect and keep data for their own specific programme only and other organisation does not know and have access to such data.

4.5.3 Data access and sharing

Sharing of spatial data among multiple participants reveals a host of organisational issues similar to GIS implementation. Issues which are relevant to spatial data sharing include (Onsrud and Rushton, 1995).

- *Variation in priorities and goals among participants*
- *Differences in GIS resources and skills*
- *Differences in the characters of each organisation, such as the level of bureaucracy and whether the participant is public or private*
- *Differences in data quality, format and differences in organisational power stability*

There is a need to be policies to establish data standards, responsibility, ownership and frequency of exchange (Calkins and Weatherbe, 1995). Prior studies conducted in Geo- information sharing in Namibia stated that no spatial data sharing policy exists in government ministries to guide information sharing between government departments. A spatial database centre of (central) natural resource, if exists would be of help to improve information sharing. Most of the literature about sharing data has focused on institutional issues and ignores the key issues of individuals (Calkins and Weatherbe, 1995). Institutional issues, behavioural and observing issues impacting spatial data sharing are;

- ***Institutional structure*** – The structure of an institution or organisation can have impact on the information flow, the degree of rigidity versus flexibility and ability or willingness to react in timely manner to external demand;
- ***Bureaucratic practices and standard procedures*** – bureaucratic procedures are used by institutions as a means of controlling functions.
- ***Difference in GIS and resource and skills*** – refers to incompatibility of data set which can cause difficulties to exchange spatial information.
- ***Differences in individuals*** – Differences between public and private organisations can cause unwillingness to share information.

5. The Data Collection Approach

5.1 Introduction

This chapter describes the method and material used in the study area. The processes that were carried out in this research are shown in (Figure 6). The approach used for data collection is based on secondary data obtained from literature review and primary data from field work through interviews, questionnaires and field observation. This chapter give an overview of issues discussed. Section 5.2 focuses on the operationalization of the concepts required for the fieldwork. The fieldwork has been done by corroborating different sources of information based on various data collection methods. The secondary data collection strategy aimed at acquiring data from different various organisations is described in section 5.3. In sub section 5.4.1 the procedure of household interviews is described. Section 5.4 describes the primary data obtained from interviews with Regional officers and CLB members and through the PGIS approach.

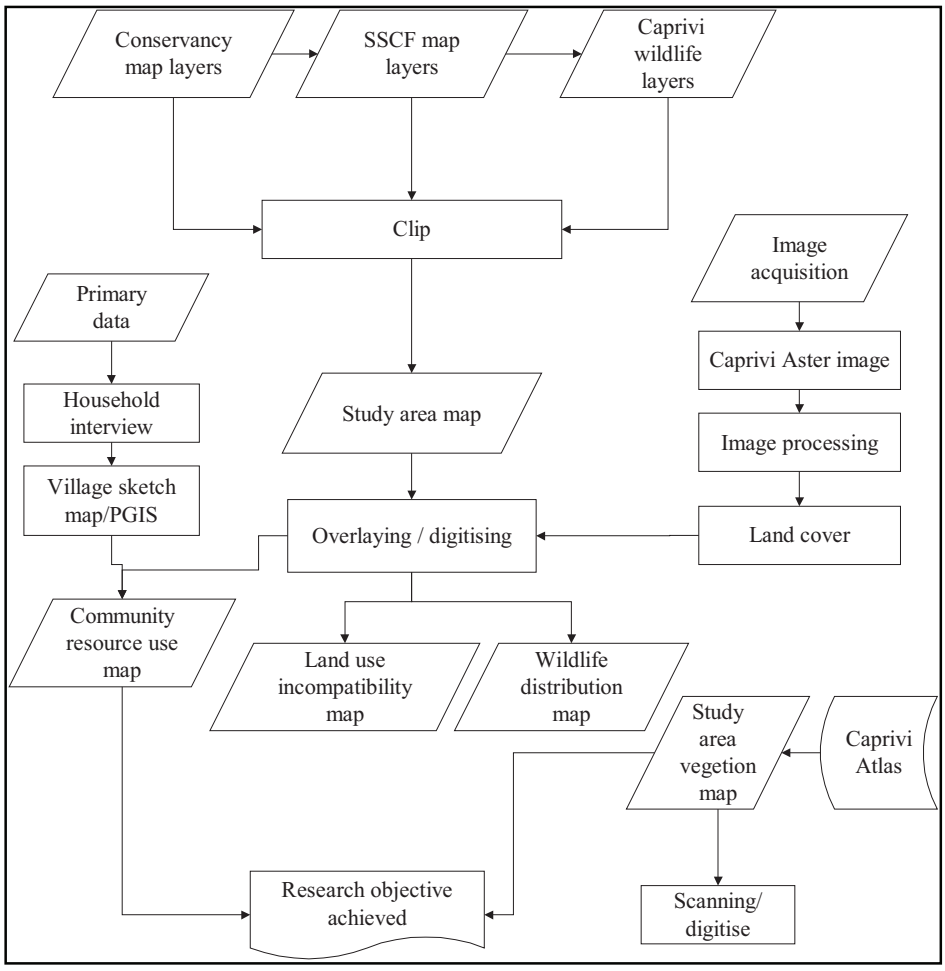

Figure 6: Flow chart of the methods

5.2 Operationalization of Concepts

The land use incompatibility discussed in Chapter 3 the research questions had to be further refined and translated into questions for the interview at various levels, types of secondary data to retrieve and types of observation to make. These concepts refer to the land use types and the actual and potential conflicts determining land use incompatibility, organisational requirements on information sharing and stakeholders interest Appendix 1, 2, and 3 shows the guiding questions.

Table 1: Operationalization of Concepts

Concepts	Source of information (observed through)	Decision
Land use types	GIS – visualize the extent or fix boundary and display land use incompatibility Interview - perceive boundary	When boundary of incompatibility is ill-define become source of conflict which turn to disagreement between stakeholders If respondents perceive that new development may affect their resource use then proper investigation is needed
Stakeholders requirements	Observe through laws, policies & regulations, written reports and interviews	If different laws one require 100 % in farming, other in conservation which govern the same thing seems contradicting may lead to incompatibility Uncoordinated plans may be contradicting at local level may lead to double allocation of land. Inadequate of information and consultation bring tensions between government and farmers
Stakeholder interest	Report and literature review on stakeholder analysis and PGIS	Participatory method can be used to integrate local knowledge in information system for new development then it is essential to involve community in decision making

5.3 Secondary data

In the first phase, secondary data were acquired from reports available in the ITC library. Also a geo-data base with data both in digital and hard copy formats was available at ITC. The study area is covered by three Aster images of 2 September, 11 September and 4 October 2006 (Figure12). The images were re-projected into UTM WGS84 to match the coordinates system of the points collected in the field. The sequence of flow chart for geo-referencing of image is shown in Appendix 6. This was done before going to the field. After the field the image was overlaid with the village sketch maps to visualize the community's resource use mapping. Secondary data were obtained from different organisations and Government Ministries in Namibia during the field work (Appendix 5).

5.4 Primary data

Interviews are a commonly used methods of collecting information from different people through different forms of interaction (Kumar, 2005). First structured household's interviews were conducted. After that semi-structured interviews followed with the key stakeholders who took part in the process of the establishment of SSCF. The first round of literature review gave a basis for selecting stakeholders and formulating the questionnaires. The questionnaires contained both closed and open-ended questions. Open-ended questions give the respondent a chance to express his or her views and give an answer he or she feels is appropriate for the question (Appendix 1, 2 and 3).

5.4.1 Sampling procedure

The study used a sample of households selected on a random basis. The sample consisted of fifteen households in the Conservancy area and ten from the non-conservancy area as shown in Table 2.From the Conservancy, which has a population of about 570 registered members a simple random sampling approach was use to select the household's to be interviewed. Ideally the sample size should be at least 25 or even 50 per village to ensure representative (De Gier, 2004). Thus the population size for this study was established to be 25 households per villages. It was ideal to do 125 household but due to time constraint and problem experienced during the field could not be done. Only households were selected that had lived in the villages for 5 years or more.

Table 2: Shows the sample villages and household sample size

Sample villages		Sample households
Conservancy	Kansoko	5
	Masida	5
	Sintanta	5
Non-conservancy	Kaenda	5
	Sikubi	5
Total	5	25

5.4.2 Household interviews

Structured interviews with heads of households from the Conservancy area were carried out in Kansoko, Sintanta and Masida. The households' records from the Conservancy were obtained in the Conservancy office. The individuals interviewed were selected from a list of households supplied by the Conservancy Manager. It was difficult to select farmers from the non-conservancy area. Some of the households dropped out. The selection was done through meeting with their village headmen at Kaenda and Sikubi respectively. These interviews took about 35-45 minutes per individual and about two days were spent on it in each village. The interviews were conducted with the assistance of an interpreter from English to the vernacular language *Silozi*.

Figure 7*:* First individual interview session in Kansoko village in Sobbe Conservancy

5.4.3 Participatory Mapping

Participatory mapping as primary data collection method was done after the household's interviews. Participatory was used to collect information through participation. In PGIS participation can take many forms. For the collection of primary data different data acquisition techniques were used such as focus group discussion, participatory sketch mapping, ground survey through transect walk and observation

Sketch map and focus group discussion

In each village a focus group discussion session were organised after the household interviews. The participatory mapping took place at the village Conservancy office. The non-conservancy farmers were transported from their area to one of the village Conservancy offices. Participants were selected for basic skills in drawing. At the start the researcher explained about the contents of the exercise and the tools that will be used. The facilitating team from MLR regional office provide an aerial photo at scale 1:10 000 of September 2007. With this aerial photo the participants were able to identify the spatial features related to their resources such as cattle posts, roads and other prominent features. Focus group discussion was used to collect group views regarding the perceptions and attitudes of participants towards the establishment of the proposed SSCF. About 16 participants took part in sketch mapping from both parties. For conservancy farmers two groups were formed comprised of five men and six women. The women also participated in drawing to test whether would have different perspective in indicating their zoning areas for wildlife conservation and grazing areas. The five local farmers from non-conservancy areas show their cattle post and grazing areas (Appendix 9). Features were depicted by using large sheets of craft paper and coloured marker pens and the process is documented and records are kept for interpreting depicted symbols. The lack of a consistent scale and geo-referencing of the data leaves room for subjective interpretation of the final community resource use map. During the mapping exercise agreements and disagreements were observed and then discussed until a final consensus was reached. It was observed that local people are very much aware of the location of their resources. Especially the elderly people are important sources of information although they did not actively participate in the drawing.

Transect walk

A transect walk is a spatial data gathering tool to collect information and essentially to observe and document the similarities and differences of socio-economic and bio-physical features (Reisch and Schubert, 1993). Two sessions of transect walk were undertaken after the mapping exercise. The purpose was to prove that resources really there where participants had indicated them their sketch map. It was not possible for the researcher to cover two areas as the area is too large and distant from each other and extremely hot weather condition make it possible to take a walk.

First transect walk was done with Conservancy members who participated in the mapping exercise. It took the whole day from eight in the morning up to five in the afternoon. A GPS (Garmin 12) was used to navigate and to capture all the points during transect walk. The second transect walk was undertaken in the non-conservancy. The traditional leaders and MET warden officer were able to accompany the team with the participants. It is important to note that not all features marked out on the non-conservancy farmers' sketch map could be visited because of poor road accessibility. According to Elvis Mwilima warden officer from the MET, uncontrolled bush fires in the area have frustrated efforts taken by the local community for the conservation of wildlife. These environment unfriendly activities scare the wild animals and force them to migrate to other areas.

Key informant interviews

In addition to the formal household interviews, interviews with Regional Government officials and Communal Land Board members were conducted. The organisation concerned all had one representative or spokesperson to represent the views of their departments in the region. Table 3 below shows the number and level of respondents interviewed. The purpose of the interview with key stakeholders was to give an overview how the information was coordinated for the establishment of SSCF and NC.

Table 3: Number and Level of Respondents interviewed

Organization	Number of Interviewees	Level of interviewees
Ministry of Lands & Resettlement	3	Former Deputy Director Regional Development Planner Secretary of Land Board
Ministry of Environment & Tourism	2	Regional Chief warden Officer Warden Officer
Likwama Farmers Union	1	Member of Farmers Union (chairman of Land Board)
Traditional Authority	1	Mashi representative
Communal Land Board member	1	Women engaged in farming

5.5 Geographical Information System and Remote sensing

Geographical Information Systems (GIS) are software packages used for capturing, manipulation, analysis and displayed spatially referenced data. A GIS was used to integrate the data from different sources, process this large amount of data and better presented and display land use incompatibility maps. The data collected from different sources were in different coordinates system. Table 4 shows a list of GIS data gathered with their source. The preparation of data type for use in Arc GIS was processed before and after the field work. All data have been projected into the world geographical coordinates system (WGS 84) and after that all layers could be overlaid perfectly. By incorporating GIS in this study reliable and quality information generated.

The primary, secondary and GIS data were collected and compiled as follows; the analyses process involved the generation of digital data, included geo-referencing, scanning and overlaying. Tools employed included Software such as Arc GIS 9.3, ERDAS 9.2 for spatial analysis and a digital camera. These data are analysed and presented in graphs, tables and maps. This process to re-project all the shape files and convert it to WGS 84 was time consuming. After geo-referencing a personal geo-database was created. The physical information from satellite image was used as polygon layers digitised on screen to show the grazing area and the zoning wildlife conservation area.

Table 4: GIS data source

Data	Data type	Source
Cattle post	vector	GPS reading
Settlement	vector	GPS reading
Small-scale farms boundary	vector	MAWF
Borehole layer	vector	MAWF
River layer	vector	Website www.dea.met.gov.na
Wildlife data	vector	MET
Roads layer	vector	Website www.dea.met.gov.na
Park boundary	vector	MET
Sobbe conservancy boundary	vector	MET
Vegetation	vector	ITC geo-data base
District boundary	vector	ITC geo-data base
Namibia boundary	vector	ITC geo-data base
Aster image	Raster	ITC geo-data base

5.6 Stakeholder

For a study looking at a problem as diverse as that surrounding the development of SSCF farms in the Sobbe area, an intensive analysis of various stakeholders is necessary in order to understand which are the key stakeholders and which interest guide their actions and decision. The study looking at the diversity of the problem surrounding the development of the SSCF farms in the area, an intensive analysis of various stakeholders' is necessary in order to understand the concept of stakeholder groups with key interests in the project.

Definition of Stakeholder:

The definition of a stakeholder has been formulated as follows *(Groenendijk and Dopheide, 2003; ODA, 1995)*

- *"... persons or groups that have, or claim, ownership, rights or interest in a corporation and its activities, past, present, or future".*
- *"..Any individual, groups and institutional who would potentially be affected, whether positively or negatively, by a specified event, process or change".*
- *"A stakeholder can be persons, groups or institutions with interests in a project or programme". "Other defines that it can be any group of people organised, unorganised with a common interest or stake in particular system".*
- *"Stakeholders include all actors or groups who affect, and or affected by, the policies, decisions and actions of a project or proposed intervention".*

Stakeholder analysis can be defined as an approach and procedure for gaining an understanding of a system by means of identifying the key actors or stakeholders in the system and assessing their respective interest in that system (Groenendijk and Dopheide, 2003; Mushove Patrick and Vogel, 2005). Stakeholder analysis assists in decision making situations where various stakeholders have competing interests, resources are limited and stakeholder needs must be appropriately balanced a good stakeholder analysis is of paramount importance. Stakeholder analysis includes methods of project design, consult, inform and seek to integrate the interest of disadvantaged and less powerful groups (McCall, 2003; McCall, 2004). Stakeholder analysis is a central theme in conflict management. In the development of the SSCF consultation with the inhabitants of the area, was of utmost importance because it may yield information on how they perceive the project.

After the identification of stakeholders as summarised in Figure 7 below, there was a need to categorise them as some are affecting by or are affected by the system differently. The stakeholders can be grouped in primary, secondary and external and key stakeholders. Primary stakeholders are those individuals or groups who ultimately are affecting the system (ODA, 1995). Secondary stakeholders are those who are affect the system, acting as intermediaries between primary and key secondary stakeholders. External stakeholders are including those individuals, groups or organisations that are not directly involved but interested on the outcome of the system. Key stakeholders are those who can significantly influence or are important to the system. Figure 5 shows how stakeholders may interact and are linked to the Natural Resource system.

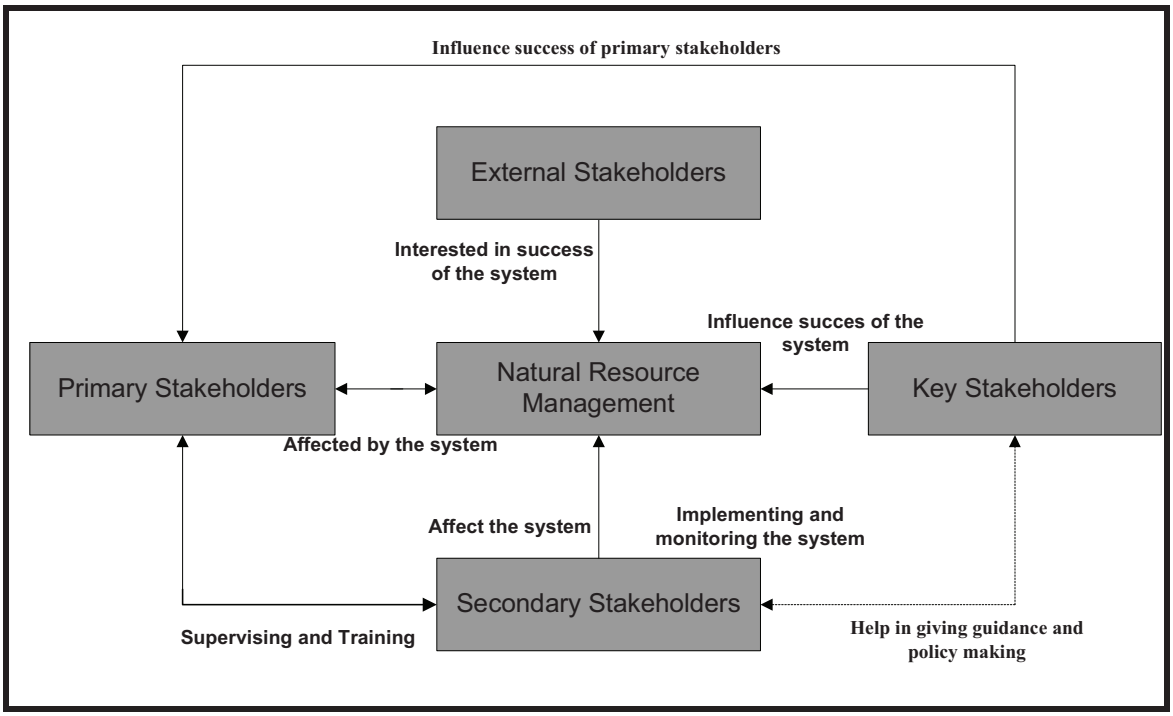

Figure 8: Stakeholder interaction and relationship ***Adapted from (ODA, 1995)***

6. Location and extent of potential and actual conflict

6.1 Introduction

This chapter addresses the research questions as outlined in chapter 1. The results addressing through the aspect of spatial overlap, the farmers response to SSCF plan, the impact of HWC conflict through interviews (see checklist 4.9 in Appendix A). The results of PGIS and stakeholder analysis were presented in this chapter. The results are presented in the form of graphs, tables and maps.

6.2 Spatial overlap

The study found that the SSCF area overlaps with pre-existing land uses (Figure 8). The study revealed that Sobbe Conservancy act as buffer along the Mudumu National Park. The Sobbe Conservancy covers only 390 hectares out of 187 000 hectares of the SSCF. The Conservancy comprised of mixed farming areas (livestock and crop fields), settlements, school and boreholes are present. In addition, from the mixed farming and settlement the areas zoned for tourism and hunting. The hunting occupies the largest areas as shown in Table 5 and Figure 9 below.

Table 5: The Sobbe Conservancy's resources zones

Feature name	Area coverage	Features type
Hunting areas	194 hectares	Polygon
Mixed farming	61 hectares	Polygon
Grazing areas	70 hectares	Polygon
Tourism	53 hectares	Polygon
Crop fields	10 hectares	Polygon
Settlements	4 main settlement	Points
School	1 school	Points
Boreholes	6 boreholes	Points

Borehole

The location of 5 out 6 boreholes drilled for the planned SSCF will overlap with the Sobbe Conservancy. The location of these boreholes in the Conservancy is incompatible with the land use of the Conservancy and may result in conflict because this borehole is intended for the new settlers of the SSCF. The destruction of borehole by elephant may be expected, because the boreholes are located in the buffer zone of the NP.

Cattle post

The study shows the overlap between cattle posts and therefore cattle grazing uses by the neighbouring villages along the Trans-Caprivi high way north of the SSCF and along the Linyanti gravel road south of the SSCF. Therefore the grazing area will be minimized because of the SSCF occupied the biggest part of the area.

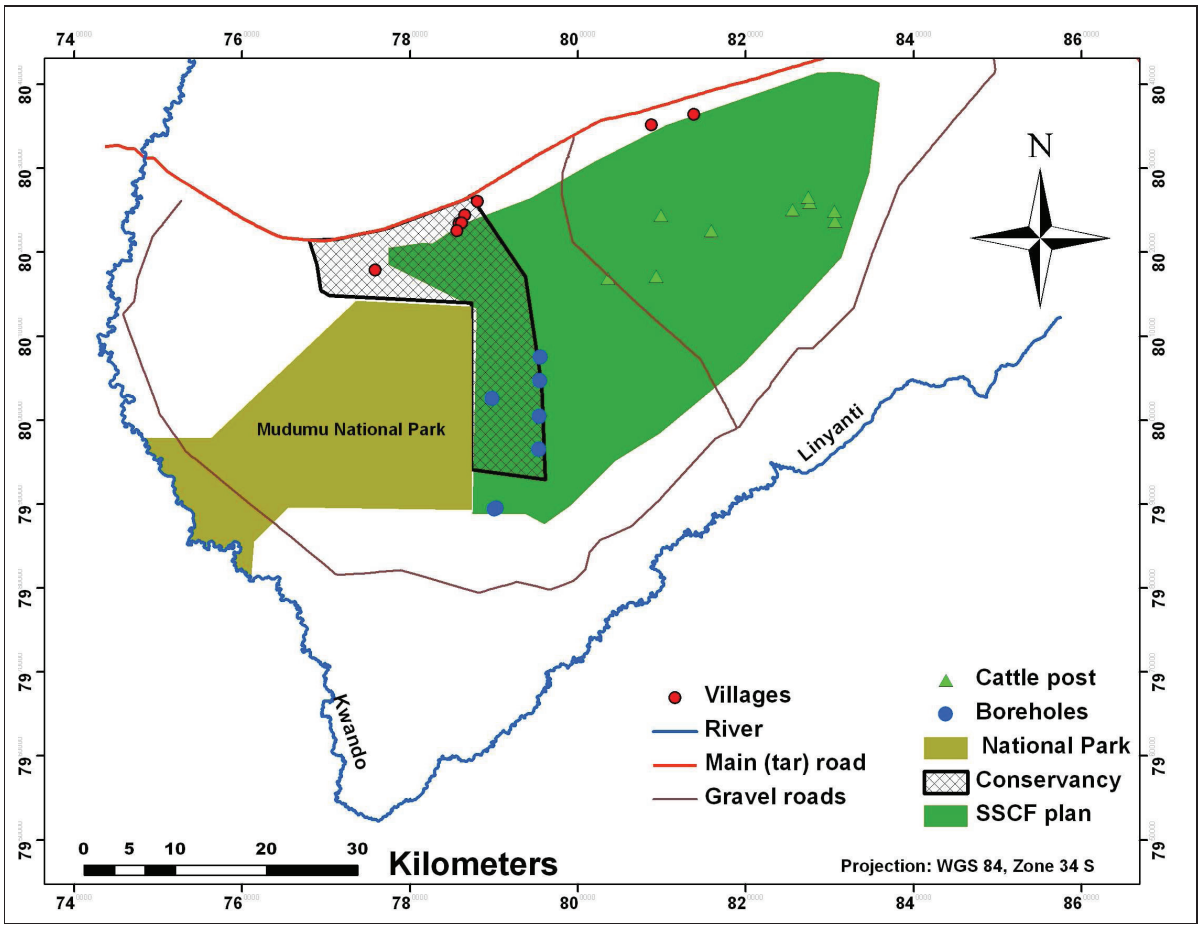

Figure 9: Land use incompatibility in the study area

Apart from wildlife utilization the study found that Conservancy farmers practice traditional agriculture livestock and crop. The crop fields are small and generate little income.

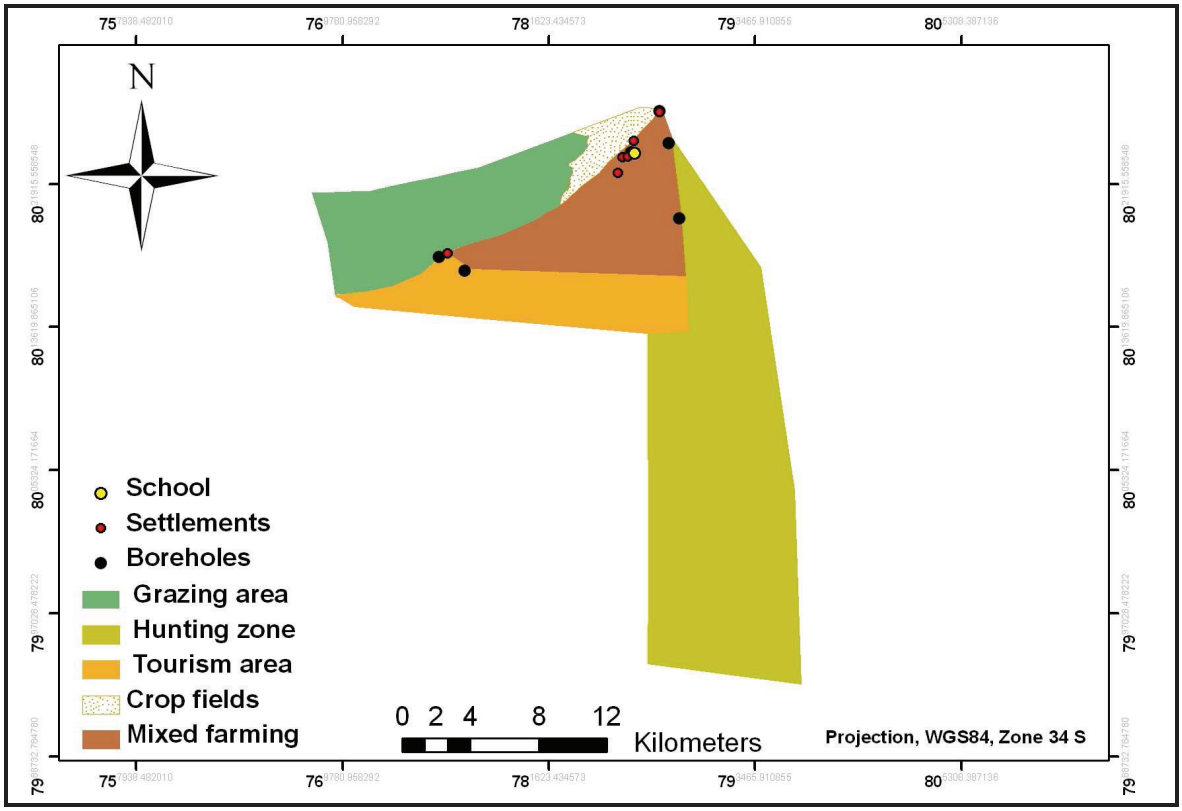

Figure 10: Conservancy resources that overlap with proposed SSCF area

6.3 Mutual impact of Human Wildlife interactions

Summaries of crop damage by wildlife incidents were analysed in SPSS as illustrated in table 6 for better understanding. This analysis refers to questionnaire 2.6 sections C (Appendix A) and other information derived from MET and IRDNC.

6.3.1 Results of HWC interactions

Table: 6 shows that the percentages of conservancy and non-conservancy farmer who reported problem of crop damage by wildlife species are high. The study found that the majority of HWC incidents were caused by elephants while impacts by warthogs/bush pigs, antelope and cattle are significant but relatively infrequent.

Table 6: Crop damage by wildlife species in 2008

			Animals caused damage to crop field				Total
			Elephant	Bush pigs	Antelope	cattle	
category	Conservancy farmer	Count	10	2	1	2	15
		% within category	66%	13%	6%	13%	100%
	Non-conservancy farmer	Count	9	1	0	0	10
		% within category	90%	10%	0%	0%	100%
Total		Count	19	3	1	2	25
		% within category	76. %	12%	4%	8%	100%

Figure 10 below shows the incidents of wildlife in Conservancies reported in 2007. The high species incidents reported is elephant in Sobbe and Kwando Conservancies. The two Conservancies are located in wildlife migratory route(NACSO, 2007).

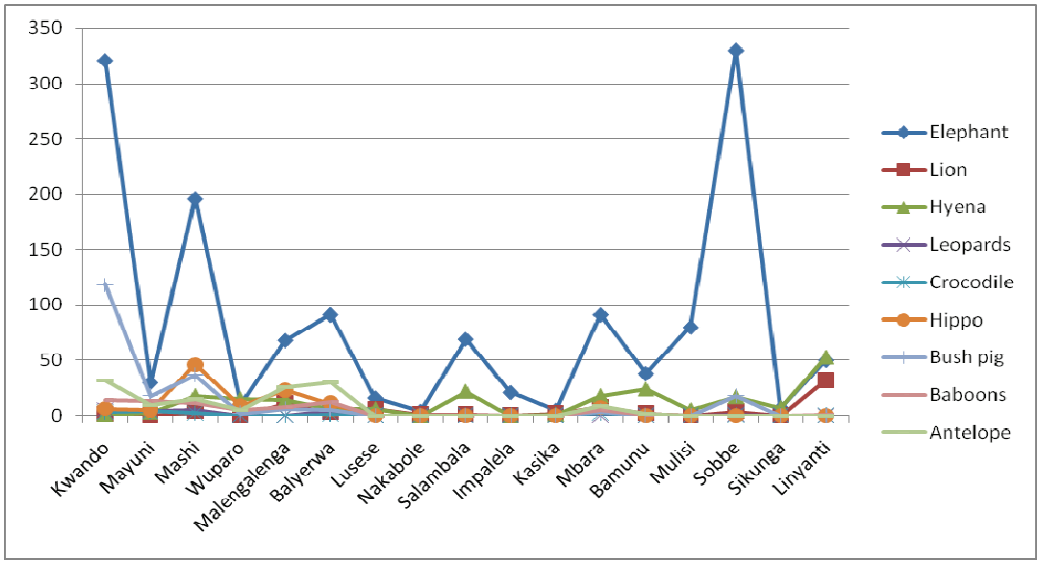

Figure 11: Reported incidents by Wildlife species in registered Conservancies in Caprivi
Source: IRDNC Event Book, 2007

6.3.2 Results on Elephant distribution in the study area

Figure11 demonstrated Elephant in dry season location in the study area. There is not elephant found in the proposed area for SSCF. The incidents reports from our interviews and IRDNC show that incidents happen during the wet season from (Jan-April).

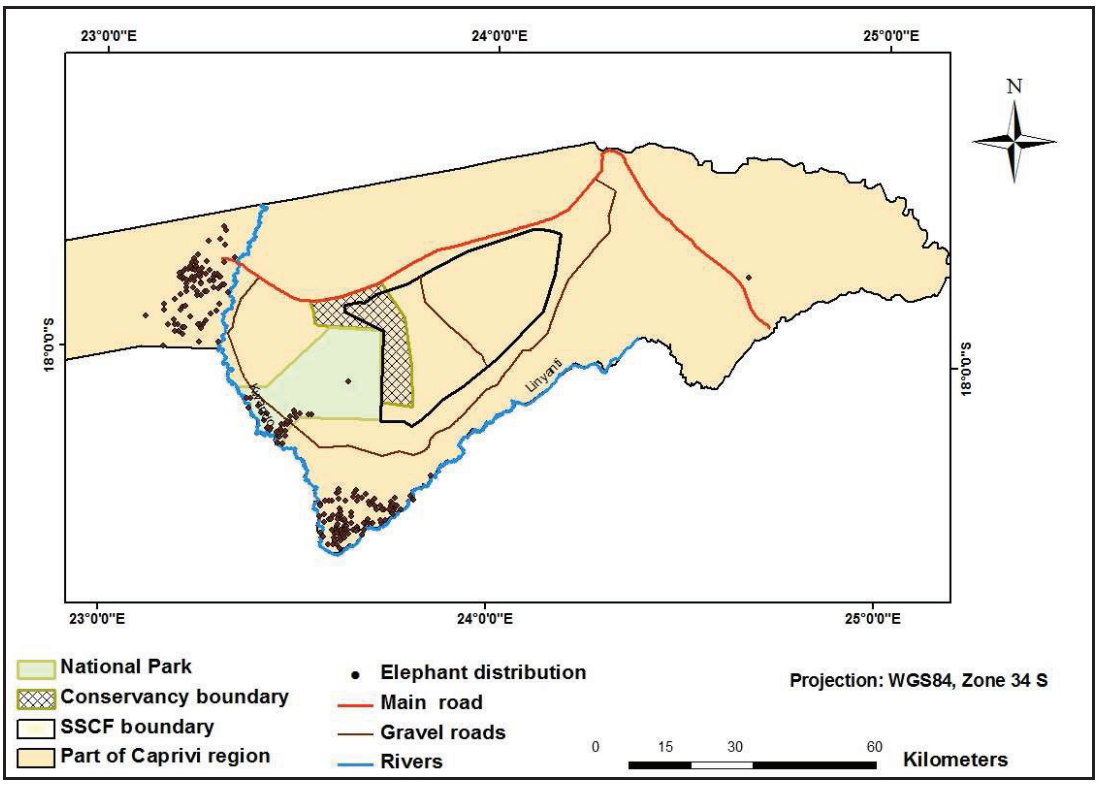

Figure 12: Dry season elephant distribution around the study area ***Source: MET, 1997***

6.4 Farmers response to SSCF-plan

The questionnaires were analysed as shown in (Appendix 1, section C no 4.9) and cross tabulations are used to represent the responses from each category of conservancy farmers and non-conservancy farmers. This section addressed the result of research question 1.1 in relation to resource use conflict.

Table 7 shows that the majority of the respondents from both conservancy and non-conservancy farmers 76 % (equivalent to 19 people) were strongly opposed the development of SSCF on the basis that they were not appropriately informed about the project and that clarity is required on who will be the beneficiaries and what benefit are they getting from it. For example conservancy farmers (5 out 25) dislike and (10 out 25) strongly dislike, while in non-conservancy farmers only (9 out of 25) strongly dislike. Of all respondents who opposed the development of SSCF only one person (1 out 25) agreed with the development of SSCF. The respondent stated that SSCF will bring better grazing management, enhance grazing system such as breeding and animal disease control, and reduced stock theft.

Table 7: Farmers response to the demarcation of SSCF

			Farmers disagree with the demarcation of SSCF			Total
			strongly dislike	dislike	strongly like	
category	conservancy farmer	Count	10	5	0	15
		% within category	66 %	33 %	0%	100%
	non conservancy farmer	Count	9	0	1	10
		% within category	90%	0%	10. %	100%
Total		Count	19	5	1	25
		% within category	76 %	20. %	4.0%	100 %

6.5 Results of Participatory GIS

Figure 12 shows community resources zoning map overlaid on the false colour Aster image. The overlay show the SSCF area is used as grazing area as depicted in aster image the blue and whitish colour shows the cattle post that are used the area for grazing when water is available in swamps and pans during rainy season as shown in Appendix 9. The red arrow indicates the direction from the villages along the road to the grazing areas. Fires burning were seen in the SSCF area as shown in dark and black colour in the image. The result also shows that there is no crop fields found in the SSCF planned area because the pixel size on the image was small and it was impossible to do classification.

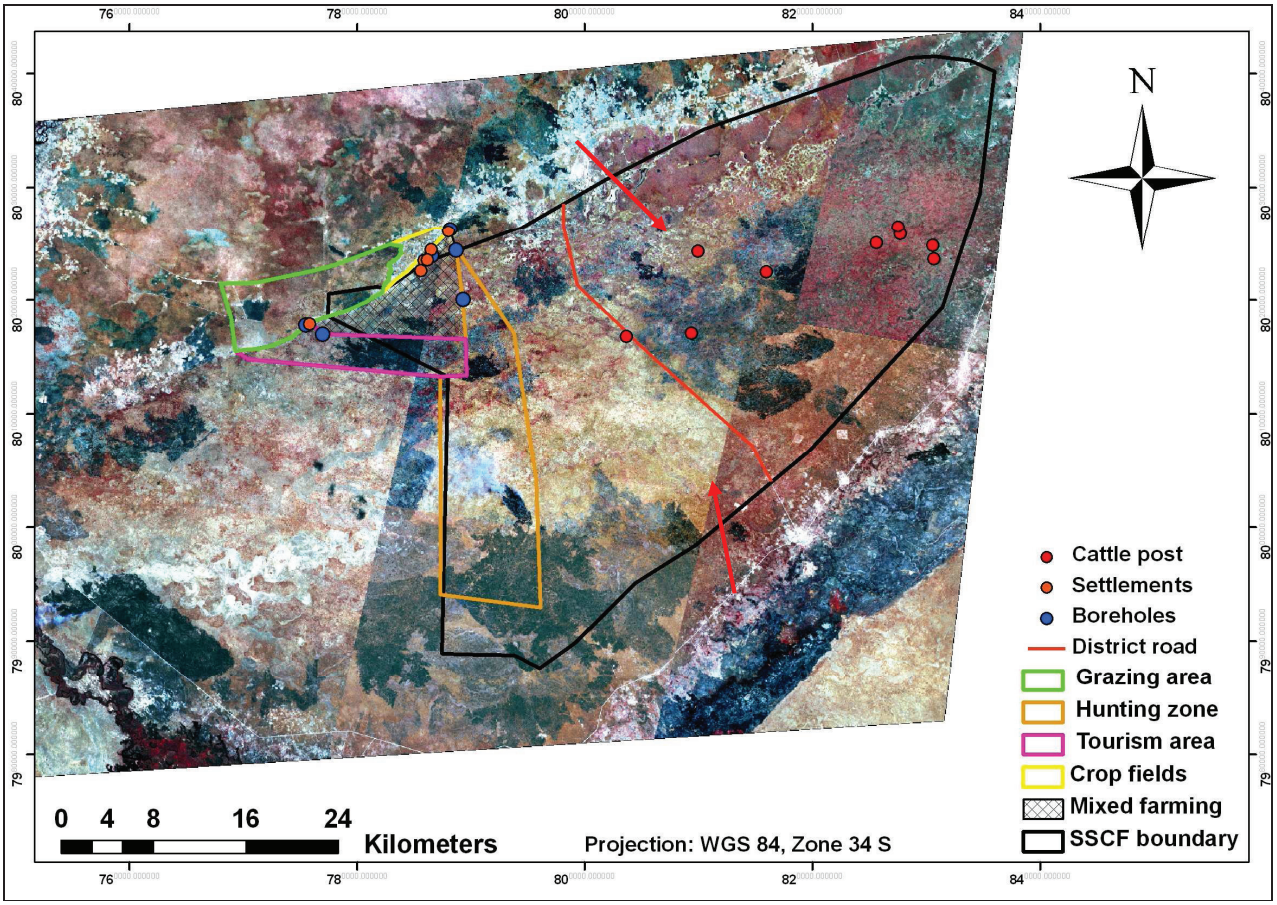

Figure 13: Aster image of September 2 September 11 and 4 October 2006 overlay with Community resource use map in false colour composite band 321

- Dark and black represent- fire burning
- Bare ground – grazing
- Red arrows – indicate the direction from villages to the grazing area
- whitish and blue colour represent the settlements

6.6 Stakeholder Analysis

During field work an analysis of stakeholder was done, after the identification and listing of stakeholders as shown in Table 8. The aim was to understand the interests, importance and their role of stakeholders in relation to land use incompatible. The analysis of primary stakeholders' semi-structured interview was used and the farmers would have a chance to express their views with regard to land use incompatible. Table 8 is describing the different actors in relation to NRM and their responsibility at regional and local level institutions. The institutional for NRM in Namibia context are under different ministries such as MET, MLR, MAWF and MRLGHD. These ministries decentralised their activities and devolve rights and responsibility to the regional level.

Table 8: outline different stakeholders groups and their interest

Primary stakeholders	**Role/power**	**Interests**	**Level of responsibility**
SSCF-farmers	Unknown	Not defined	Community
Conservancies	Wildlife and Tourism management	Tourism, poles for building material, hunting, bush foods	Community
Farmers (women)	Protection of resource use, Change in livelihood protection of their resources on land	Fuel wood for cooking, Keep culture intact, Forest products (basketry & wooden tools for domestic chores)	Community
Secondary stakeholders			
Traditional Authorities	Registration of customary land rights	farm revenue, development of the area	Community
Communal Land Board	Land Allocation and registration with traditional authorities	Conservation of wildlife resource, (generate revenue) from tourism	Regional and Community
Regional Council	Regional development planning	Make development plan for the Region	Regional
Ministry of Lands and Resettlement	Land Use Planning	Development of farms, Sustainable utilization of resources	Regional
Ministry of Environment and Tourism	Environmental Management	Conservation of Natural Resource management	Regional
Ministry of Agriculture Water and Forestry	Protection of environment and forest	Forest management	Regional
National Planning Commission	Development planning	Promote economic plans	National and Regional
External stakeholders			
NGOs	Assist State in community consultation Capacity building, empowering community on resource management	Tourism promotion Provide training to local people to effectively manage their natural resource Promote community on natural resource management	All levels
Private Sector	Tourism	Hunting rights	All levels

Adapted from (Blackie and Tarr, 1999)

6.6.1 Stakeholder Analysis matrix

Stakeholder analysis matrix adapted from (Groenendijk and Dopheide, 2003)has been used to analysis the interest and importance of stakeholders (Figure 13) below. Importance of stakeholder was assessed in terms of their priorities of interest and influence was judged in terms of their power in NRM. The position of the stakeholders groups indicates how different stakeholders can be classified together according to their importance and influence. Those stakeholders of high importance in NRM but with low influence shown in box A are affected by project outcomes. In box B, are the stakeholders with high degree of influence and importance to the development of the SSCF project. In box C are those stakeholders with high influence and who can affect the project outcomes. In box D influential stakeholder but with less importance help in giving guidance and assisted government in community consultation. The values per stakeholders were derived through stakeholder interest assessment as shown in Table 8. In Namibia context all citizens have equal status to land rights and state ownership. Hence conflicts may arise due to cultural, political or social differences. Stakeholder analysis therefore would play a major role when conflicts on land related projects are planned. Stakeholders must be carefully identified in relation to the problem or nature of project based on their attributes such as interests, influence and importance.

High

↑

Importance

Low

A. Local farmers,(SSCF, Non-Conservancy farmer and Conservancy farmer (women)	**B.** Traditional Authority Communal Land Board Regional Council
D. Local NGO - IRDNC Private sector	**C.** MLR, MET, MAWF and NPC

Figure 14: Stakeholder Classification matrix

Low Influence → High

According to the classification matrix above Box A, B and C are the key stakeholders involved in the development of SSCF project. The implications of each box are summarises as follows;

A. Stakeholders of high importance to the project but with low influence. This implies that they require special initiatives if their interest are to be considered and accepted.

B. Stakeholders have high degree of interest and influence; these stakeholders are very effective both on influence and success of the project.

C. Stakeholders in this category have influence to the project and affect the project outcomes but whose interests are not the targets of the project.

D. Stakeholders have low influence and importance, hence their role might just be monitoring of project progress.

6.6.2 Nature of conflicts between stakeholders in relation to the development of proposed SSCF and NC

In the study, different key types of conflict between stakeholders involved in the establishment of SSCF and NC were identified through interviews (Appendix A, C, D and E) and literature review as shown in (Figure 14). The main conflicts were identified as spatial information sharing and coordination observed as the major source of conflict because both ministries MLR and MET did not consider each other on the implementation SSCF and NC. The lack of socio-economic impact assessment on SSCF did not considered the situation on the ground, i.e. the impact on wildlife distribution on the NP and impact on neighbouring areas due to growing pressure on grazing. However inappropriate information between the CLB and Traditional Authority contribute to the conflict because they could have been expected to stand up for the communal grazing (customary rights) of the villages north and south of SSCF plan. Lack of consultation between the Traditional Authority leads tension among local residents.

Stakeholders	Type of conflict
Government ministries MET and MLR	Lack of spatial information sharing and coordination in planning of SSCF and NC
MLR and Land Board	Lack of socio-economic impact assessment on the establishment of SSCF
Communal Land Board and Traditional Authority	Inappropriate information between Traditional authority and Land Board
Traditional Authority and Local residents	Lack of consultations between the Traditional Authority and the local residents

Figure 15: Main conflict identified between stakeholders in the planning and implementation of SSCF and NC

6.6.3 Spatial information sharing related to SSCF and NC

This sub section addressed how information was shared and coordinated between the MLR and MET on the establishment of SSCF and NC. This section provides answers to research questions 4.1, 4.2 and 4.3.

- ***Spatial information used by which stakeholders:***

From the interviews with the MLR and MET Regional Officers it was identified that no information was shared for the establishment of the SSCF and NC in the same area. A respondent from MET stated that the information used for the development of SSCF is known by MLR and Traditional Authority and MET is not aware. When asked what the respondent perceived the difficulties of sharing spatial data. The respondents stated that because of incompatibility of data set and lack of standardised system lead to lack of data sharing.

- ***Procedures for sharing spatial data***

Most of the respondents indicated that requesting information from line ministries makes personal visits within the same ministry. In case of different ministries the procedures to request information by sending memorandum to the head of department before you receive the information.

- ***Difficulties encountered in sharing information***

From the respondents from both Ministries the following statements were raised as difficulties encountered in sharing of spatial data;

- The information required not always received on time because the process of sending memorandum delayed if the person in charge is busy or attending workshop.
- In some cases, in the Regional offices is difficult to provide information digitally or in CDs paper maps because lack of resources.

Interviews with CLB members: Almost similar questions were asked concerning the development of SSCF and NC and the stakeholders involved in the planning process. The responses from the CLB were contradicting with the responses from the government officers. One responses from MET said that he was not aware of the development of SSCF but the MET was consulted in the development of SSCF. Respondents were asked how the local community informed concerning the development in the area. Some respondent said they were informed some said not only traditional authority who supposed to inform them.

7. Discussion

This study is aimed to visualize the land use incompatibilities. The zoning map of conservancy resource use did not exist. The data now is available to be used by the conservancy management committee and other responsible stakeholders in wildlife management. This research set out to compare the land utilization types their interactions by identifying the actual and potential land use incompatibility. The visualization of land use incompatibility the extent and location of various land use overlap were described. The mutual impact of interactions between people and wildlife as well as the perception of different categories of conservancy and non-conservancy farmers were described. Comparing the literature and the findings of this research is important in order to understanding the missing link.

7.1 Spatial overlap

The MLR consultant IDC to contact a study and IDC has identified the SSCF as underutilized. However our findings shows that most of the SSCF area was used in one way or other, i.e. Conservancy and NP buffer zone and livestock grazing from the villages north and south of the SSCF area. The overlap of the SSCF and the Sobbe Conservancy is particularly problematic because the borehole drilling for the SSCF so far only in the Sobbe Conservancy. The reason is that the underground water is shallow and the water quality is good (personal communication Henry Beukes, Hydrology department in the MAWF 2008) compared to rest of area. Both SSCF and NC are coordinated by different regulations it assumed that if the zoning plan is uncoordinated may lead to overlap. Other potential land utilization type cattle posts were found in the study area without overlap. The interactions between traditional agricultural grazing, NC and NP co-existed without interference with each other in the same environment Prins (1992) stated that the co-existence between traditional agriculture and their livestock and wildlife were living together in harmony. In this case study, the introduction of SSCF brings tension among farmers because it occupied the biggest part of the area which may lead in potential conflict. Farms however, will involve land clearance and fencing. These have the potential to affect wildlife distribution, migration through habitat fragmentation and fencing. The farms adjacent to NP may lead in potential conflict.

7.2 Impact of HWC interactions

Respondents identified wild animals that causing damage to crop fields and one domestic animal (cattle) as can be seen in Table 6. Elephants identified as the species causing most damage to crops. The Farmers reported that the raids by wild animals are seasonal and they are more prevalent during the growing season to harvest from January to May. However, as the damage occurs early on the growing season the farmer used tradition measures to prevent the animals from their fields i.e. beating drums, chilli bump and guarding the fields at night. Livestock caused less damage to crops because they were attended by herd boys who prevented them from entering the fields and could be easily removed if they invaded the fields.

Damage to crops by elephant in Caprivi are common problems, in recent survey of households in Conservancies damage caused by elephant was very high as shown in (Figure 9). Although that there is no evident of elephant in the study area as shown in (Figure 10) it assume that the elephant in dry season concentrating along the rivers and close to their habitats because of availability of forage. According to (Galanti et al., 2005) elephant movement vary according to daily season cycles from river and migratory species on seasonal basis to another area. Therefore there is possibility that this area used as trans-boundary nature of wildlife movement, elephants within and between Botswana and Caprivi move regularly into the eastern floodplains of Caprivi region (O'Connell-Rodwell et al., 2000). Elephants and other large mammals are depending not only on the National Park but on the large areas surrounding them especially along the rivers.

The study found that crop raids by elephant are high (Figure 10 and table 6) as expected in this research. However, the difference found in movement patterns in Figure 9 is because of data limitation. In this study the sample sizes used for the different categories of Conservancy and Non-conservancy farmers could be a point of discussion however although the sample size is small but can be considered valid if respondents give similar answers. In addition, the overall wildlife census data could not be traced only old data was used to demonstrate the distribution pattern of elephant in the study area. Another limitation is that it was not possible to compare the average distance of wildlife distribution time series before and after interventions to the new boreholes due to two year's data set because the Conservancy was establish in 2006 and planned SSCF is not yet known.

7.3 Farmers response to SSCF

Majority of the Conservancy and Non-conservancy farmers opposed the development of SSCF in the area as evidenced in table 7. The farmers' claims that land resources are limited the available land is minimal for survival of local communities because of the diversity of land use in the region. Therefore the various land users feared that their resource use rights might taken by landless. This study assumes that SSCF will deny access to fuel wood collection and other resources in the overlapping area. This may lead to conflict among rural residents.

7.4 Community resource mapping through PGIS

In this study, participatory method was used to generate local knowledge on the status of the resources. The method was chosen following the acknowledgement of participatory studies that has been used successfully in Lebanon (Zurayk et al., 2001).The method used to gather local knowledge in the form of community resource map and integrate into GIS. Local knowledge was crucial resource for identifying the bio-physical characters of the land in their area. Hence the method has some limitations (Figure 11). This map although is unique and material described by the Conservancy and Non-conservancy farmers, may not be accurate but evidently reveal the current situation. However the local farmers were able to define their resource use by observing some features such roads and cattle posts on the aerial photo to come up with the community resource use map. Prior studies in similar situation observed that the participants found it difficult to identified feature on satellite image. It was noticed that community can identify better on the aerial photo instead of satellite image for example (Elifas, 2008) those with basic education find topographic map and aerial photos easier to interpret. McCall (2003) stated that PGIS bring great value into GIS successfulness by integrating local knowledge. PGIS reveal that local knowledge can provide information which could be relevant for decision makers. The sketch map can be of importance to be used by conservancy management committee in interacting with private sector, tourism operators and in making decision. Participatory process revealed some limitations regarding the use of GPS, map reading because the farmers are not familiar with new technology. As a result throughout the process the majority of participants were unable to use the map freely which required the researcher to act as interpreter.

The evidence of both the existing cattle posts and villages north and south of SSCF will not make use of the grazing area even in rainy season as demonstrated by arrows in Figure 11. There will be winners and losers. The winner will be the Conservancy who is registered as legal entity. Losers will include those who collect fuel wood, including women; neighbouring villages who grazing in the area and wildlife managers concerned that habitat fragmentation and fencing will negatively affect wildlife and related tourism. Most of the local people felt that the proposed SSCF is an attempt by the government to take their grazing areas away in favour of individual farmers.

7.5 Stakeholder Analysis

In this study a stakeholder analysis matrix has been used as way of analysing the stakeholder interest and importance (Figure 13). Also the stakeholder matrix can be used to analyse the kind of information which can be shared by stakeholders. The researcher experienced difficulties to select the best person from the MLR because the people who were present during the initial establishment of the SSCF would not longer working in the ministry. The study found that there are no spatial data was shared for the establishment of SSCF and NC between MLR and MET. The respondents when ask that are aware of any laws regulate land use. They were all aware of the regulations but not practice. It will assume that institutional cooperation does not exist. The interview meant to update and confirm data from secondary sources on the establishment of SSCF and how local communities would be affected by this project. Though that the CLB and Traditional Authority initially were agreed to the proposals of the SSCF it appears that they have different understanding or did not understand the whole concept of SSCF. For the reason that none of the local representatives of the implementing institutions were able to explain how the information was sharing among stakeholders.

8. Conclusion and Recommendation

8.1 Conclusion

The objective of the study was to develop relevant spatial information for use by stakeholders to avoid land use incompatibility and to prevent conflict. Based on the findings of the study SSCF is incompatible with the existing land uses, this area is not under-utilized as identified by IDC on behalf of MLR.

The overlap of the land utilization types of planned SSCF, NC and the location of boreholes in these area are the major potential conflict might pose threat to biodiversity. This research also visualizes the problem and documented the spatial information dimension could be used by decision makers (policy) and land use planners for future development plans and wildlife management.

HWC conflicts are common problem in Caprivi because wildlife and agriculture co-exist in one landscape. Based on the government policies that provide economic and other benefits to rural communities to adopt wildlife as (a viable form of) land use option the increase of wildlife leading to an increase of HWC. However conflicts over damage caused by elephant cannot be easily controlled. The existing recent spatial wildlife data could not be obtained from the MET. The availability of geographical data could have added value in the analysis and prediction of WHC.

Because of the incompatibility of the Conservancy resources management with the projected SSCF, legal issues on resource user rights that may be affected by the SSCF development must be should have considered within the framework of land use planning. The establishment of SSCF requires a multidisciplinary stakeholders approach to ensure the sustainable use of natural resources.

The PGIS approach was successful incorporating local knowledge into the GIS. The database that was produced is now available for use by decision makers, land use planners and community itself to support and guide local land management efforts.

8.2 Recommendation

Even though that the first and second phases of the SSCF implementation has been done already the researcher recommends that the procedure for this area should be resumed this time involving proper consultation of all stakeholders and that the Ministry of Justice should be consulted for legal advice.

A spatial database centre for institutions dealing with natural resource management should be established either within the ministry's departments or within line ministries for storage of spatial data collection from the field by many parties to enable these data to be shared by other parties to be used in studies of this nature and thus avoid situations of planning of incompatible land uses in the future.

Further studies and consultations concerning social impacts, impacts on wildlife in NP and quality and quantity of water should be carried out. An environmental impact assessment (EIA) must be undertaken in line with the provision of Environmental Assessment Policy to avoid or minimising negative impacts by mitigation measures.

I hope that the information and ideas generated by this study serve as baseline for SSCF and land use planning that is better informed by local knowledge on natural resource management and available geo-information.

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10. Appendixes

Appendix 1: Village Households questionnaire **Interview data sheet No**

VILLAGE HOUSEHOLD SURVEY 2008

I am a (Natural Resource Management) Student at the International Institute for Geo-information Science and Earth Observation (ITC) in the Netherlands. Aim conducting a research on *"Small-Scale Commercial Farms and Sobbe Conservancy"* Kindly answer the following question in the spaces provided. Your personal particulars will be treated strictly confidential.

Interviewer: ..... Respondent's name: .....
Date: ..... Time of interview.....
Village Name……
Sex: Male ☐ Female ☐
Which Traditional Authority does the area belong? ……
For how long have you been residing here.....? (= year in which respondent settled in the village)
Family members:
Adults ☐ Female: ☐ Male: ☐ Children: Boys: ☐ Girls: ☐

Education level:
No Formal education: ☐ Basic education: ☐ Secondary: ☐
Other education (specify)? Tertiary ☐

B: Livelihood sources

1. What are you doing for a living? *(Multiple sources possible)*
Arable (crop) farming ☐
Livestock farming ☐
Forestry ☐
Both livestock and crop ☐
2. Are you employed, in which organisation? Yes ☐ or No ☐
In which organisation: .....
3. Do you have own enterprise? Yes ☐ or No ☐
4. What type of business? Craft market ☐ Cuca shop ☐ other ☐

5. Which activity (source of livelihood) generate more income

a) Farming ☐ b) Forestry ☐ c) Fishing ☐ d) Tourism ☐

e) Hunting ☐ f) Poultry ☐ g) Off-farm income ☐

6. What challenges do you face in your daily livelihood?

……

……

C: Resource-use and constraints

1. Livestock farming

1.1 Do you have any livestock? Yes ☐ no ☐ if yes, how many? Mention specific number.....number in heads.

1.2 Where do your animals graze? Communal grazing areas ☐ private grazing ☐ Community forest areas ☐

1.3 Have you noticed any stealing of cattle or poaching in your village/area?

1 = Yes or ☐ 0 = No ☐

If yes, what do you think should be done? .....

1.4 What kind of damages caused by animals that you experience?

……

1.5 When did last happen? Every year ☐ last year ☐

1.6 Do you have any livestock killed by wild animals? If so, how many …….

2. Crop farming

2.1 Do you have any crop land? Yes ☐ or No ☐

2.2 Where are your crop field? Communal grazing areas ☐ private grazing ☐ Community forest areas ☐

2.3 In what season does wildlife come to your plot? *(Please tick)*

Summer ☐ winter ☐ harvesting ☐

2.4 How often does it happen? Daily ☐ weekly ☐ monthly ☐ yearly ☐

2.5 What time do damages occur? Late morning ☐ early morning ☐ afternoon ☐ late afternoon ☐ evening or night ☐

2.6 Which animals do you think causes the most damage to your crop field? (Please mention)

.....

2.7 What do you do to prevent the damage caused by wildlife?

.....

2.8 Do you have a solution to the problem? Yes ☐ or No ☐

If yes, what is the solution? .....…….

2.9 Where do you get help to minimise/tackle these problems? (Please tick) Government ☐

NGO ☐ Local authority/Khuta ☐ Conservancy ☐

2.10. What action does the concerned organisation take?

.....……

……

3. Forest and fuel wood collection (use)

3.1 Are you registered as a conservancy member? Yes ☐ or No ☐
If no, explain why not? .....……..
3.2 Do you use any forest products? Yes ☐ or No ☐
Mention types of forest products that you collect from the forest? *(Please tick)*

01Fuel wood collection ☐

02 Thatch grass ☐

03 Carving ☐

04 Timbers ☐

05 Herbs ☐

06 All of them ☐

3.2 Do you use the forest products for subsistence or for commercial purposes?
.....……
3.3 Where are you collecting fuel woods?
……
……
3.4 How do you use fuel resources collectively or individually?
.....
3.5 Where are you hunting?
.....……
……

4. Stakeholders perceptions, view and attitudes

4.1 Do you get any benefits from the conservancies? Yes ☐ or No ☐
If yes, what benefit do you get from wildlife?
.....……
……
4.2 How are benefit distributed to the conservancy members?
.....……
……
4.3 What would you think if the wildlife were removed in the area?

01 No problem	02 less meat for the family	03 less cash from hunting income/licenses

☐ ☐

4.4 Do you have any disadvantages from conservancies? Yes or No
If yes, explain?
……
……
4.5 Should conservancy members be allowed to hunt as much as they need in the area?
.....……
……...
4.6 Do you experience any land use conflict in the area? Yes ☐ or No ☐
If yes, what are conflicts about
Explain).....
.....
4.7 Are you aware of the demarcation of Small-Scale Commercial Farms in the areas?
Yes ☐ or No ☐
If yes, were you involved or consulted in decision making about the Small-scale farms?
……
……
4.9 Do you agree with the demarcation of Small-Scale Commercial Farms proposed by the government in your area? *(Please tick)*

Strongly like = 5	Like = 4	Neither = 3	Dislike = 2	Strongly dislike = 1

4.10 Do you think you will benefit from the Small-Scale Commercial Farms developed by the government in your area?
1 = Yes ☐ or No ☐
If yes, in which way will you benefit?
.....……
……
If no, why do you think you will not benefit?
.....……
……
4.11 In your opinion what would you expect to happen with resource use rights if the Small-Scale Commercial farms are being resettled and become operational?
……
……
4.12 What if the whole area becomes Small-Scale Commercial Farms or Conservancies what is your suggestion*?*
.....
.....
..

Appendix 2: Checklist for Management level at MLR & MET Interview guide Questions at Regional level

1. What kind of spatial information was used for the establishment of Small-scale commercial farms and Sobbe conservancy?
2. Did your ministry or institutions considered other relevant development plans during the planning process or did you used own sector planning? Yes or no, if yes, which plans were available? If not, what information was omitted and why?

3. Are you aware of any laws or regulations that regulate land use? Yes or no, if yes, which one are you aware of? Please mention

4. Which (land use) regulations do you follow?

5. Which other land use regulations were you aware of, or did you apply as well?

6. What according to you do these regulations regulate with regard to land use, and what not?

7. How did Ministry of Lands and Resettlement and Ministry of Environment and Tourism inform the line ministries with regard to the planning process of the Small-Scale Commercial Farms and on the establishment of conservancy in same area? i) Small-Scale Commercial Farms ii) Sobbe conservancy

8. What type of data was shared during the initial establishment of the two projects in the same area?

9. In what format was the required data provided? *(Please tick)*Paper map ☐ CD/storage device ☐ Electronic ☐ Report/map ☐

10. Did you make use of maps? If so, which map do you have copy?

11. Do you think it was important to use a map for the planning process of the two projects? Yes or No, if yes why it is important? If no, why was it not relevant to use the map? (Explain)

12. Which kinds of information does a map provide for you?

13. If you use maps do you know where these maps were made or do you think they are accurate and relevant?

14. Whom did you contact and at which office did you have a problem to acquired information from other line ministries?

15. What are the procedures or step taken by your ministry to obtain the required information from other line ministries?

16. What difficulties did you encounter in obtaining information from other organisations?

17. In your own opinion what do you think are the possible causes of difficulties in data sharing?

18. What are other problems that your ministry or institutions observed in spatial data sharing?

Appendix 3: Checklist for Caprivi Communal Land Board members

1. Which institutions are you belong to? Please tick
   Government ☐ Traditional Authority☐ Conservancies ☐Farmers Union
   Private Sector ☐
2. Which stakeholders were involved in the identification and assessment of Small-Scale Commercial Farms? Mentioned involved parties
3. During the planning process of the two projects was local indigenous knowledge considered? Please explain
4. How was the local community informed concerning the land proposed by government for the development of Small-Scale Commercial Farms and the Conservancy in Linyanti and Sibbinda constituencies? i) Small-scale commercial farms ii) Sobbe conservancy
5. Was the information well communicated to all stakeholders? Yes ☐ or No ☐

If yes how was it communicated? (Please specify) If not what was the problem? (Please explain)

6. What are procedures or steps taken for the two projects to co-exist in the same area?
7. In your opinion are the communities satisfied with the co-existence of the Small-scale commercial farms and Sobbe conservancy in the same area?

Yes or ☐ No ☐

If not, why are they not happy? (Please explain)

8. Did you experienced problems with regard to the initiation of the two projects in the same area? Yes ☐or No ☐

If yes, what is the problem all about? *(Explain)*

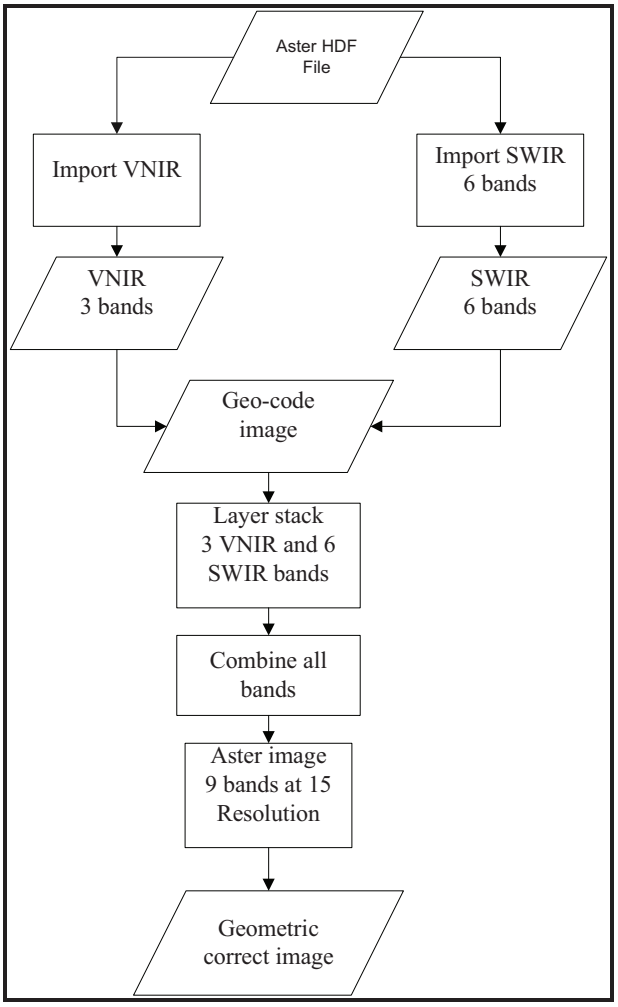
9. What do you think to solve this problem of land use overlap?

Appendix 4: List of Interviewees

No.	Name of respondent	Date	Time of interview	Duration	Location	Organisation/T.A	Qualification
1	Mr Versius D. Pikinini	01/10/208	14H00 a.m	30 minutes	Regional Office, Katima mulilo	Mashi representative	Formal
2	Mr E.S Mataba	12/10/2008	08H00 a.m	35 minutes	Village	Chairperson of CLB	Formal
3	Ms Clara Muswell	01/10/2008	15H00 a.m	30 minutes	Regional Office, Katima mulilo	Women engage in farming	Informal
4	Mr Sylvester Mayakupe	02/10/2008	08H00 a.m	30 minutes	Regional Office, Katima mulilo	Board Secretary, Ministry of Lands	Formal
5	Mr Siloka T.	11/10/2008	14H00 a.m	35 minutes	Regional Office, Katima mulilo	Ministry of Environment	Formal
6	Mr Elvis Mwilima	10/10/2008	08H00 a.m	35 minutes	Homestead	Ministry of Environment	Formal
7	Mr Muvangua M	20/10/2008	18H00 p.m	40 minutes	Restaurant	Former Deputy Director-MLR	Formal
8	Ms Mary Silewa	06/10/2008	14H00 a.m	35 minutes	Sintanta village	Sobbe Conservancy	Formal
9	Ms M. Mutihe	06/10/2008	14H45 a.m	34 minutes	Sintanta village	Sobbe Conservancy	Informal
10	Mr R. Luoke	06/10/2008	15H20 a.m	45 minutes	Sintanta village	Sobbe Conservancy	Formal
11	Mr Charles Matengu	07/10/2008	13H00 a.m	45 minutes	Sintanta village	Sobbe Conservancy	Informal
12	Mr Moven Litike	06/10/2008	10H00 a.m	36 minutes	Sintanta village	Sobbe Conservancy	Formal
13	Mr Foster Ntaba	07/10/2008	10H45 a.m	30 minutes	Masida village	Sobbe Conservancy	Formal
14	Mr Rakias Kabula	07/10/2008	11H15 a.m	35 minutes	Masida village	Sobbe Conservancy	Formal
15	Ms Beritah Ndungati	07/10/2008	12H20 a.m	40 minutes	Masida village	Sobbe Conservancy	Formal
16	Ms Malesu Magaret	07/10/2008	14H20 a.m	33 minutes	Masida village	Sobbe Conservancy	Informal
17	Mr Fransis Keloso	06/10/2008	11H00 a.m	30 minutes	Masida village	Sobbe Conservancy	Informal
18	Ms A. Simukwenga	06/10/2008	14H30 a.m	34 minutes	Kansoko village	Sobbe Conservancy	Informal
19	Mr Lister Mwabela	06/10/2008	14H21 a.m	34 minutes	Kansoko village	Sobbe Conservancy	Formal
20	Mpangu Pheeden	06/10/2008	15H00 a.m	45 minutes	Kansoko village	Sobbe Conservancy	Formal
21	Ms loveness Siluvangua	06/10/2008	15H20 a.m	30 minutes	Kansoko village	Sobbe Conservancy	Formal
22	Mr Bonbright Kufwa	06/10/2008	16H15 a.m	35 minutes	Kansoko village	Sobbe Conservancy	Formal
23	Mr F.M. Luseso	08/10/2008	10H00 a.m	35 minutes	Kaenda village	Local farmers	Formal
24	Mr A.N. Mungulike	08/10/2008	10H35 a.m	34 minutes	Kaenda village	Local farmers	Formal
25	Mr B.K. Mulonda	08/10/2008	11H00 a.m	40 minutes	Kaenda village	Local farmers	Formal
26	Mr Muyeka Mujela	08/10/2008	11H36 a.m	34 minutes	Kaenda village	Local farmers	Informal
27	Mr Michael Kaenda	08/10/2008	12H00 a.m	30 minutes	Kaenda village	Local farmers	Formal
28	Mr Laurance Buiswalelo	08/10/2008	14H10 a.m	45 minutes	Linyanti area	Local farmers	Formal
29	Mr G.C. Mbango	10/10/2008	11H30 a.m	33 minutes	Sikubi area	Local farmers	Informal
30	Mr J.S. Masake	08/10/2008	14H30 a.m	45 minutes	Sikubi area	Local farmers	Formal
31	Mr Charles Kache	08/10/2008	16H00 a.m	35 minutes	Sikubi area	Local farmers	Formal
32	Mr C.N. Tabusenge	10/10/2008	14H00 a.m	37 minutes	Sikubi area	Local farmers	Formal

Appendix 5: Secondary data collected

Document type	Content of the document	Source
Communal Land Reform Act No. 5 of 2002	Act document	MLR
Forestry Act No12 of 2001	Act document	MAWF
Nature Conservation Amendment Act No. 5 of 1996	Act document	MET
Namibia's communal conservancies	A review of progress and challenges in 2007	MET
National Land Policy, 1998	Policy document	MLR
Civic Organisations Partnership Policy, 2005	Policy document	National Planning Commission
Namibia Constitution	Constitution	Office of the Prime Minister
Integrated Land Use Plan for Caprivi, 31 July 2001	Final Report	MLR
Assessment of Development of Communal Areas in the Caprivi Region, August 2002	IDC Report	MLR
National Land Use Planning Policy, 12 November 2002	Final Report	MLR
Guide to the Communal Land Reform Act	Land, Environment and Development Project	MLR

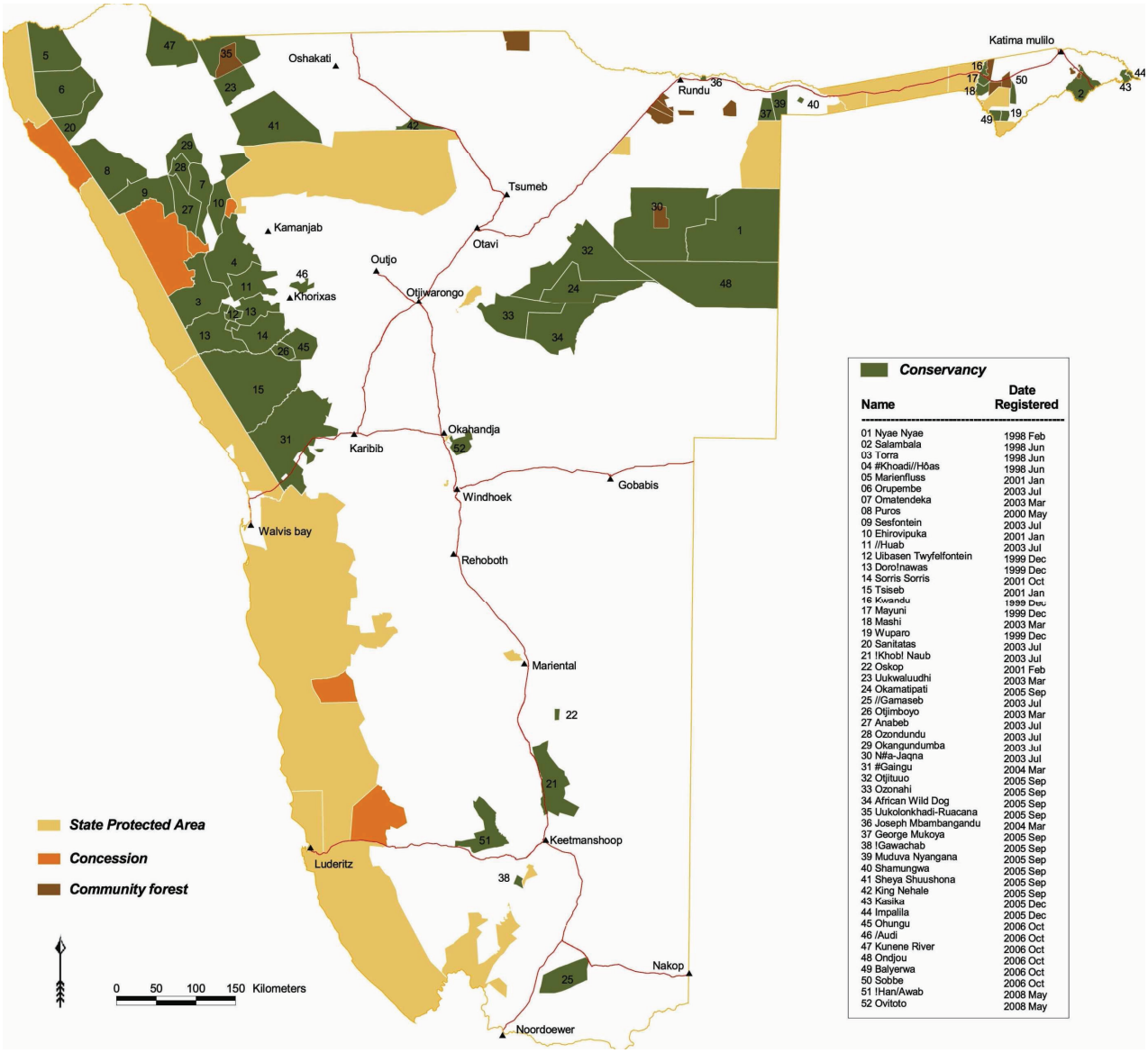


Appendix 6: Flow chart for geo-referencing of Aster image

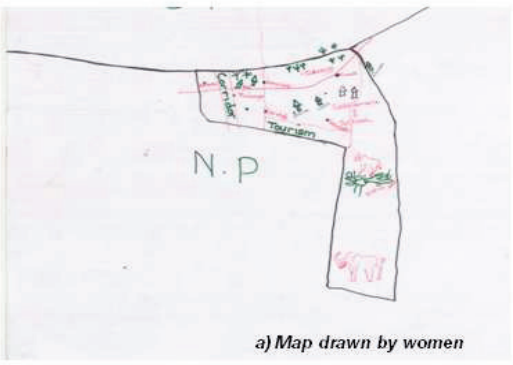
Appendix 7: Observational points

Villages and resource use points	
X	**Y**
17.84929	23.7238
17.88858	23.73364
17.91988	23.73364
17.95094	23.71929
17.91769	23.61427
17.91043	23.60031
17.83245	23.71874
17.86373	23.69661
17.85425	23.70358
Cattle post	
X	**Y**
17.91477	23.86722
17.91142	23.92131
17.84643	23.9258
17.86193	23.98237
Boreholes drilled for SSCF Points	
X	Y
18.16459	23.74341
18.16324	23.74554
18.09971	23.79245
18.06386	23.79242
18.02544	23.79242
18.00035	23.79242

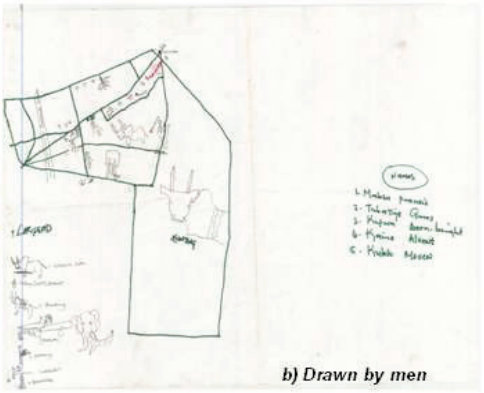
Appendix 8: Map of Namibia showing the locations and Registered Communal conservancies, Source: MET July 2007



Appendix 9: Sketch maps and photos collected during field work



a) Map drawn by women



b) Drawn by men

c) Drawn by local farmers outside the conservancy area