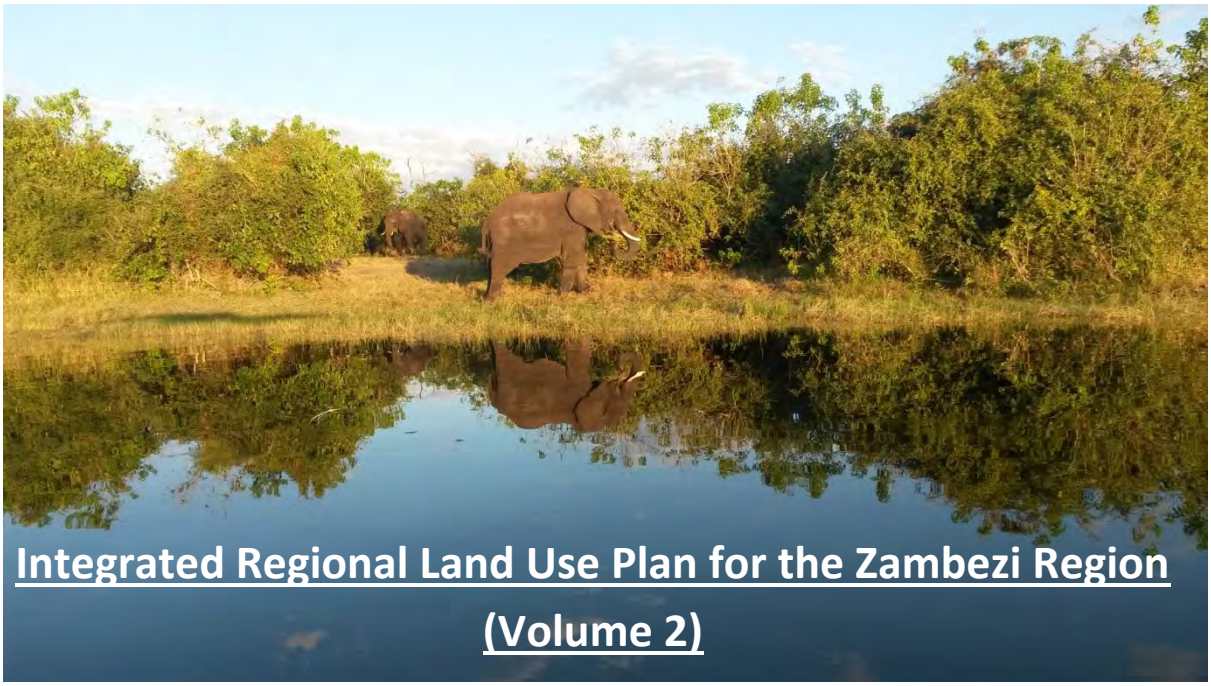
MINISTRY OF LANDS AND RESETTLEMENT



Integrated Regional Land Use Plan for the Zambezi Region (Volume 2)

Prepared by:

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Africa Planning Forum

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List of Abbreviations and Acronyms

APF	Africa Planning Forum
CBT	Commodity-based Trade
CBNRM	Community Based Natural Resource Management
CCLSI	Cabinet Committee on Lands and Social Issues
DVS	Directorate of Veterinary Services
EIA	Environmental Impact Assessment
EPL	Exclusive Prospecting Licence
ESKOM	Electricity Supply Commission of South Africa
EU	European Union
ECFSP	Emerging Commercial Farmers Support Programme
FAO	Food and Agriculture Organisation of the United Nations
FGD	Focus Group Discussions
FMD	Foot and Mouth Disease
FPA	Fish Protection Area
GIS	Geographical Information Systems
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HWC	Human Wildlife Conflict
IRDNC	Integrated Rural Development and Nature Conservation
IRLUP	Integrated Regional Land Use Plan
KAZA TFCA	Kavango Zambezi Trans-Frontier Conservation Area
KfW	Kreditanstalt für Wiederaufbau
LED	Local Economic Development
MAWF	Ministry of Agriculture, Water and Forestry
MCA-N	Millennium Challenge Account – Namibia
MET	Ministry of Environment and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MLR	Ministry of Lands and Resettlement
MME	Ministry of Mines and Energy
MOHSS	Ministry of Health and Social Services
MUA	Multiple Use Area
MWTC	Ministry of Works, Transport and Communication
NamPower	Namibia Power Corporation
NamWater	Namibia Water Corporation LTD

NDP4	National Development Plan
NEWFIU	Namibia Early Warning and Food Information Unit
NGOs	Non-government Organisations
NORED	Northern Namibia Regional Electricity Distributor
NSA	Namibia Statistics Agency
NTA	Namibia Training Authority
PCLD	Programme for Communal Land Development
PPO	Producer and Processor Organisation
RGP	Regional Growth Point
SADF	South African Defence Force
SAIEA	Southern African Institute for Environmental Assessments
SCIRLUP	Steering Committee for Integrated Land Use Planning
SEA	Strategic Environmental Assessment
SPC	Stubenrauch Planning Consultants
SSCF	Small Scale Commercial Farms
TA	Traditional Authorities
TCLSI	Technical Committee on Lands and Social Issues
UNAM	University of Namibia
VTC	Vocational Training Centre
WLC	Wild-life Corridor
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Corporation

EXECUTIVE SUMMARY

To be completed upon acceptance of IRLUP

1. INTRODUCTION TO INTEGRATED REGIONAL LAND USE PLANNING

Land use planning is defined by the Food and Agricultural Organisation (FAO) as the 'systematic assessment of land and water potential, alternatives for land use and economic and social conditions in order to select and adopt the best land use options. Its purpose is to select and put into practice those land uses that will best meet the needs of the people while safeguarding resources for the future' (FAO, 2013). Unfortunately, there is often great confusion by the general misunderstanding of land use planning.

Land use planning should not be confused with an implementation, development or policy plan. Essentially, after a land use plan has been compiled and approved, the respective authorities operating within the area are to utilise the land use plan to evaluate any development applications submitted to the institution or to advise developers/ investors where such a development should or can take place. Additionally authorities can utilise the land-use plan to strategise for their projects and to put forth action plans on how to achieve the best suitable land use. A land-use plan reflects the existing land use situation within a region and proposes certain recommendations for land use change for the future in order to optimally utilise the land.

The Zambezi Integrated Regional Land Use Plan (IRLUP) was commissioned by the Ministry of Lands and Resettlement (MLR) in March 2014 as part of its mandate to undertake land-use planning for the entire country. One of the main objectives of IRLUP, as set out by the MLR, is to correct previous deficiencies in land-use planning in Namibia and against this background, MLR (as custodian of land and land related issues) commissioned the Modelling Integrated Regional Land Use Planning Process. The new approach was first piloted in the two southern regions of Karas and Hardap. These processes were tested, refined and put into practice with the third land use plan for the Kavango Region. The Zambezi IRLUP is based on the new approach of bottom-up planning involving local stakeholders in the planning and creation of a Geographical Information System (GIS) database.

The Zambezi IRLUP consists of five components:

- Zambezi Integrated Regional Land Use Plan Baseline report (Volume 1)
- Zambezi Integrated Regional Land Use Plan report (Volume 2)
- Participatory Land Use Planning reports providing community inputs into the IRLUP
- Geographical Information System (GIS) database
- Strategic environmental assessment report on the Zambezi IRLUP

Stubenrauch Planning Consultants (SPC) together with Ashby Associates cc and Africa Planning Forum (APF) were appointed by the Ministry of Lands and Resettlement to undertake and facilitate the Integrated Regional Land Use Planning project for the Zambezi Region.

1.1 STRUCTURE OF THE ZAMBEZI INTEGRATED REGIONAL LAND USE PLAN

The Zambezi IRLUP is split into two volumes. The preparation of Volume 1 of the ZamIRLUP project is a combined effort between SPC and Southern Africa Institute for Environmental Assessment. Volume 1 focuses on providing baseline information related to the Zambezi Region.

Volume 2 is based on the findings from the participatory land use planning workshops, the recommendations from participants and experts, and the analysis of these recommendations into land use proposals and recommendations. The volume is structured as follows:

Volume 2:

Chapter 1: Introduction to IRLUP and the process and inputs into the IRLUP

Chapter 2: Strategic principles that influence the IRLUP, including Vision 2030, NDP 4 and objectives and visions identified by participants

Chapter 3: Challenges and opportunities of the region as identified by stakeholders

Chapter 4: Land-use proposals and recommendations

Chapter 5: Conclusion

Chapter 6: Executive Summary of the SEA

Chapter 7: Monitoring and implementation

Chapter 8: Bibliography

Annexure: Issues and responses section.

1.2 LAND USE PLANNING PROCESS

Volume 2 of the ZamIRLUP is the identification of potentials, the land use recommendations by stakeholders and the analysis of these recommendations to formulate final land-use proposals.

The IRLUP approach followed by MLR is two-fold: community and stakeholder involvement into the land-use planning and secondly, technical analysis of the potentials to formulate the final land-use proposals. As with any planning it is key to have the involvement of the local communities and stakeholders in such a plan, but it is equally important to assess the technical constraints and potentials to ensure that recommendations are:

- feasible
- practical
- realistic
- logical

Essentially a land-use plan should discuss the following:

- What needs to happen and where to protect valuable resources?
- What needs to happen to change underutilised areas?
- Where to direct growth in a sustainable manner?

A land-use plan is to provide guidance to policy makers, decision makers, planners and investors on:

- developers wanting to check whether their project will be supported;
- interested parties who wish to comment on development applications;
- decision makers such as traditional authorities (TA's), Communal Land Board (CLB), development planners who wish to locate community infrastructure such as clinics, schools, public infrastructure or projects.

1.2.1 COMMUNITY AND STAKEHOLDER PARTICIPATION

The regional planning workshop held in Katima Mulilo with major stakeholders on 24 and 25 April 2014 was to:

- Mark the start of the Zambezi IRLUP process through a kick-off workshop in the region with major stakeholders, and to introduce the IRLUP concept, process, tasks, work plan and procedures;
- To identify existing and future development projects through participatory mapping;
- To identify visions and objectives for the various land uses;
- To undertake a stakeholder analysis to identify the key organisations that should be involved in the land-use planning process;
- a strengths, weaknesses, opportunities, threats (SWOT) analysis by stakeholders of the main land use activities in the region.

A separate workshop report is available for further detailed perusal on the outcomes of the workshop (SPC, APF, Ashby, 2014 -g)

A second round of community workshops were held during 8 to 23 May 2014 in the regional constituencies with local communities. The purpose of these participatory local level land-use planning workshops were to:

- identify potential natural resources;
- identify existing land use conflicts;
- identify advantages and disadvantages of these land uses that are conflicting;
- rank the various conflicting land uses;
- identify land use recommendations and solutions to land-use conflicts.

Separate workshop reports are available for detailed information from stakeholders during these sessions.

A third consultative process, in the form of a discussion, (focus group) was held between July and August 2014 with national stakeholders in Windhoek. The aim of these stakeholders' discussions was for stakeholders to discuss what they know about the region in terms of its potentials, existing and planned projects and proposals towards land uses within the region that will promote sustainability.

Table 1 provides an overview of the community participation workshops and focus group discussions held with stakeholders from the Zambezi Region as well as national stakeholders.

Table 1: List of stakeholder participation workshops and discussions

Workshop	**Date and Venue of workshop**	**Objective of workshop**
Official opening and kick-off of project	24 April 2014	Official opening of the Zambezi IRLUP project and introduction of concept to stakeholders
Regional revealing workshop	24 and 25 April 2014	Stakeholders tasked to identify visions for each land use and map existing and planned projects
Local level planning workshops	8 – 24 May 2014	Identify potentials for the region; identify conflicting land uses or critical underutilised land uses; rank critical issues/conflicts; give recommendations on future land use

Workshop	Date and Venue of workshop	Objective of workshop
Stakeholder Focus Group Discussions	29 – 31 July 2014	Focus group discussions with experts in the field of agriculture; livestock farming; conservation, tourism; water; irrigation; NamPower; urban and infrastructure
Feedback regional workshop	6 November 2014	Presentation of main findings and recommendations of the ZIRLUP
Comment period	Until 15 December 2014	Verification of findings
Feedback and closure workshop	February 2015	Regional verification of final report
Final Closure workshop	April 2015	

In addition to the stakeholder participation, a number of reports, proposals and studies were perused for background information on the Zambezi Region. These are listed as references in the bibliography of this report.

1.2.2 GEOGRAPHICAL INFORMATION SYSTEM (GIS)

The use of GIS forms a vital part of a land-use planner's analysis. GIS data is only useful if the data is updated regularly. In Namibia, much of the GIS data comes from the Atlas of Namibia done by Mendelsohn *et al* which means much of the data has not been updated since the Atlas was completed in 2002.

With analysis on topics such as the wildlife corridors, the information provided by stakeholders (community and national) produced a better understanding of where these corridors are in relation to villages, homesteads, schools and clinics. By combining local knowledge with GIS information, it was possible to identify wildlife corridors that have not been compromised by development and to propose buffer areas around these corridors for no-development zones. By utilising the GIS, it was also possible to overlay the various projects and land uses in order to identify potentially conflicting areas.

1.2.3 STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) INPUTS

The SEA provides a big picture overview with recommendations on how to avoid negative impacts of current and future developments in the Zambezi Region, as well as how to enhance synergies between sectors and projects. The SEA also proposes ways that various

stakeholders and decision-makers can collaborate to achieve a common approach towards sustainable development.

The land use proposals of the IRLUP are assessed by the SEA using three main criteria:

- Do the plans maintain environmental systems and minimise harm to the natural environment?
- Do the plans achieve long-term social upliftment that carries national (not just individual) benefits?
- Are the plans economically viable?

To compile a land-use plan that will be useful to current and future decision-makers, the proposals for each sector need to be realistic and practical. The SEA process purposely sought opinions from relatively senior decision-makers to achieve this aim.

The inputs from the SEA are included in the land-use plan and used to highlight issues of concern. Throughout the IRLUP process the SEA team was closely involved in all the meetings and workshops, thereby also ensuring a parallel and collaborative process between the two approaches.

2 STRATEGIC PRINCIPLES FOR THE ZAMBEZI REGION

This chapter will highlight the key inputs from the participatory planning workshops and focus group discussions held with stakeholders at both regional and national level. The inputs obtained were on the existing land uses, the vision and objectives for growth and possible solutions to conflicting land uses in the region. However, before proceeding into the regional perspective for the Zambezi Region, it is necessary to remind ourselves of the national strategic principles of Vision 2030 and NDP 4. The following key principles of Vision 2030 and NDP4 are relevant to the main sectors that will be highlighted in the next sections.

2.1 NATIONAL TARGETS FOR MAIN SECTORS: VISION 2030 AND NDP 4

The concept of sustainable development is the cornerstone on which Vision 2030 was based (Office of the President, 2004). For the purpose of this land-use plan the next section will focus primarily on the main contributors to the economy of the Zambezi Region; Agriculture, Forestry, Tourism, Conservation, Fishing and Infrastructure.

Vision 2030 - where we want to be by 2030

Land and Agriculture Production

- Equitable access to land
- Declining rates of land degradation
- Appropriate tenure over natural resources
- Unpolluted soils and agricultural water run-off
- Optimal land-use and livelihood options
- Improved economic development options

Forestry

- Equitable access to land by all
- Declining rates of deforestation
- Rehabilitated woodlands and riparian forests
- High biodiversity, healthy wetlands and soils
- Appropriate tenure of all forest resources
- Optimal land-use and livelihood options

Wildlife and Tourism and biodiversity

- Extended and well managed parks and nature reserves, with well maintained camps and excellent services.
- The protected area network should include biodiversity hotspots and transboundary areas.
- CBNRM extended into all viable rural areas to improve livelihoods.
- Protection of Namibia's unique tourism product, focusing on low impact, high quality nature-centred tourism
- Tourism and wildlife increasingly contributing to economic growth for sustainable development of Namibia.
- Diminished rates of biodiversity loss.
- Equitable access to and appropriate tenure over all natural resources through CBNRM initiatives.
- Strong partnerships and significant sharing of skills and opportunities between GRN, private sector and conservancy stakeholders.
- Vibrant, productive rural areas
- Rehabilitated and productive riparian forests, woodland and savannah biomes

Fishing

- Intensive commercial freshwater aquaculture
- Sustainable yields reached and managed effectively to prevent overexploitation

Non-Renewable Resources

- Mining well planned, resulting in minimal, if any, impacts on human health and the environment
- All mines to be fully rehabilitated after closure
- Investments resulting from mining are used to develop other sustainable industries and human capital for long term national development
- Strong small-scale mining sector

Urban and Rural Environment

- Basic social services and infrastructure facilities available in both urban and rural areas
- Healthy, self-sufficient rural populations and reduced rates of rural-to-urban migration
- Well planned, well managed clean, safe and aesthetically pleasing urban areas
- Recreation facilities (parks, monuments, museums) available in cities
- Equitable access to land and essential services
- Rural population has diversified economy and healthy living environmental prevails

Based on Vision 2030 for Namibia, the National Development Plan was drawn up. NDP 4 is currently in operation and has three goals; high and sustained economic growth, creation of employment opportunities and increased income equality. Based on these three overarching goals the following economic sectors will receive priority during the NDP 4 period:

Logistics

The desired outcome is for Namibia to have laid the foundation for establishing itself as a regional leader in logistics and distribution. (Republic of Namibia, 2012). *In terms of logistics the Zambezi Region is well located for trade with SADC countries as the Trans-Caprivi Highway, one of the major transport corridors, runs through the region.*

Tourism

The target of Namibia is to have made significant strides towards becoming a leading tourist destination on the continent for travellers worldwide by the end of 2017. Namibia's ranking is expected to increase on the World Economic Forum Travel and Tourism Competiveness Index from 3rd position to 1st position in Sub-Saharan Africa. (Republic of Namibia, 2012). *Zambezi Region has immense tourism potential and can contribute towards this vision.*

Manufacturing

The target is that the contribution of general manufacturing in constant dollar terms has increased by 50% over the baseline figure of the 2010 National Accounts, and significant strides have been made in identifying and developing upstream and down-stream economic activities in the mineral sector (Republic of Namibia, 2012). *This vision is something that the Zambezi Region can focus its efforts on, as currently there is no manufacturing in the region.*

Agriculture

Agriculture will continue to be a priority as this sector remains the backbone of the Namibian economy and livelihood creation. The outcome is for the agricultural production to increase and result in agriculture experiencing average real growth of 4% per annum up to 2017 and certain strategies are to be deployed to achieve this outcome, such as:

- Continued promotion of the Green Scheme
- Initiatives to increase the land's carrying capacity for livestock
- Establishment of agricultural fresh produce markets
- Establishment of other agricultural infrastructures such as silos and research stations.

The Zambezi Region is in an ideal position to contribute towards this goal through initiatives such as the Communal Land Development Project and irrigation schemes.

2.2 VISIONS AND CORE OBJECTIVES IDENTIFIED FOR THE REGION

During stakeholder meetings with regional and local stakeholders, a number of core visions and objectives for each of the main land use sectors were identified. These targets are further described in the workshop report for the Kick-off and Revealing Workshop (SPC, APF and Ashby Associates, 2014 -a). The next section briefly highlights some of the main points:

Settlements (Urban and Rural)

Vision: Improving and enhancing the livelihoods of the rural and urban people by 2025

Objectives:

- Urbanisation of growth points: Bukalo, Chinchimani, Kongola, Lusese, Ngoma, Sangwali and Sibbinda;
- Minimise rural to urban migration;
- Improve allocation of development funds for rural development;
- Development of infrastructure and services within settlements;
- Ensure land tenure security.

Infrastructure

Vision: Improved infrastructure such as roads, water supply, energy, schools and agro-industries by 2030

Objectives:

- Construction of fish processing plant in 2013 by NGOs and Government;
- Use of solar energy by almost 90% of communities within Zambezi Region by 2018
- Establishment of an inland dry-port by 2017;
- Trans-Zambezi corridor fully developed by 2020;
- Town boundaries extended by 2020 to make provision for urban growth;
- Development of an agricultural hub in Zambezi Region by 2020;
- Free entry/ access to four countries (Zimbabwe; Namibia, Botswana, Zambia) by 2020;
- Provision of industrial land to accommodate industrial activities;
- Investigate and develop measures to mitigate floods.

Livestock farming

Vision: To be the leading producer of marketable meat and meat products in the Northern Communal Areas by 2025

Objectives:

- Reduce frequency of Foot and Mouth Disease outbreaks by 90% by 2016;
- To introduce improved rangeland management practices among 60% of communal farmers by 2020;
- To improve the quality of livestock through training of farmers in breeding and selection;
- Promote commercialisation of the livestock sector in the region through providing infrastructure and training support;
- To ensure access to markets through establishment of appropriate animal handling and marketing facilities
- To conduct at least two research initiatives in livestock rangeland and related fields by 2025.

Irrigation and dry-land crop farming

Vision: Food security and economic sustainability for local communities by year 2020

Objectives:

- Environmental conscious food production in place by 2020;
- Training and capacity building (5,500 farmers) by 2017;
- To enhance dry land cropping yields through using right cultivars, manure, fertiliser and conservation tillage;
- Create 16 dryland cropping and two irrigation projects in each constituency by 2020;
- Water conservation for irrigation purposes;
- Expansion of crop diversity and promotion;
- Support and supply from government of seeds, equipment, subsidies and markets;
- Improved farming systems and climate resilient crops;
- Zonation of land for crop production.

Fishing

Vision: Zambezi Regional Fisheries operate at an optimal, sustainable level through community- based management systems by 2020

Objectives:

- Network of Fish protection Areas to be established and elimination of destructive fish gear and methods;
- Building capacity at local and regional level for people to understand what is meant by sustainable fisheries;
- Harmonised fishery legislation with neighbouring countries;
- Identification and establishment of 60 viable fish ranching sites by 2020;
- Effective communication channels established and maintained with all stakeholders by 2015;
- Construction by MFMR of one modern fish farm plot (Wenela site) by 2017;
- Improved post-harvest storage and marketing by 2018 .

Conservation

Vision: To sustainably manage and utilise natural resources in the Zambezi Region for the benefit of rural communities, both present and future generation, and to maximise community benefits by 2025.

Objectives:

- Improve the relationship between wildlife and residents of the Zambezi Region, through conflict mitigation strategies ;
- Provide benefits to residents through sustainable utilisation of natural resources;
- Enhance food security and rural development;
- Separate land uses through zonation.

Tourism

Vision: Zambezi Region is to be one of the major tourism hubs in Namibia and tourism is to be one the major contributors to income of the people for the region by 2025.

Objectives:

- Tourist to stay longer than 2 days in the region and the number of tourist to increase per year by 30%;
- Tourism strategy for Zambezi Region to be developed, including a marketing concept;
- Diversify tourism activities through community tourism, cultural/historical, and eco-tourism;
- All tourism enterprises in the region to have standards as prescribed by the Namibian Tourism Board (NTB).

Throughout the IRLUP process it became clear that communities in the Zambezi Region are still very reliant on subsistence livestock and crop farming. Together with this, the benefits arising from diversification into tourism and conservation, as well as fishing, provides a broader economy for rural communities.

In order to fully understand the region, it is important to review the challenges and potentials in terms of the four main land-use activities in the region. This will be discussed in section 3.

2.3 NATIONAL INPUTS INTO THE IRLUP

Various sector based Focus Group Discussions (FGDs) were held with national stakeholders in Windhoek. The aim of these FGDs were to establish, from the national perspective and from expert views, what the potentials for each of the land uses are, as well as the challenges each of the land uses face and what recommendations should be made for the region.

3 CHALLENGES AND OPPORTUNITIES OF THE LAND USES WITHIN THE REGION

The following section will briefly look at the identified challenges, conflicts and opportunities for the four main livelihood activities in the region: agriculture, tourism, conservation and fishing.

These challenges and opportunities were identified by local participants during the workshops held in each of the constituencies and by national stakeholders during the focus group discussions held in Windhoek. Where relevant, the results from research carried out by Mendelsohn for the Caprivi Atlas has also been included in this section. The results from the constituency workshops held are recorded in the following documents:

- Community Inputs towards the Zambezi IRLUP: Judea Lyaboloma Constituency (SPC, APF and Ashby Associates, 2014 -a)
- Community Inputs towards the Zambezi IRLUP: Kabbe North Constituency (SPC, Ashby and APF, 2014-b)
- Community Inputs towards the Zambezi IRLUP: Kabbe South Constituency (SPC, Ashby, APF, 2014-d)
- Community Inputs towards the Zambezi IRLUP: Katima Rural Constituency (SPC, Ashby, APF, 2014-c)
- Community Inputs towards the Zambezi IRLUP: Katima Urban Constituency (SPC, Ashby, APF, 2014-d)
- Community Inputs towards the Zambezi IRLUP: Kongola Constituency (SPC, Ashby, APF, 2014-f)
- Community Inputs towards the Zambezi IRLUP: Linyanti Constituency (SPC, Ashby, APF, 2014-h)
- Community Inputs towards the Zambezi IRLUP: Sibbinda Constituency (SPC, Ashby, APF, 2014-i)

The region is dominated by subsistence agriculture activities in the form of livestock and dry-land cropping. The majority of households practice subsistence dry-land crop farming (40.9%) while 20.4% practise livestock farming (NSA, 2014). Throughout the participation with local stakeholders, it became clear that dry-land crop farming and livestock farming not only provided income, but were also part of the culture of the communities.

3.1 LIVESTOCK FARMING – CHALLENGES

Foot and mouth disease (FMD): Currently meat products from the Zambezi Region may not be exported to the EU due to the region being a FMD area. Since 1996, the Zambezi Region

has suffered five outbreaks of FMD with four occurring in the periods of 2007, 2011 and 2012. Subsequently, the region was placed under FMD restriction for 44% of the 68 months (Barnes, 2013). Local and informal trade in meat and livestock is also hampered during FMD outbreaks, as no permits for moving livestock are issued during these outbreaks. These restriction of meat export is one of the biggest challenges faced by farmers in the region.

Poor quality and quantity of grazing during dry months: The Zambezi Region does not really have high grazing capacity and as such during dry months the quality of grazing decreases. The Meatco abattoir is closed from August to November each year due to the poor quality of the livestock. The closure of the Meatco abattoir during FMD outbreaks and during periods of drought, also adds pressure to the grazing situation. Farmers cannot sell their livestock to the closed abattoir and have to keep the animals grazing on already poor grazing areas. Livestock farming is one of the main livelihood activities in the region. Research done by Mendelsohn (Mendelsohn & Roberts, 1997), indicates the grazing potential, based on the various types of vegetation found within the region. This report by Mendelsohn shows that large parts of the region have moderate potential for livestock farming, and only small parts (mainly in floodplains) have good grazing potential. Figure 1 shows the grazing potential of the Zambezi Region with the higher potential areas for grazing mostly situated in the Sibbinda constituency, the national parks and along the dune valleys in Bwabwata National Park. The moderate grazing potential is shown as covering almost the entire region.

Human Wildlife Conflict (HWC) is another challenge faced by farmers in the region. Especially farmers living in proximity to national parks and rivers where wildlife such as lions, hippos, crocodiles and hyenas are more abundant.

The **increasing allocation of land for conservancies** also poses a challenge to communal farmers. Although a conservancy will still have areas demarcated for livestock farming, it is erroneously believed that once it is established, no farming is allowed within the conservancy.

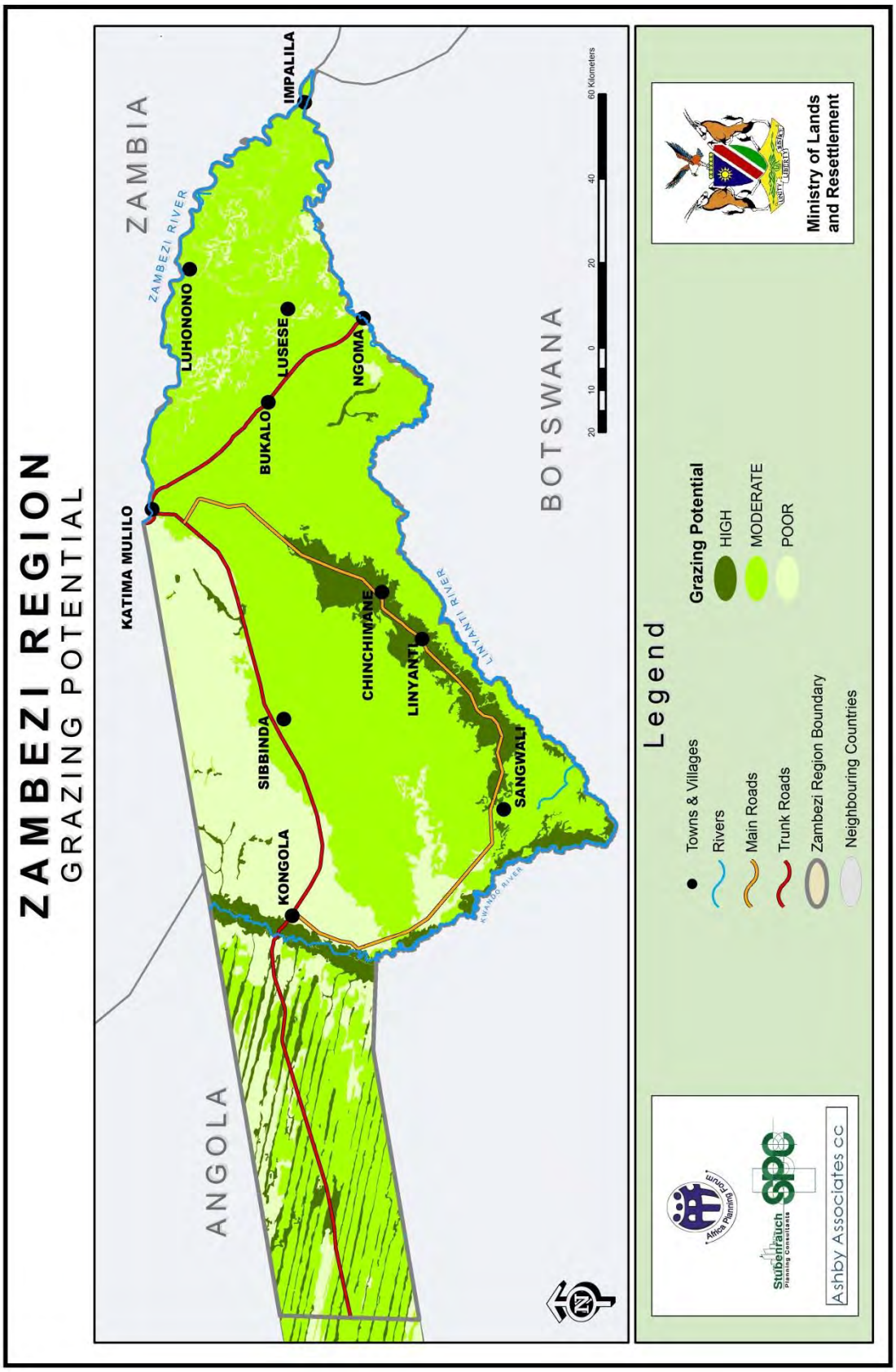
3.2 LIVESTOCK FARMING - OPPORTUNITIES

Subsistence livestock and crop farming still remain important livelihood activities. More than 41% of the households engaging in crop farming and 20% engaging in livestock farming (NSA, 2014).

Investigations into the possibility of exporting meat from FMD areas through methods such as Commodity-Based Trade (CBT) are looking promising. CBT is a production and marketing approach, which assures product safety, regardless of the disease status of the area and therefore permits adaptation of conventional (geographically-based) animal disease control measures (Barnes, 2013). The economic analysis done by Barnes on CBT indicates an approach where CBT becomes central to disease management, rather than focusing on eradication of FMD. According to the analysis by Barnes, the introduction of spatially segregated, fenced foot and mouth disease free areas is technically impractical and would be economically undesirable as the loss of growth in the wildlife income and the significant costs for fencing will by far outweigh any new economic gains in abattoir viability and livestock farming incomes. National stakeholders are very excited about CBT and the potential such a marketing strategy holds.

Another potential is the commercialisation of the communal land. There is a definite potential under the Programme for Communal Land Development (PCLD), which aims to assist communal farmers to become commercial farmers through the development of communal land with water, auction pens, roads and markets. In line with the MLR's vision of communal farmers becoming more commercialised, the PCLD is aimed specifically at assisting communal farmers to become commercialised. The proposed method of communal farming with the right technical support, training and advice, can bring forth a number of opportunities for farmers. However, the support for infrastructure to the area cannot be a standalone project, and needs to be accompanied by marketing strategies as well as establishing export markets for the livestock from the region. CBT initiatives can lead to economic advantages for the communal farmers within this programme if they receive the support under the PCLD. In terms of land-use planning it is important that the programme recognises the existing zonations in the area.

Figure 1: Grazing potential within the Zambezi Region



Source: (Mendelsohn & Roberts, 1997)

3.3 DRY-LAND CROP FARMING, IRRIGATION AND HORTICULTURE – CONSTRAINTS AND CHALLENGES

The Zambezi Region has relatively poor soil for cultivation purposes. To achieve economically viable yields it is necessary for farmers to utilise fertilisers to increase harvests. Currently most of the communal farmers, that practise subsistence crop farming, do not use fertilisers, manure or any other type of methods to increase their yields. Most farmers are subsistence farmers, ploughing their own fields for food security for their household. Many do not have the capital to invest in manure, fertilisers and manpower. Therefore most farmers then revert back to the traditional crop farming methods. Figure 2 shows the areas within the Zambezi Region that are highly to poorly suitable for crop cultivation.

Markets for crop production are limited and distances to these markets are also a challenge for communal farmers with limited transport. Another challenge to crop farmers is wildlife and the resulting damage caused by wildlife, especially those in proximity to rivers and national parks. Some farmers use mitigation measures such as chilli bombs and other methods, but these are not always effective. Compensation paid out to farmers is slow or sometimes no compensation is given out.

It is not only the wildlife that causes damage to crops but also livestock. Many of the crop fields are not fenced off, or are fenced with rather poor fencing, resulting in cattle entering the fields and destroying the crops. This again leads to conflict between neighbours and communities.

Moving to higher areas in flood season also holds its own set of problems for communities. Communities explained that sometimes, during the annual flood season, they are not allowed to move to certain areas due to the following reasons. Land was allocated by the traditional authorities to someone else during the dry period, or the traditional authority has given consent for a conservancy to be established. This means that some communities then cannot move into the upperland during the flood season and they have to either move to areas much further away or face the floods.

3.4 IRRIGATION – CONSTRAINTS AND CHALLENGES

A major constraint with irrigation in the region is the availability of suitable fertile land which is not flooded annually. Most of the fertile land with rich soils and in proximity to water, is situated within the floodplains, which poses a risk during flood season. Whilst the Zambezi River has the largest of the floodplains, the Kwando and Linyanti rivers have less

floods. Stakeholders from the irrigation focus group discussion, cautioned against any irrigation on the Kwando River. This is because the water capacity of the river is not sufficient for large scale irrigation projects. Therefore, any large scale water abstraction from the river will have a negative impact on the downstream flow of the water into the Linyanti and Chobe Swamps and downstream users.[1]

The Governor of the Zambezi Region indicated the need for such projects along the Kwando River. In light of such proposed activities, the land-use plan will indicate the possibility of such irrigation activities, but with the following recommendations:

- consultation with MAWF Hydrology Department on the allowable rate of abstraction for such irrigation projects;
- feasibility studies addressing not only the economic but also social aspects and type of crops that will be most feasible;
- study on the downstream flow of the river to establish whether abstraction will leave sufficient water for continued fishing.

For a number of reasons, irrigation projects identified over the years on drier inland areas have not taken off. One such project is the Namibia Renewable Agriculture project, which is at the feasibility and EIA stage. This project is proposed within the Sibbinda Constituency and will bring water from the Zambezi River via a 50km long water canal. Concern was expressed by stakeholders on the high channel costs, splitting the region and potentially causing social and environmental problems. Furthermore, the concern of abstracting water from the Zambezi River during low flow season (drier months) when more water will be needed for irrigation. This will have a significant impact on the river flow, this is a concern not only for Namibia but also for any downstream countries.[2]

The channelling of water away from the river to suitable areas further inland for crop production is an option that can be investigated. Proper feasibility and environmental studies will be necessary. However, care should be taken when channelling water not to impede on livestock, wildlife and human movements and ensure minimum evaporation losses over longer distances.

Stakeholders also questioned the matter of food security with large-scale agriculture projects such as the proposed Oriental Tobacco Farm that is in feasibility stage. They raised the question whether such a project, which is not related to growing of food, will really

[1] Focus Group Discussion 29 July 2014

[2] Colin Christian FGD 29 July 2014

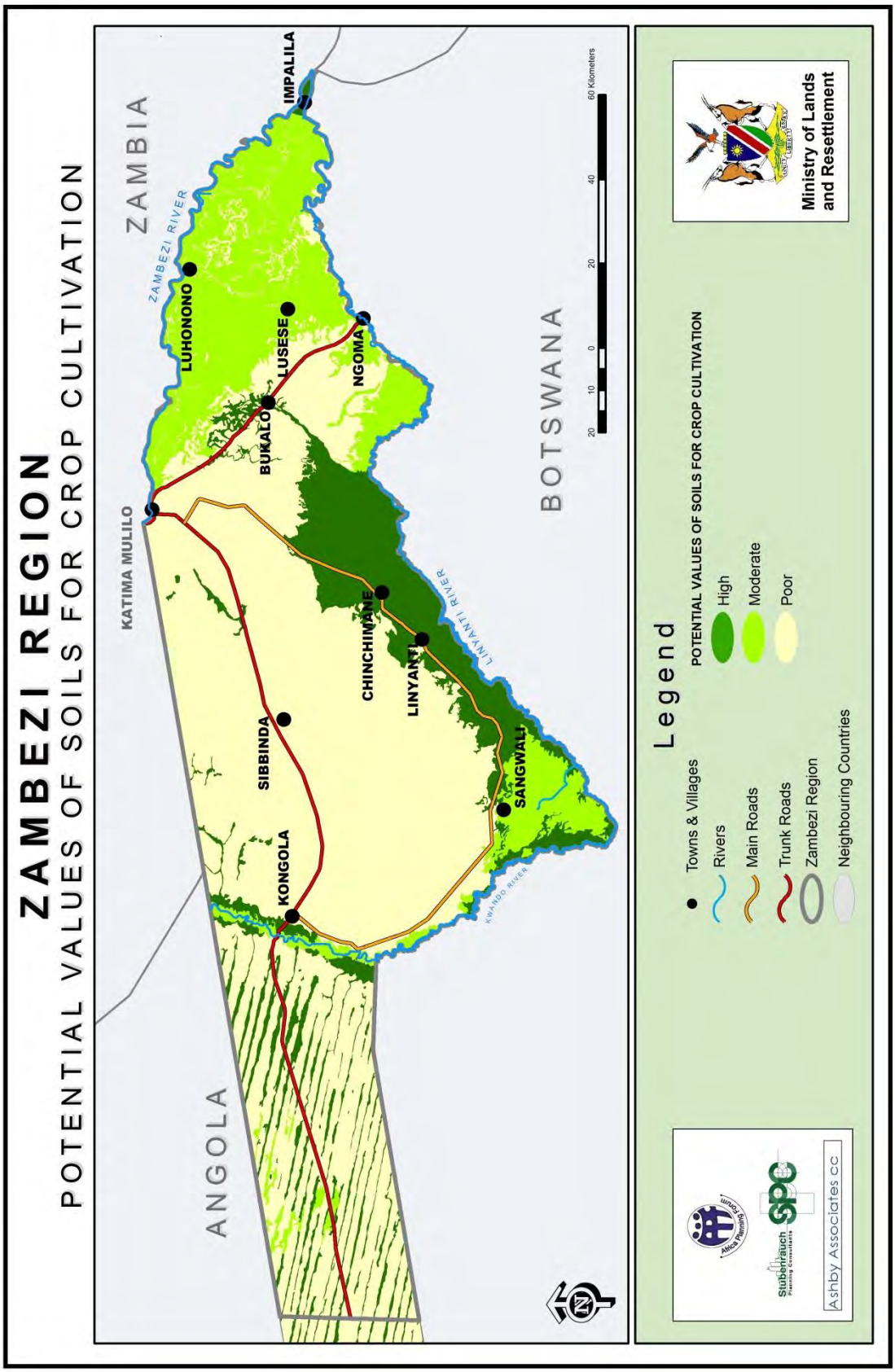
benefit the communities with regards to food security and whether local Namibians will be employed by such companies and what the economic benefits will be to communities and the Namibian economy as most of the revenue will leave the country.

3.5 DRY-LAND CROP FARMING, IRRIGATION, HORTICULTURE – OPPORTUNITIES AND POTENTIALS

Mendelsohn analysed the crop potential of the region and it is clear that large parts of the region has rather low potential for crop cultivation. The region does have potential for crop cultivation, mostly in dune valleys and in the flood plains, where the soils are of much higher quality. This will also apply to irrigation and horticulture. Figure 2 below shows the research done by Mendelsohn indicating the areas of high, moderate and poor cultivation potential. On the other hand seasonally flooding then again has an impact on the crops grown as communities then have to move to higher areas during flood season. The area in the southern Linyanti and Sibbinda constituencies have higher potential for crop cultivation and also lower risks of flooding than the areas shown as moderate in the eastern floodplains. The rest of the region is mostly shown as poor potential and this can be attributed to the type of soil found in this area as well as the availability of water.

Despite the low crop yields, the region has potential to become a crop-producing region, not only for subsistence dry-land cropping but also horticulture and irrigation. Increasing yields will require more specialised inputs and utilisation of fertilisers and conservation farming methods. Smaller horticulture projects seem to have the most opportunity for households to diversify their income, livelihoods and to increase food security on community level in the region. Larger scale irrigation is possible in higher lying areas and in proximity to Katima Mulilo and surrounding parts outside the annual flood areas. Channelling of water to suitable areas further inland for crop production is an option that can be investigated. Proper feasibility and environmental studies will be necessary. To establish whether such channelling of water is really feasible is outside the scope of this land-use plan, and will have to be properly investigated by experts in this field. It is not denied that such potentials exist, and can be realised through proper methods. This can be investigated by the region.

Figure 2: Potential for Crop cultivation in the Zambezi Region



SOURCE: (MENDELSOHN & ROBERTS, AN ENVIRONMENTAL PROFILE AND ATLAS OF CAPRIVI, 1997)

3.6 NATURAL RESOURCE HARVESTING – CHALLENGES

Illegal harvesting of Devil's Claw within the Bwabwata National Park and the state forest is an issue raised by stakeholders. The concern about unsustainable harvesting methods is a valid concern. It needs to be addressed by monitoring the harvesting and implementation of the legislation, including prosecution of offenders (Murphy – personal communication December 2014). It takes about three years for plants to fully recover after being harvested (MCA-N, 2013). The unsustainable harvesting of Devil's Claw became such a concern to MET that in 2012 there were discussions about placing a moratorium on the harvesting of Devil's Claw. Harvesters were only informed late in the season of 2013 that there will be no such moratorium and that they can apply for harvesting permits. This resulted in much confusion and low harvest yields. Therefore care needs to be taken when harvesting these natural resources to ensure a sustainable growth.

Poor harvesting methods by unskilled harvesters also lead to poor quality of materials and lower yields (MCA, 2011), and thereby lower prices that organisations will pay to the harvesters. Prices are still low, mostly because of inadequate value addition to the product in Namibia (MCA-N, 2013) and a disorganised Devil's Claw community.

3.7 NATURAL RESOURCE HARVESTING – OPPORTUNITIES AND POTENTIALS

Market research and studies being undertaken show the potential for export of Devil's Claw to other countries, such as the USA. Once these markets are available, then it is likely that the prices will increase and much more harvesting potential will be created. Alternative markets such as harvesters registering as organic harvesters also opens up potential for organic markets. One example is the Kyaramacan Associations that already has registered as an organic harvester for the European and the United States markets (MCA-N, 2013). IRDNC (Nott, January 2015, personal communication) shows that the revenue for the 9 PPOs registered for the 2014 harvesting year was N$3.2 million. This type of revenue alone shows the economic potential of that natural resource.

3.8 TOURISM AND CONSERVATION - CHALLENGES AND CONFLICTS

The tourism sector is still much undeveloped and focused on only a few key areas covering only a small area of the region (approx. 0.01%). The security of tenure within communal land is still a challenge for investors needing assistance from financial institutions. Until such time that a more secure tenure system is put in place, this constraint to tourism development will remain.

Katima Mulilo is the administrative town of the region, and at this stage, the only formal urban area. Although having potential to become a tourist centre, the town does not lend itself to tourism, as it has no real sense of place. The town centre is disorganised and not properly defined. Furthemore, the one major attraction to the town, the Zambezi River is in a sense 'hidden' away from visitors. The image and sense of place of the town needs to be changed in order for the town to become a real attraction.

Another challenge towards conservation and tourism is the general misunderstanding about the purpose and workings of communal conservancies. According to IRDNC (Munali, pers. communication) currently only a few examples exist of people having to be relocated because of wildlife. From focus group discussions held with stakeholders from the conservation sector, it became clear that there is a need to address the misunderstanding surrounding conservancies and permitted land use activities within these conservancies. There is a general belief by a small group of people, that once a conservancy is established, no livestock farming or crop farming may take place within such a conservancy. This leads to frustrated community members, as they feel that productive farming land is being reduced by the ever-increasing communal conservancies. This is however not the case with communal conservancies. Each conservancy has a set of rules, guidelines and land-use zonations, making provision for different types of land-use activities that may take place within the area.

Annual clearing of land for crop cultivation, or even irrigation projects and larger agricultural projects also brings a challenge to the conservation sector. The lack of integration and cooperation between different organisations, line ministries and institutions with the same goal are another constraint to the conservation sector. An example is the planning and management of community conservancies, community forests - both have the same goals and objectives, but each have it owns management plan, thereby leading many times to uncertainty amongst community members. By integrating some of these factions such as conservation, forestry and fishing, it will not only strengthen a zonation plan and management, but it will also help reduce confusion and uncertainty.

3.9 TOURISM AND CONSERVATION – OPPORTUNITIES AND POTENTIALS

In order to promote the region it is important that the above constraints of security of tenure are addressed. The establishment of formal wildlife corridors can provide communities with guidelines on where these movement corridors are. They can then develop their homesteads and crop-fields accordingly.

The region has a substantial number of community conservancies, community forests and national parks. The fact that the Zambezi Region is in the centre of the KAZA initiative provides opportunities for the region to be further involved in conservation efforts. The region has potential to continue to grow within the conservation field. Suggestions that the current state forest should be turned into a nature reserve/national park to support the ecologically migratory routes of wildlife has been advised by conservationists. The creation of wildlife corridors/ecological routes, has been proposed to minimise human wildlife conflicts (HWC). These are all activities that can contribute towards the conservation efforts of the region. HWC is an unfortunate by-product that comes with increased conservation, however they can be mitigated through measures such as chilli bombs, better herding and quality kraals where predators cannot see the cattle, fencing of fields, 'buffer areas' and land-use planning.

Tourism in the region is currently focused mainly on four areas: Bwabwata National Park, the area south of Kongola, the area from Impalila to Ngoma and the town of Katima Mulilo. These areas are tourism hotspots because of the abundance of wildlife found within these areas and scenic areas. Tourism already plays an important role within the economy of the region and the importance of tourism in the local economy will increase as tourism grows. The tenure system in the region is a challenge to the tourism industry. With the current tenure system, it is challenging for a tourism enterprise to obtain financial assistance from financial institutions with an insecure form of tenure as collateral. Obtaining suitable land is also challenging, as the process of obtaining leaseholds are cumbersome, expensive and lengthy. On the other hand, some communities benefit from the tourism enterprises within their area, although some communities found the lack of communication between these enterprises and the communities challenging. It seems that there is a need for communication between communities and tourism enterprises, but not necessarily land use challenges.

A sub-regional marketing strategy focusing on the main tourism areas will also lead to more opportunities for the region.

3.10 FISHING AND FISH FARMING – CONSTRAINTS AND CHALLENGES

Perhaps the biggest challenge to the traditional (subsistence) fishing sector is the uncontrolled overfishing that takes place in the region with illegal nets and fishing gear. However, the Ministry of Fisheries and Marine Resource (MFMR) do try to regulate the method of fishing such as the 'number of nets, mesh sizes and net lengths' (Tweddle, 2009). But staff members on regional level are few and control within such a vast region is difficult.

In addition, the use of more modern and illegal fishing gear does have an impact on the sustainability of the fish growth. Some of the newer fishing nets have smaller mesh sizes which means the smaller and younger fish, needed for reproduction, are also caught in the nets. Drag netting also causes the same problems, as these nets tend to catch all types of fish, impacting the sustainability of the fish stocks.

With the increased fish stock in Lake Liambezi the influx of fishermen from outside the area and neighbouring countries also increased. Illegal fishing from neighbouring countries has been reported as the biggest problem for communities, as these fishermen do not keep to regulations and general overfishing occurs. This became such an issue that local fishermen at Lake Liambezi organised a committee to manage the fishery in the lake by implementing the following procedures:

- fishing in the lake was suspended for a certain period of time;
- all fisherman wishing to fish in the lake had to register;
- limiting fishing methods are allowed within the lake, such as gillnets with a mesh size of 89mm.

Another challenge for community fishermen is the conflict between fishermen and lodge operators. Many fishermen complained that they are restricted by lodge operators to fish within certain areas. Fishermen also complained about the use of speedboats by tourist operators having no respect for local fisherman that need to fish while speedboats are passing by. These are not land use issues, as fishing and tourism are compatible land uses. These are management issues that need to be discussed between the parties when a leasehold is signed.

3.11 FISHING AND FISH FARMING – OPPORTUNITIES AND POTENTIALS

Fishing is one of the main livelihood activities for communities in the region and therefore stock needs to be protected from overfishing. This can be done through various mitigation measures such as integrating the management of fish protection and fish protection areas into the conservancies to lend it creditability and support from the conservancies. Integrating the management will also ensure that the larger community knows where fish protection areas are, and can also assist with the regulation thereof. Currently, due to different line ministries having authority over different sectors, each of the sectors have their own management system. This leads to a lack of integration and coordination between vital sectors. It is therefore important that the three main sectors: conservation, fishing and forestry liaise and form one coordinated management system in order to increase coordination, integration and ultimately sustainability.

Although aquaculture or fish farming is high on the agenda of the government, it seems to be struggling. This could be due to the high input costs, especially for fish food and electricity. MFMR is currently constructing a fish hatchery at Katima Mulilo, which if maintained, holds potential for the region. It was found that smaller fish ranching projects are more feasible for communities and have a longer life span. Fish ranching is when natural ponds and pans and old 'borrow pits' from road construction are used to stock fingerlings. Fingerlings are provided either annually or semi-permanent in cases where ponds keep water for longer periods. This type of fish farming seems to be more successful in terms of providing a sustained food source to communities. It would have been financially lucrative if the fish were sold on the markets, but most communities only harvest for subsistence purposes. This in itself is a good idea, as communities then do not have to buy food (Murphy & Lilungwe, 2012).

Another potential within the region is sport/commercial angling. Fishing lodges and tourism has the potential to be a good source of income and for spin-off benefits leading to an additional income for communities. It was estimated by Sweeney (Sweeney, et al., 2010) that an average fish lodge can generate around N$1.8 million per year (total financial benefit per lodge), with about N$1.06 million in wages paid directly to members of the local community.

Annual floods

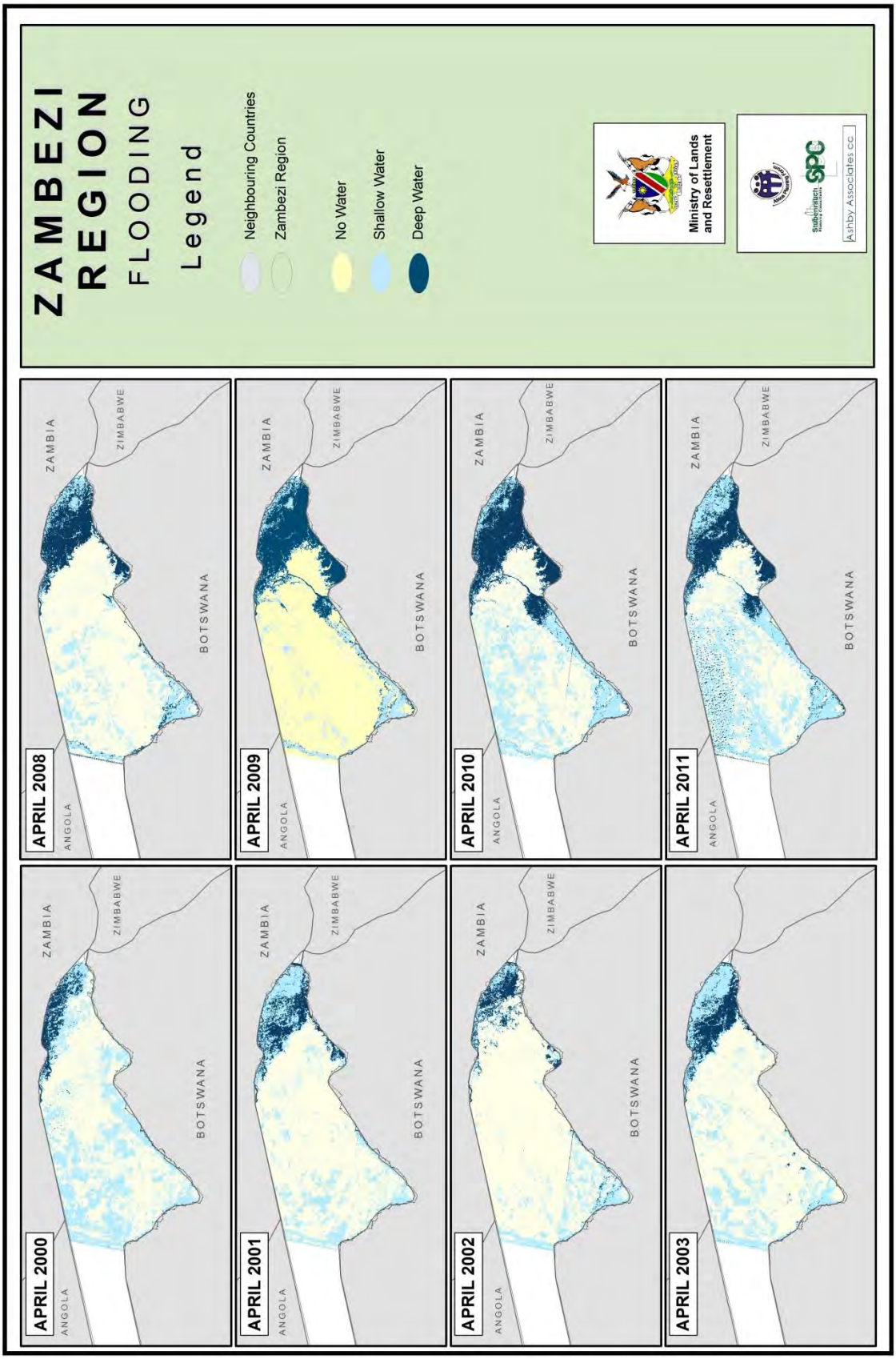
Annual floods in the eastern part of the Zambezi makes any type of permanent infrastructure, service development and project planning difficult. Agriculture projects that are reliant on good soils and water cannot establish in the eastern floodplains due to annual floods. Settlements within the eastern floodplains are also influenced by the annual floods. Until such time that a permanent solution has been found for the annual floods, the eastern floodplains will remain predominantly floodplains, where little infrastructure can take place. Figure 3 and 4 shows the floods that took place in 2011 and figure 4 shows the annual floods from 2000 – 2011.

Human Wildlife Conflict

Although difficult to establish the real costs of the HWC in the region, it is indeed a challenge for communal farmers. The current restrictions placed on farmers to fence off their land is just one of the factors contributing to this issue. The removal of wildlife from the region or fencing national parks is not a viable option, as wildlife is one of the valuable contributors to the tourism industry. Fencing is be expensive and not efficient. There are various mitigation methods that can be used by communities to reduce HWC, such as chilli bombs, herding of livestock, predator proof kraals and so forth.

FIGURE 3: 2011 FLOODS IN THE ZAMBEZI REGION

FIGURE 4: HISTORICAL FLOODS WITHIN ZAMBEZI REGION



3.12 ECONOMIC VALUES OF SECTORS

As part of valuation of the ecosystem services that was done by Barnes et al (2015) for the Zambezi Region, the following main findings with regards to the economic monetary value of the land uses within the Zambezi Region was calculated. The table below provides a summary of the main conclusions on the economic monetary value of the main land uses.

TABLE 2: MODELLED ESTIMATES FOR CURRENT ANNUAL ECONOMIC DIRECT USE VALUES IN THE ZAMBEZI REGION (N$, 2013)

Current annual values Zambezi Region	
Provisioning services	**N$ (million)**
Livestock grazing	27.27
Soils/ crop	152.27
Game	27.49
Fish	92
Fuel/ energy	124.58
Thatching grass/ building poles and timber	16.46
Craft production	0.28
Cultural services: tourism and recreation	226.05
Total	**579.23**

(Barnes, Suich, & Tarr, 2015)

These annual values show the contribution of each of the activities towards the economy of the region. It can be seen from these that each and every sector plays a vital role within the economy of the region.

4 LAND-USE PROPOSALS AND RECOMMENDATIONS FOR THE ZAMBEZI REGION

It is quite clear that dry-land cropping and livestock farming is currently the most important livelihood for communities in the region. This can continue, but there is a need for communities to start diversifying into other activities for a sustainable livelihood.

Before continuing into the land-use recommendations, it is important to look at the overall guiding principles for land use in the region.

There are three overarching guiding principles upon which the land-use recommendations are based:

- support and promote regional economic development;
- establishment of sub-regional growth points (node development) and concentrating service delivery within these points;
- protecting the environment and the natural resources.

4.1 PRINCIPLE 1: SUPPORT TO REGIONAL ECONOMIC DEVELOPMENT

Regional economic development is paramount. Most of the communities are relying on subsistence farming. With possible climate change predictions and increase in droughts or even flood occurrences, communities have to diversify their economic activities to increase their income, and to ensure a sustainable livelihood. The saying of 'don't put all your eggs in one basket' remains true for the Zambezi Region and the rest of Namibia. There are three key areas on which the region should focus:

1) The region has to market its comparative advantages. These are the large scale subsistence communal crop and livestock farming, the irrigation and a growing tourism and conservation potential. These sectors are to be marketed as an attractive and competitive location for investors.
    - Areas earmarked for livestock farming are to be marketed for investment and agriculture development is to take place within these areas;
    - Irrigation has potential for bringing economic growth to the region. The IRLUP supports such initiatives, especially in the identified irrigation areas;
    - Areas earmarked for tourism are to be marketed for investment and investors;

- Devil's Claw is one of the potentials of the region, but currently all processing takes place outside of Namibia. There is potential for a processing facility within the region. This potential is to be marketed to investors;
- Minimise slash and burn practises in order to maintain the natural resources such as timber, reeds and grass for the continued livelihood support of communities that rely on firewood; reeds for buildings; timber for selling and wild fruits for consumption;
- The importance of transportation corridors are increasing and activities related to these corridors such as dry-port activities need to be marketed;
- Increasing crop production through methods such as conservation agriculture where the slash and burn methods are minimised and fertility of land is increased through practising certain methods;
- Amendment of Regional Council's Act to allow for sale and lease of land to increase the economic base of a settlement.

2) Commercialisation of the livestock sector (PCLD area) and implementation of Commodity Based Trade initiatives (CBT). The PCLD project and possible export of meat through CBT has the potential to assist communal farmers to achieve greater benefits from their farming activities, and to boost the regional economy.

3) Development within communal areas is difficult due to the existing tenure system. In order to promote regional economic development the current system of land tenure will have to be modified to encourage investment in the region. Sufficient land will also have to be made available for industry specific developments such as:
   - to ensure adequate land to be made available for future development. As Katima Mulilo is the only town in the region, the expansion of Katima Mulilo will be crucial. A area of approximately 5km x 5km should be made available for future development of the town;
   - Kongola, Chinchimani, Bukalo still have sufficient land, but provision needs to be made for areas outside of the townlands for future development. Within these identified future townland areas, no development is to take place to ensure that this land is available for town development in the future;
   - Katima Mulilo to provide serviced industrial land;
   - Katima Mulilo to provide surveyed and serviced agriculture land for irrigation projects;
   - Corridor development – sub-regional growth points such as Kongola, Bukalo and Ngoma on the main corridors are to be ready for development by means of serviced and surveyed erven;

- Identification and preparation of irrigation areas. Areas should be surveyed and made ready for investors just to come in and lease the areas;
- Katima and Ngoma to become gateways to the Zambezi region and Namibia. A sense of place of these areas is lacking. Urban structure plans need to be in place to guide development and to assist the local authorities in making land available to investors for development.

4.2 PRINCIPLE 2: CLUSTER RURAL DEVELOPMENT SERVICES TO SECONDARY GROWTH POINTS (NODE DEVELOPMENT)

The current linear ad-hoc provision of rural services is contributing to a linear settlement pattern. This is costly and decreases the strength and purpose of growth points. Establishing sub-regional growth points are essential to guide development within a region. Achieving regional objectives and meeting future development demands requires the integration of regional public investments and growth. It is therefore important to concentrate growth and infrastructure development within selected nodes in order to minimise fragmentation of service delivery, and to maximise the use of infrastructure and service provision.

This principle of central growth points are based on the identification of larger rural growth points, where service delivery is to take place to minimise the linear spread of services currently found within the region. The provision of services within nodes in the region will be cost effective and will minimise land use conflicts and will ensure an economic base for such a growth point.

Service delivery in the Zambezi region is currently very linear, due to people settling along the main roads and the rivers. It is acknowledged that service delivery is essential for rural communities but the current ad-hoc service delivery is costly and weakens the role and function of larger settlements. Clustering of services in sub-regional growth points will ensure better service delivery and less linear development. The following is necessary to address this issue and to ensure sub-regional growth points:

- Coordinate and align physical infrastructure planning between various organisations;
- Provide basic essential services such as health, education and banking facilities in these growth points;
- Identify and protect corridors for transportation, transit and infrastructure requirements;
- Consolidate existing infrastructure between various localities;

- Node development – where higher intensity of land uses and activities will be supported and promoted. Node development improves efficiency as it provides easy access and creates thresholds for a variety of uses and services;
- Communities should be encouraged to move to the identified sub-regional growth points and government is to support and provide the necessary services in these growth points.

4.3 PRINCIPLE 3: PROTECT THE ENVIRONMENT AND NATURAL RESOURCES

Sustainable development is key for any regional development. Protecting the natural resources of a region and key biodiversity hotspots/environments is essential for the economy of a region such as the Zambezi, where tourism, as one of the growing economic sectors, relies on preserving the environment with its natural resources and wildlife.

Protecting natural resources not only includes wildlife but also resources such as timber, reeds, grass, clean water, soils etc. These are all factors that are important for sustainable and continued livelihoods for the people of the region. Once these natural resources are depleted, the communities will no longer have the additional resources to diversify their incomes.

4.4 LAND USE RECOMMENDATIONS

The economics of land-use plays a role in the identification of areas for a specific land use. Barnes, (1994) in his study on the value of non-agricultural land use, provided important economic values for non-agricultural land uses in communal land. The aim of this study was to provide land-use planners with the background on the economic value of non-agriculture land uses in order to identify zones or areas that have high potential to contribute to the national economy. According to Barnes (1994), within the Zambezi Region, the protected areas have a high value, mostly because of non-consumptive tourism. It is estimated by Barnes (1994) that this potential of national parks can increase six-fold. The potential use values outside parks are, to a larger extent, derived from consumptive use (hunting/natural resources) and highlight the importance of the protected areas as potential contributors to economic growth, in addition to the non-use values associated with them.

This study also found that for the Zambezi Region, the concept of buffer zones surrounding national parks have a high economic value. Meaning that potentially, such areas should be reserved for compatible wildlife utilisation land uses, as this has a higher economic value. The high values in areas adjacent to the protected areas are to some extent dependent on

the maintenance of the protected areas and vice versa. Maintaining the integrity of the protective area therefore plays a major role in the economic value. It was estimated by Barnes (1994) that the non-consumptive contribution towards the national income by the Zambezi Region in 1994 was N$4,996,413 with a potential growth towards the economy of N$8,329,207.

These figures show the high economic value of the non-agriculture land uses in the region, and thereby the importance of these land uses. Based on these potentials and the potentials identified by stakeholders the following land use recommendations are proposed for Zambezi:

- Multiple Use Areas – settlements, crop and livestock farming: areas that will be reserved for multiple land uses such as dry-land cropping, horticulture, livestock and settlements due to either good locality, good soil or proximity to water;
- Commercial livestock farming – area reserved for commercial livestock farming (PCLD) and where support is to be given to the communal farmers through infrastructure support and training;
- Irrigation areas – areas of suitability for irrigation projects. Suitability refers to soil and proximity to water resources, areas not flooded annually or in conflict with other land uses;
- Regional Growth Points (RGP) – urban areas identified as being regional growth points with higher priority service delivery and where services are to be combined;
- Sub-regional growth points are smaller settlements where rural services such as water, schools and clinics are to be focused ;
- Local growth points are smaller local villages with a number of traditional homesteads and where basic services such as water and electricity are to be provided. Communities should be encouraged to move to these local growth points, rather than allow for the spread of linear services along settlement patterns;
- Conservation buffer areas – areas adjacent to high biodiversity areas or national parks. These areas outside national parks have the highest potential for wildlife based activities such as tourism activities, hunting, wildlife viewing and so forth;
- Core Conservation Areas – all areas proclaimed as national parks or core areas within conservancies. These are strictly reserved for conservation purposes;
- Wildlife Corridors (WLC) – are identified migratory wildlife routes. Within these WLC routes limited settlements, urban development or service development is to take place. These are to remain free for wildlife to move between areas of biodiversity. These are not to be fenced off;
- State Forest – for conservation, wildlife and protection of natural resources;

- Tourism priority areas – areas where tourism development can take place. Areas from the community conservancy management plans were included;
- Flood plains – these are the eastern floodplains, which are annually flooded;
- Fish Protection Areas – areas which will be reserved for the protection and breeding of fish during certain times of the year. During these times, no fishing will be permitting within proximity to these areas.

Please note that the conservancy management and zonation plans of the conservancies and community forests were taken into account with these recommendations. As this is a Regional Land Use Plan, the recommendations are not detailed local level recommendations and readers are advised to peruse the conservancy zonation plans for detailed zonations of the conservancies.

4.4.1 AGRICULTURE SECTOR

Agriculture remains one of the important livelihood activities within the region. It is therefore important to keep supporting this industry while trying to increase the commercialisation of farming.

The agriculture sector can be divided into the following land use areas:

- Communal support livestock area
- Irrigation areas
- Multiple Use area

Communal support livestock area

The Communal Support Livestock Area is the area within the Sibbinda and Linyanti Constituencies that has been earmarked for the PCLD programme of MLR. The area will be approximately 148,084 hectares in extent and the objective of the programme is to enhance sustainable land management practices, to improve the productivity, and market-orientation of communal farmers. Under this programme, infrastructures such as water, crush pens, rotational management and so forth will be provided to the farmers to enable them to become commercialised and move away from the day to day subsistence livestock farming.

This area does overlap with the Bamunu Communal Conservancy and partly with Sobbe Conservancy. Of main concern are the areas of these two conservancies identified for exclusive wildlife: no disturbance should overlaps with the commercial livestock area. The following is recommended for this area:

- The Bamunu Conservancy management and zonation plan is to be followed and areas earmarked for exclusive wildlife should remain for exclusive wildlife;
- A farming co-operative is to be established to manage the marketing, sale and implementation of the management plan for this area;
- A detailed management and zonation plan is to be drawn up and implemented for this area, integrating the existing community forest and the Bamunu Communal Conservancy plans ;
- No large scale irrigation or agriculture production projects should be allowed within this area except if the project is identified and run by the co-operative;
- The farming method will be based on a communal commonage method and not the subdivision into small scale commercial farms.

TABLE 3: RECOMMENDED LAND USES WITHIN THE COMMUNAL SUPPORT LIVESTOCK AREA

Communal support livestock area	**Higher preference**	**Lower preference**
	livestock farming	Mining
	Crop cultivation	Private irrigation schemes
	Co-operative irrigation, intensive agriculture	No livestock farming to take place on areas zoned as wildlife exclusive areas/breeding areas by conservancy management plans
	Conservation farming	
	Conservancies	
	Hunting (per agreed management plan)	

Recommendations on identified agriculture projects

A number of large scale agricultural projects were identified by stakeholders during the IRLUP. The following section will briefly provide broad recommendations on these proposed projects in terms of land-use planning:

- The locality of the Oriental Tobacco Farm in the state forest is not supported by the IRLUP. The state forest is reserved for protection of natural resources and the clearing of 10,000 hectares of land will be against this principle. The state forest is also an important wildlife corridor and any such large project will have an impact on the wildlife movement. The project needs to find an alternative area within the irrigation area proposed by the IRLUP. The size of the project is quite extensive and it is proposed that for a first phase the project be allocated 3,000 hectares of land until

they have proved their capability to make this project work. If the land is not developed within 3 years the land is to revert back to the respective authority.

- Namibia Agricultural Renewable Project: this project is not supported by the IRLUP for the basic reason that the allocation of 30,000 hectares in size will reduce the PCLD area significantly. The locality of the project is not supported and it is proposed that the project be relocated closer to Katima Mulilo, and that initially only 3,000 hectares of land be allocated to the project until they have proved their capability to make this project a success.
- Experts in the water and agricultural sector state that large scale irrigation projects on the Kwando River are not feasible. The water flow of the river is simply not enough to support this type of irrigation. Furthermore, it will have a negative impact on the downstream fishing sector. As there appears to be a great political drive for such projects on the Kwando River, it is recommended that if irrigation is considered the following has to be done:
  - Consultation with MAWF hydrology department on the rate of abstraction for such irrigation projects;
  - Feasibility studies addressing not only the economic but also social aspects and type of crops that will be most feasible;
  - Down-stream flow of the river study to establish whether abstraction will leave sufficient water for continued fishing;
  - Environmental impact assessment.

Irrigation Areas

Although the water capacity of the Kwando River may not be sufficient for large scale irrigation, the capacity can be established through studies as mentioned above. Therefore, the potential for irrigation (large and especially small-scale irrigation) on the Kwando River will be indicated, subject to these projects being proven viable, water capacities proven sufficient for downstream habitats and fish populations and environmental clearance.

Small scale irrigation with underground water has potential, especially in areas with large underground aquifers close to the surface. Such small scale irrigation can be quite beneficial for communities who can either produce crops themselves or, alternatively, get a private investor to develop the fields in partnership with the community.

The irrigation potential around Katima Mulilo is much higher, due to proximity to water, better soil and markets. Any irrigation within this area ought to be high value crops only and outside the state forest. Lake Liambezi also has some potential for irrigation but the SEA has highlighted concerns about this area due to the annual fluctuating water levels of the lake.

Feasibility studies need to be done for any irrigation around Lake Liambezi to ensure the project's viability in terms of available water.

The land-use plan recommends that irrigation can take place in the following larger areas:

- Kwando River (with proper studies as mentioned above)
- Surroundings of Katima Mulilo
- Surroundings of Lake Liambezi

TABLE 4: LAND USE ACTIVITIES WITHIN THE IRRIGATION AREA

Irrigation Area	**Higher Preference**	**Lower Preference**
	Commercial irrigation	Hunting
	High value crops	Mining
	Irrigation to receive priority above livestock and subsistence crop cultivation	
	High valued crops	
	EIA, feasibility studies, down stream water flow studies, underground water abstraction studies	

Specific site locality of irrigation projects are not indicated on the land-use plan, as these are indicated in Volume 1 on the identified agriculture projects map.

Multiple Use Area

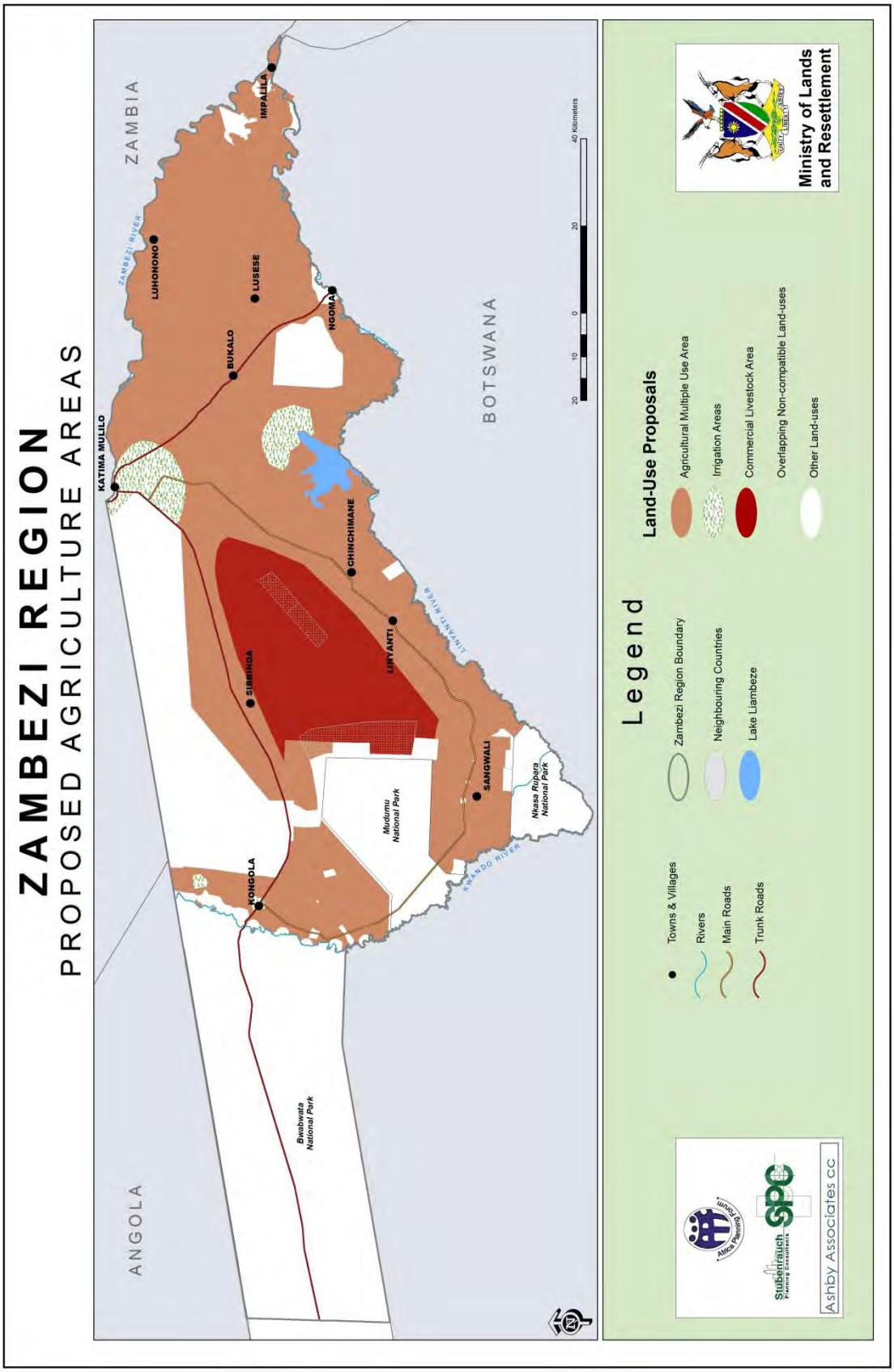
Multiple Use Area – MUA – refers to land available for communal livestock farming, crop farming and settlements/homesteads. It does include areas identified by community conservancy management plans as multiple use areas for livestock, cropping and settlements. For more detailed conservancy zonations the conservancy management plans need to be perused.

This area will cover the largest part of the region as this is the current trend and livelihoods will continue. Within this area, settlements, livestock and crop farming is to receive priority. However, any other uses within this area should be reviewed on merit and not excluded. The aim of this multiple use area is to make land available for any type of land use in the future without being restrictive, but to also ensure that communities have access to land and natural resources.

TABLE 5: LAND USE IN MULTIPLE USE AREA

Multiple Use Areas	**Higher Preference**	**Lower Preference**
	Communal livestock	
	Communal crop farming	
	Settlements	
	Irrigation/small gardens/ horticulture	
	Tourism (community tourism)	

FIGURE 5: AGRICULTURE LAND USE PROPOSALS



4.4.2 TOURISM AND CONSERVATION

Protecting the natural environment will not only preserve it for future generations, but will also protect a vital source of income for the communities from the tourism sector.

The next section will discuss the recommendations for each of the land uses with a map giving a spatial overview of the discussion. The following land use recommendations are made for Tourism and Conservation:

Tourism Area

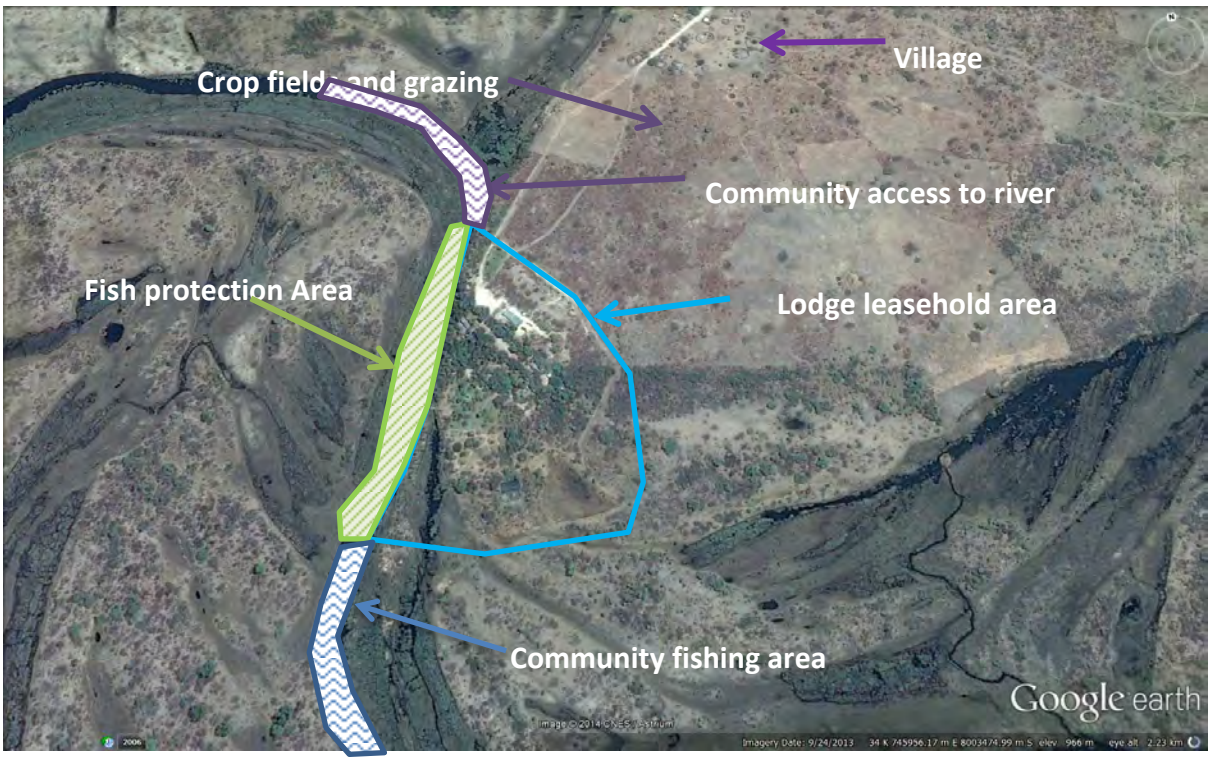
The tourism area is where tourism activities such as lodges and wildlife viewing will have a high economic potential. In these areas, tourism activities will mostly be on the river banks and within the vicinity of areas with abundant wild and birdlife.

This area is not exclusive to tourism only and other compatible land uses such as livestock farming, settlements, crop farming, fishing and harvesting of natural resources can take place. In order to minimise conflict between communities and lodge operators, a smaller scale management plan is to be followed. Certain land-use recommendations can be made for the tourism areas, such as:

- Lease area for lodges should be fenced off to prevent livestock from entering the premises, as well as to demarcate the boundaries of the lease areas;
- Areas in front of lodges to be used for wildlife viewing and fish protection;
- Areas next to the lodge will be for community access to the river for fishing, water and for their livestock;
- Essentially all new lodges should not have more than 500m - 600m of riverfront. This still then leaves sufficient space surrounding the lodge for community access to the river;
- There must be a corridor of 1 to 3km between lodges. This corridor is to ensure that communities always have access to the river.

Figure 6 provides an example of how compatible land uses can be managed ,and still provide for community access to the river without taking away the rights of community to farm and fish.

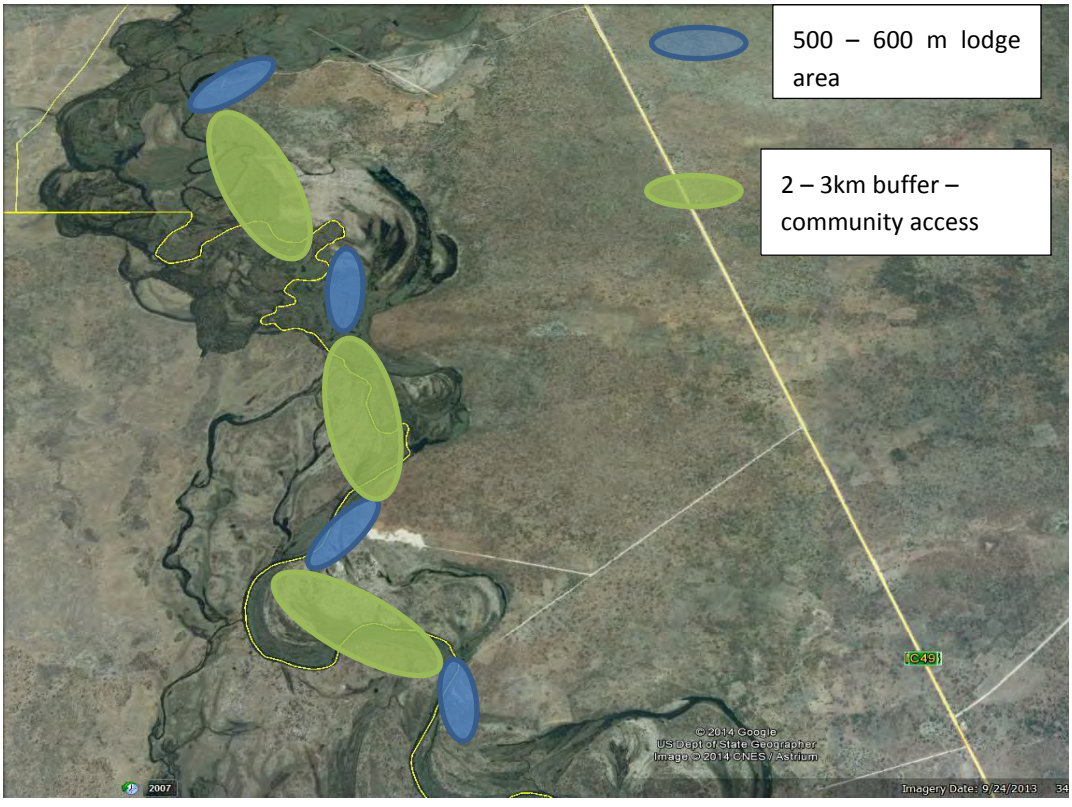
Figure 6: Examples of management of various land uses



Source: Google earth (2014)

Figure 7 illustrates spatially how land can be managed in high pressure tourism areas.

FIGURE 7: SPATIAL ALLOCATION OF LODGES AND COMMUNITY ACCESS TO RIVER

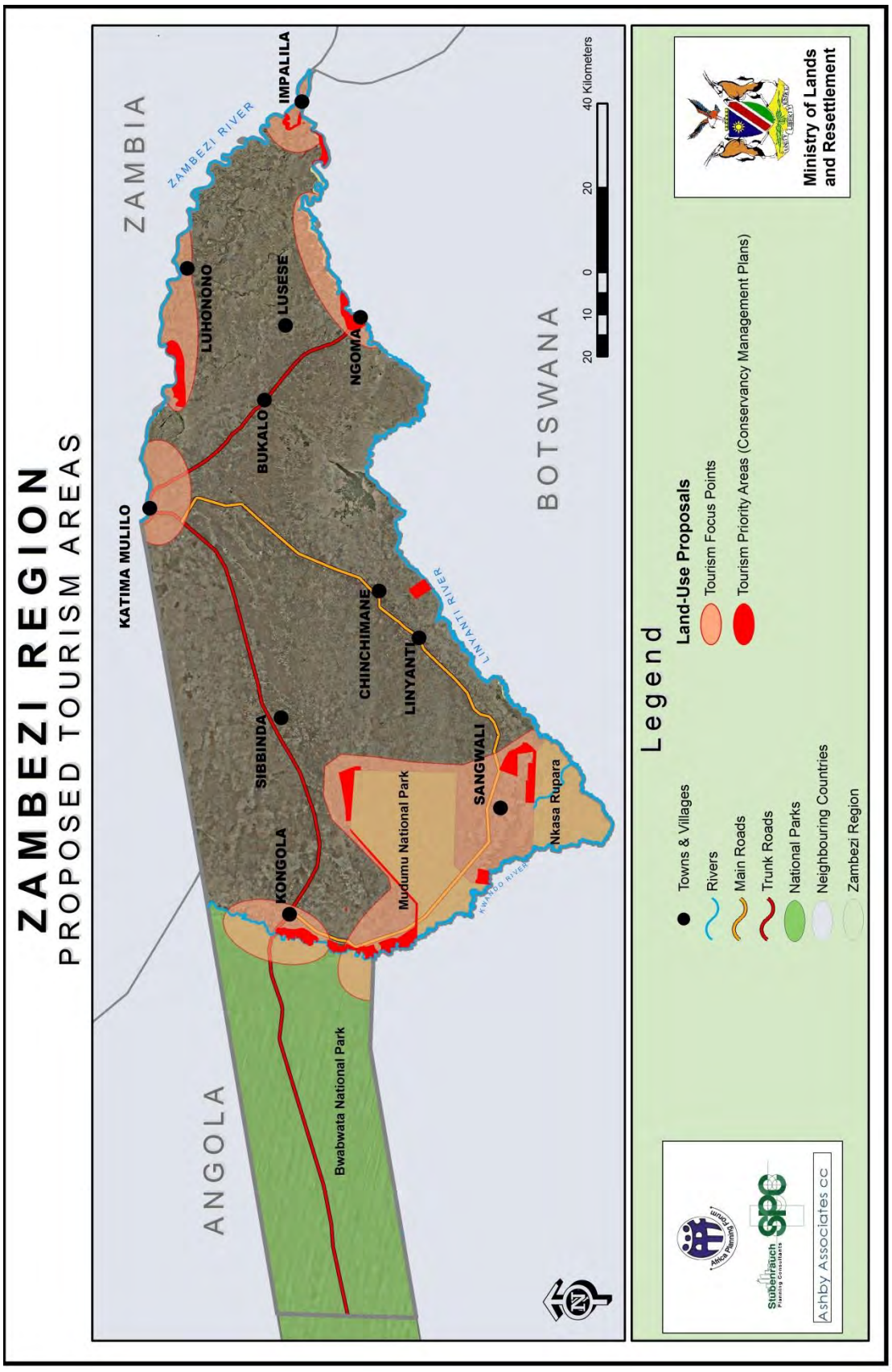


There are also a number of historical buildings and archaeological sites in the region such as buildings at Luhonono, Livingstone tree, Kamenga Beacon, Sibatwana and Sikeletu's graves and the historical routes in Katima Mulilo. These are all historical sites that need to be preserved. By preserving these sites and marketing them as part of the reason for visiting the region will also be an added advantage.

TABLE 6: RECOMMENDED LAND USE REGULATIONS FOR TOURISM AREAS

Tourism Area	**Higher Preference**	**Lower Preference**
	Tourism activities	Mining
	Livestock (outside lease areas)	Hunting (except where community conservancy management plan states otherwise)
	Crop farming (outside lease area)	
	Harvesting of natural resources (outside lease area)	
	Fishing (outside lease area)	
If a conservancy management plan states otherwise the conservancy management plan should be followed. Access corridors of 1 to 3km between lodges to allow for communities to access the river.		

FIGURE 8: PROPOSED TOURISM PRIORITY AREAS



Conservation Priority Areas

There will be four Conservation Priority Areas:

- Buffer areas
- Core Conservation Areas (CCA)
- Wildlife corridors (WLC)
- State Forest Areas

Buffer Areas

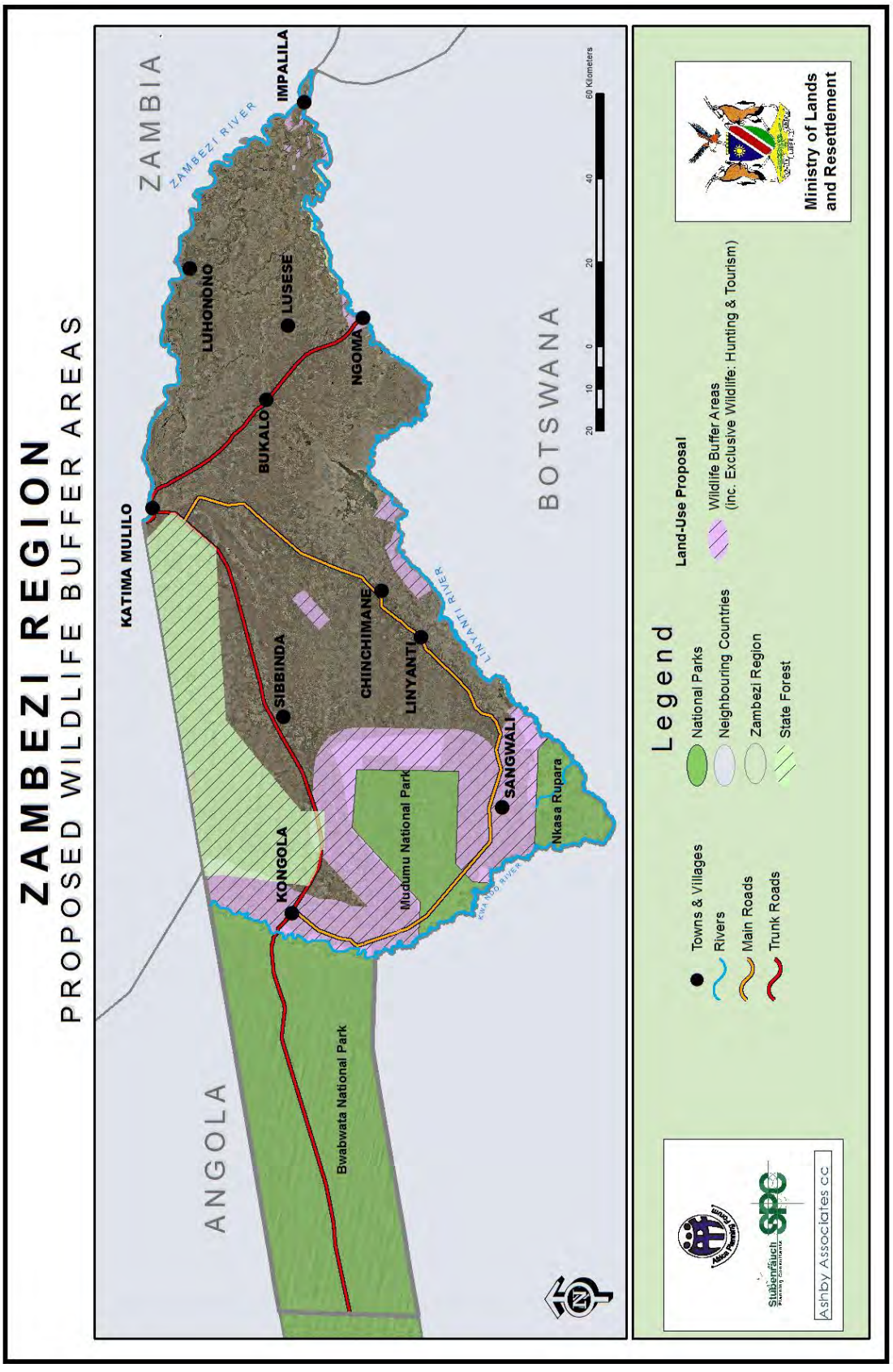
The buffer areas refer to an area immediately outside core conservation or sensitive areas. These buffer areas are to protect humans against wildlife and vice versa. It has been found by several studies such as Barnes (1994), that areas surrounding national parks are high conflict areas. In terms of economics of land use, such areas should rather be used for diversification of different types of land uses, rather than farming activities, due to the high wildlife conflict. The aim of these buffer areas is to create a transition area between areas of high biodiversity and communal farming. In this buffer area, land uses that are compatible with conservation should be practised; such as tourism, natural resource harvesting, fishing, hunting, and to a lesser degree, livestock farming.

The buffer areas identified are located around Bwabwata National Park; Mudumu and Nkasa Rupara National Park. These buffer areas will typically be an area of between 10 - 15km. Conservancies already have similar management zones surrounding the park. In the case where there is an existing conservancy with a management plan, the specific management plan should be followed, except where it is in contradiction with the IRLUP proposal.

TABLE 7: RECOMMENDED LAND USE REQUIREMENTS FOR THE BUFFER AREAS

Buffer Areas	**Higher Preference**	**Lower Preference**
	Hunting	Crop farming
	Harvesting of natural resources	
	Tourism activities	
	Fishing	
	Existing settlements	
	Livestock farming	
If a conservancy management plan states otherwise the conservancy management plan should be followed.		

FIGURE 9: BUFFER AREAS



Core Conservation Areas/ Sensitive areas

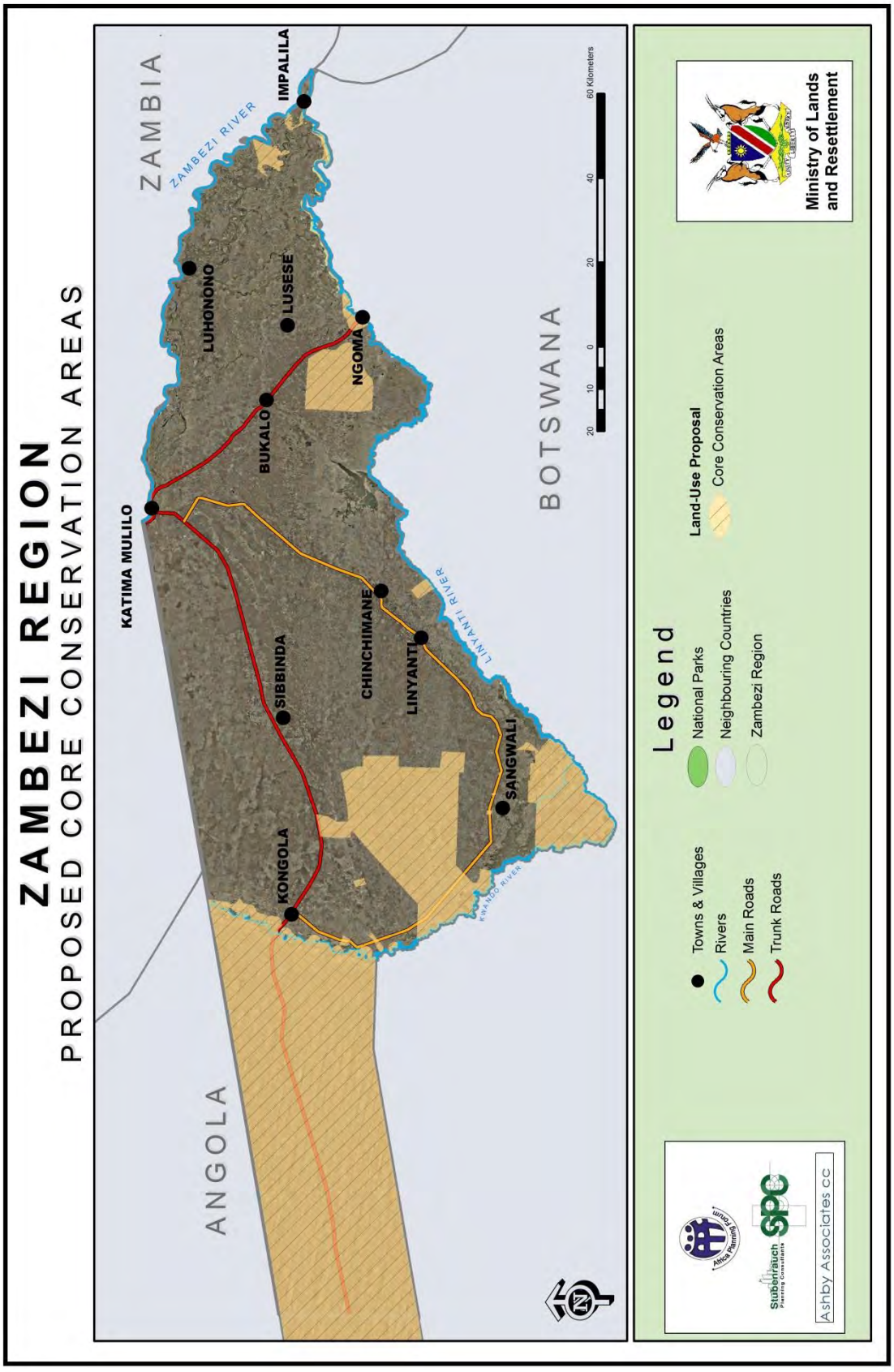
It is recognised that conservation in the region has a positive impact on other economic sectors, such as tourism. The protection of wildlife and biodiversity should also receive attention by planners. Not only is Zambezi part of the KAZA initiatives, it also has the highest number of conservancies in the country, three national parks, high biodiversity and river ecosystems such as the Zambezi and the Kwando River. Secondary to this is the tourism potential that is reliant on this conservation and from which spin-off benefits such as conservancies, arts and crafts, can be achieved. It is therefore important that the core conservation areas and sensitive areas are to be protected and maintained as far as possible.

Core conservation areas are therefore areas where wildlife and protection of the environment receives priority. These are predictably the existing national parks in the region, as well as the core conservation areas earmarked by conservancies within their management plans. Within this core conservation area no settlements, hunting, crop or livestock farming, mining or irrigation should be allowed. Otherwise these will be in direct conflict with the aim of the core conservation area. Bwabwata National Park is an exception, of which there is an existing management plan that regulates the human settlement within the park.

TABLE 8: RECOMMENDED LAND USE REQUIREMENTS FOR THE CORE CONSERVATION ZONE

Core Conservation Areas	**Higher Preference**	**Lower Preference**
	Tourism activities such as sightseeing, canoeing, bird watching	New settlements (except for Bwabwata National Park – see management plan)
	Wildlife breeding	Crop farming
	Existing settlements	Livestock farming, irrigation
		Fishing
		Natural resource harvesting
		Mining
If a conservancy management plan states otherwise the conservancy management plan should be followed.		

FIGURE 10: CORE CONSERVATION ZONE



Wildlife Corridors/Migratory Routes

A wildlife corridor refers to areas of land linking various natural habitats. These corridors are mostly areas of nature through which wildlife has moved for centuries. The aim of formalising these corridors is to create awareness amongst communities of these areas, not only for their own safety, but also for the wildlife biodiversity. There are three types of corridors in the region:

- Identified elephant migratory routes (not complete)
- Identified wildlife corridors by the communities
- Identified 'no-development' areas over major roads which were identified through the conservancy management plan. These should be kept free of any service development so as to create open areas for wildlife.

These corridors were identified through participatory planning workshops, GIS data from the conservancy management plans and GIS data from elephant tracking in the region. The greatest challenge is for communities to understand that wildlife will not move to 'man-made planned corridors', as wildlife simply will not know/understand such a concept. Therefore, maintaining existing migratory routes are a key component, rather than creating new ones and expecting wildlife to follow these. Even with following the existing corridors, there will be instances where wildlife will move into the region outside of these 'migratory routes'. It is therefore not a given that wildlife will always follow the same migratory routes, and there will still be instances of human wildlife conflict. However, by knowing where the main migratory corridors are, planners and communities can plan accordingly and minimise development within corridors, thereby minimising human wildlife conflict.

By keeping these corridors open and free of development, this will also ensure that wildlife can move between key habitats and also link key habitats with each other, thereby preventing the fragmentation of these habitats.

Integrated planning needs to take all aspects into account, and that includes conservation. This type of corridor planning is not special to the Zambezi Region. These types of corridor planning have been taking place in many other countries, and countries with far more pressing development demands. In many developed countries, district plans incorporate linking these natural habits with each other through greenbelts/corridors, especially for ecological reasons.

Figure 11 shows some of the corridors that have been planned in North America along the Trans-Canada Highway. In these corridors large areas of land were left free of development, greenbelts for wildlife to move through. There are also a number of wildlife corridors which can be reviewed as examples for the Zambezi Regions:

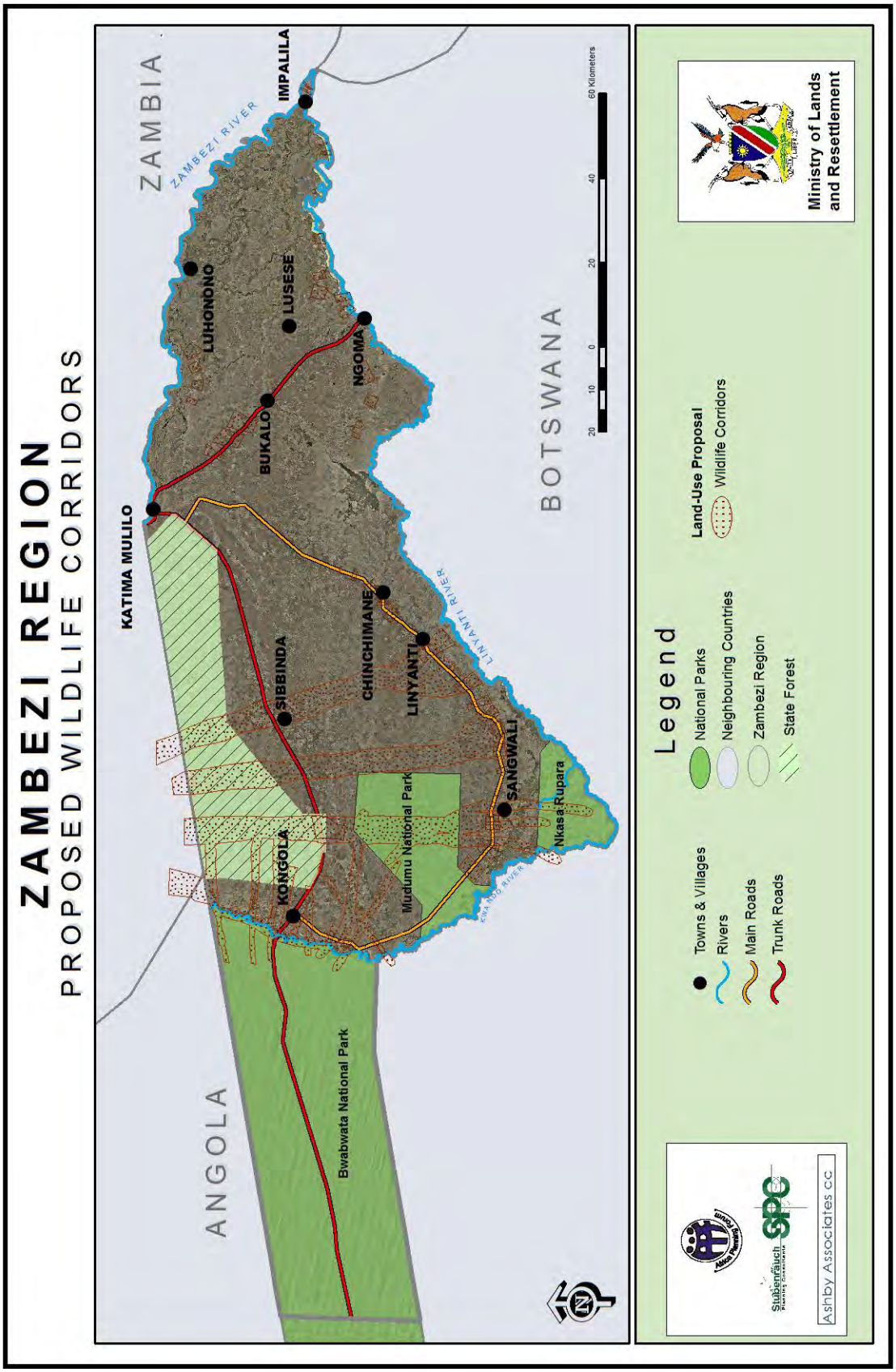
- Eastern Himalayan corridor
- China-Russia Tiger corridor
- Tandai Tiger corridor
- European Green Belt
- Selous-Niassa Corridor (from southern Tanzania into Mozambique)
- Siju-Rewak Corridor (India: protects an important population of elephants through the connection of a wildlife sanctuary with a forest)
- Ecologische Hoofdstructuur (Netherlands: a network of corridors and habitats created for wildlife)

FIGURE 11: EXAMPLES OF WILDLIFE CORRIDORS IN NORTH AMERICA (TRANS-CANADA HIGHWAY)

TABLE 9: RECOMMENDED LAND USE REQUIREMENTS FOR THE WILDLIFE CORRIDORS

Wildlife/ Ecological Corridors	**Higher Preference**	**Lower Preference**
	Wildlife	New settlements
	Natural resource harvesting	Crop farming
	Tourism	Irrigation
	Livestock (herded cattle)	Mining
	Fishing	Schools, clinics, water points
	Existing settlements	
If a conservancy management plan states otherwise the conservancy management plan should be followed.		

FIGURE 12: WILDLIFE CORRIDORS



Co-Managed Conservation Areas

Co-managed conservation areas are areas where different conservation and natural resource management areas are combined into a co-managed area with one management and zonation plan. The aim of these co-managed conservation areas are to ensure that the different natural resource management strategies such as community forestry, conservancies and fish protection areas are essentially established under one umbrella with one management plan. This will minimise the confusion from the communities side on what may or may not be allowed. It will also ensure for better control over such land. It is therefore recommended that community forests, community conservancies be combined. Such combined management plans can also then include fishing control and fish protection areas.

State Forest

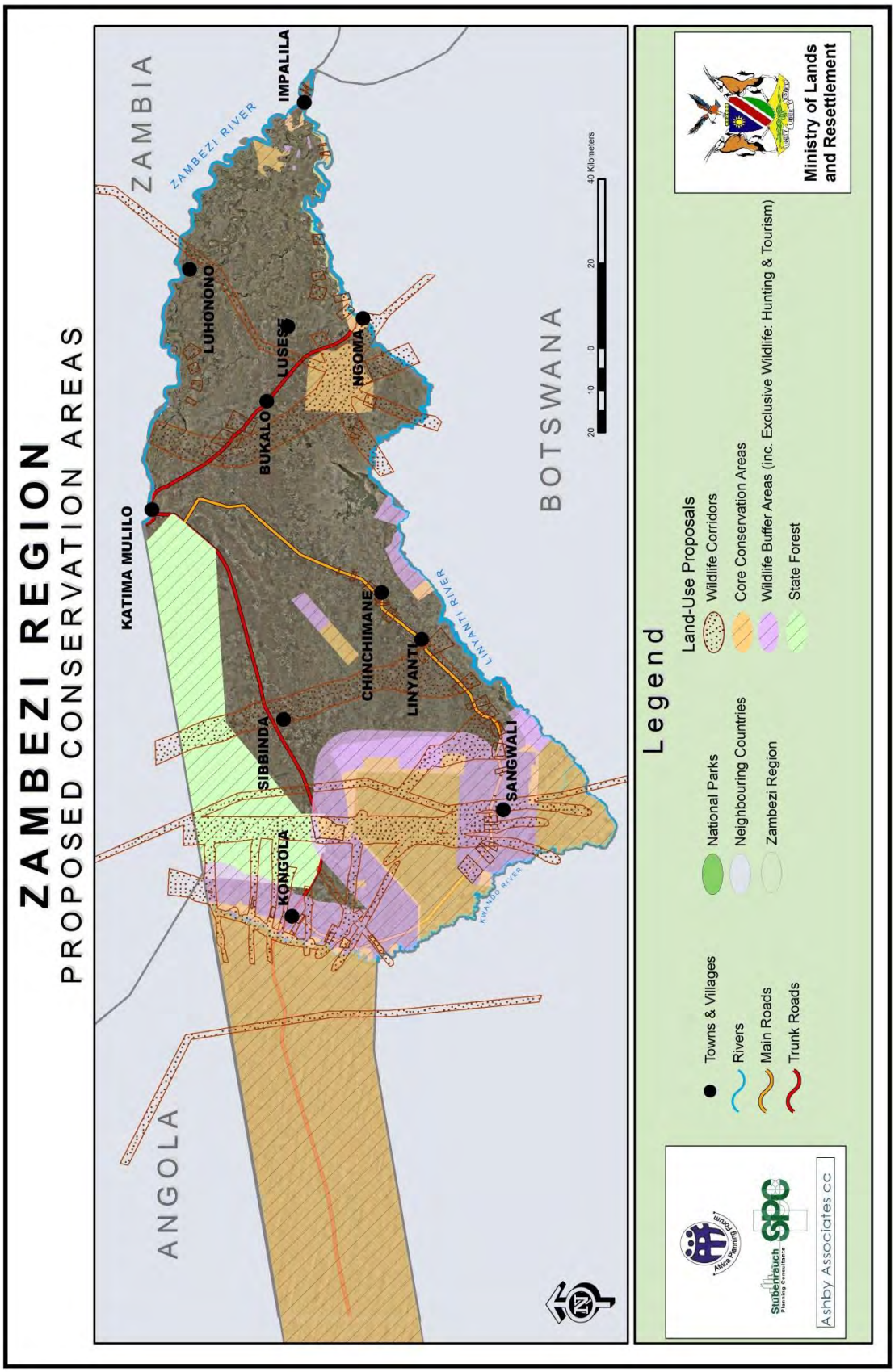
The importance of the state forest as a habitat for wildlife species should not be underestimated. Over the years, due to the non-development status within the state forest, the area has become almost a sanctuary and breeding area for many wildlife species. This is a situation that should continue as the state forest is also an import link to the national parks of Sioma Ngwezi in Zambia and Luiana in Angola. These are all important parts of the KAZA initiative, creating these interlinked conservation areas. The state forests have been having problems with seasonal fires that destroy many of the original stands of trees. Perhaps the best solution is to encourage early burning to take place to break the fuel load (C Murphy, 2014).

The status of the state forest is not clear. Stakeholders in the forestry sector state that was proclaimed state forest in the late 80's, but then the evidence of this proclamation went missing. As the state forest is an important biodiversity area and wildlife movement corridor it is necessary to ensure clarity on this area and it is recommended that the state forest be officially gazetted. It is also recommended that this area of the state forest be preserved for wildlife and natural resource protection. Livestock farming and harvesting of natural resources may take place within the forest but with consent of the MAWF, and with the necessary permits. No irrigation, crop farming, large scale clearing of land or mining should be allowed within this area.

TABLE 10: RECOMMENDED LAND USE REQUIREMENTS FOR THE STATE FOREST

State Forest	**Preferred**	**Less Preferred**
	Livestock (with permission from MAWF as per a management plan and only herded cattle)	Mining
	Devil's Claw harvesting with permits	Irrigation or large scale agriculture development
	Wildlife – wildlife breeding	Crop farming, settlements

FIGURE 13: PROPOSED CONSERVATION LAND USE AREAS IN THE ZAMBEZI REGION



4.4.3 FISHING SECTOR

Fishing remains one of the more important livelihood activities for communities living in proximity to the rivers and floodplains. This activity is supported by the IRLUP and further proposals such as fish protection areas are also supported by the IRLUP. The identified fish protection areas have been included into the IRLUP. There are basically three land use recommendations on fishing for the region:

- Fish Protection Areas
- Household fishing areas
- Lake Liambezi

Fish Protection areas

Fish protection areas aim to create certain nodes of protection where no harvesting of fish may take place, and an area reserved for the breeding of fish. These are the following identified fish protection areas:

- Kasaya Channel in Impalila Conservancy
- Sikunga Channel in Sikunga Conservancy
- Approx. 4 km east of Ngoma within the Salambala Conservancy

TABLE 11: LAND USE RECOMMENDATIONS FOR THE FISH PROTECTION AREAS

Fish Protection Areas	**Higher Preference**	**Lower Preference**
	Breeding of fish	Harvesting of fish by nets
	Catch and release	Any harvesting of fish

Household fishing and Fish ranching

Subsistence household level fishing remains an important component of livelihoods in the region. This will not be taken away, and it is acknowledged that these resources need to be protected, and that the community should have access to these resources. To minimise conflict with surrounding land users such as lodge operators, it is recommended that a typical distribution model as shown in Figure 6 and 6 be followed to ensure access to the river by communities.

This type of household level fishing will continue to take place in areas preferably outside of core conservation areas, not in front of lodges and outside fish protection areas. Within these community fishing areas, the use of speedboats should be controlled and respect should be shown to local fishermen. Discarding of nets should be managed and prevented

so to avoid pollution of the waterways. Only legal nets and gear are to be allowed and utilised by communities.

Fishing communities need to realise the issue of illegal fishing and how overfishing will impact on their livelihoods in the long term if sustainable methods are not utilised. Establishing fish protection areas and fish management committees, such as at Lake Liambezi, will help control overfishing and thereby ensure sustainability of this resource.

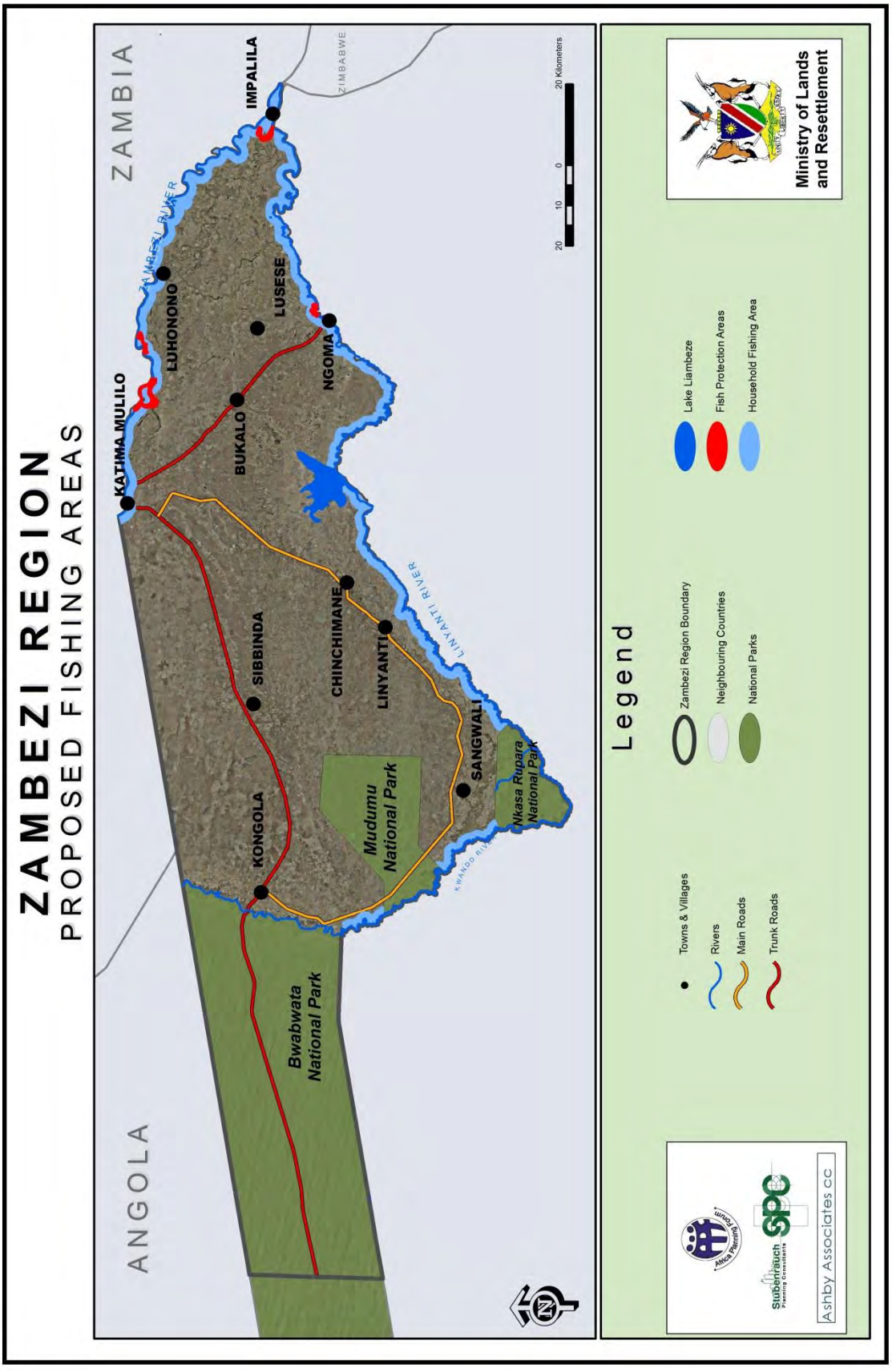
Lake Liambezi

When Lake Liambezi holds water, it has a high fisheries importance. Communities surrounding this lake should establish a co-managed fishing cooperative where fishermen are to register and obtain permits for fishing. Fishing gear and nets are to be inspected by the management of the co-operative to ensure no illegal gear or nets are used. The need for a proper establishment of markets, prices and access to markets for local fisherman is a big challenge. This needs to be addressed to assist the local fisherman in getting their fish to more lucrative markets.

TABLE 12: LAND USE RECOMMENDATIONS FOR LAKE LIAMBEZI

Lake Liambezi	**Allowed**	**Not Allowed**
	Fish harvesting with permits	Illegal fishing nets
	Fishermen to be registered	Non- registered fishermen

FIGURE 14: FISHING ZONE



4.4.4 INFRASTRUCTURE DEVELOPMENT PROPOSALS

Infrastructure, although not a land use, does play a role in land-use planning. This is especially important if infrastructure is developed without evaluating the impact of such infrastructure on land use. Therefore, it is important that, together with the main land uses, regional planners also take cognisance of infrastructure development. The next section will briefly discuss recommendations for infrastructure development in the Zambezi Region.

Urban and rural settlements

The continuous provision of services such as clinics and schools on an ad-hoc basis creates a spread out linear development in the region. This is both costly for the government to maintain, and weakens the functions of existing growth points, and larger urban areas such as Katima Mulilo. It is important for regional development that central places, such as Katima Mulilo, play a vital role in the region be strengthened. Linear development along the roads need to be minimised

In any regional development, it is important that certain services are concentrated in urban/rural nodes. This encourages the necessary support for such a node to become economically sustainable. Currently, the ad-hoc development of rural services is weakening the bigger urban areas due to the linear rural village type development where schools and water is provided to the majority of the rural villages.

It is necessary to move away from the linear development taking place within the Zambezi Region. Although much of the services already exist, it is advised that for any future service delivery, the following hierarchy of settlements is to be taken into account:

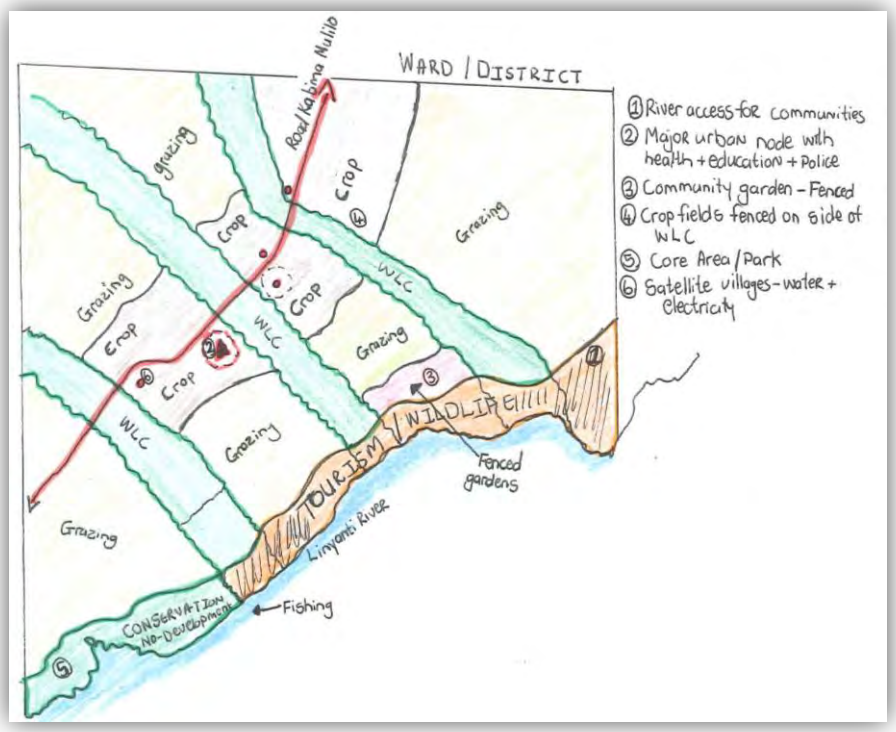
- Regional growth point – Katima Mulilo
- Sub-regional growth points (Bukalo, Kongola, Chinchimani, Linyanti, Sibbinda, Ngoma, Sangwali and Lusese)
- Rural growth points (all main rural villages – as indicated on Figure 17)

Rather than curbing linear development along the main roads, which will most likely fail in a rural communal setting such as Zambezi, planners need to focus on providing clustered developments and services, within the three categories listed above. This will attract communities towards a planned urban setting. Communities are also to be encouraged to relocate to these growth points. It is important that a proper urban settlement plan is drawn up for the region based on a hierarchy, and a land-use plan is done for each of the sub-regional growth points and rural growth points.

A further suggestion is to break down the region into smaller more manageable planning areas, such as constituencies (which are already demarcated). Each constituency is then to have a land-use plan drawn up. These constituency land-use plans will then have a sub-regional growth point that will receive certain services, while the local/rural growth points will receive basic services such as water and electricity. Communities within such a constituency should be encouraged to move to the sub-regional, or to one of the local growth points, rather than creating new growth points.

Such a constituency land-use plan (Figure 15) will typically contain a few rural growth points, with its crop fields, grazing areas and no-development areas for wildlife corridors. It will have at least one main sub-regional growth point where the more important social amenities such as health facilities, educational facilities and a police station will be located. This main village will be formalised through the formal planning process and erven within the town will be proclaimed. The satellite villages/rural growth point will have a subordinate function where water and electricity will be provided and formal properties in the form of proclaimed erven. As the Zambezi Region is a largely rural region where subsistence crop farming and livestock farming takes place as one of the important livelihood activities, it is important to acknowledge the impact that the conflict between wildlife and humans/ crops can have on this livelihood. Therefore taking account of the existing migratory routes of wildlife is essential for a regional planner in the Zambezi Region. These migratory routes need to be mapped and integrated into a constituency plan for the region. Figure 15 is an indicative illustration of such a constituency plan.

FIGURE 15: ILLUSTRATION OF A DISTRICT/WARD PLAN



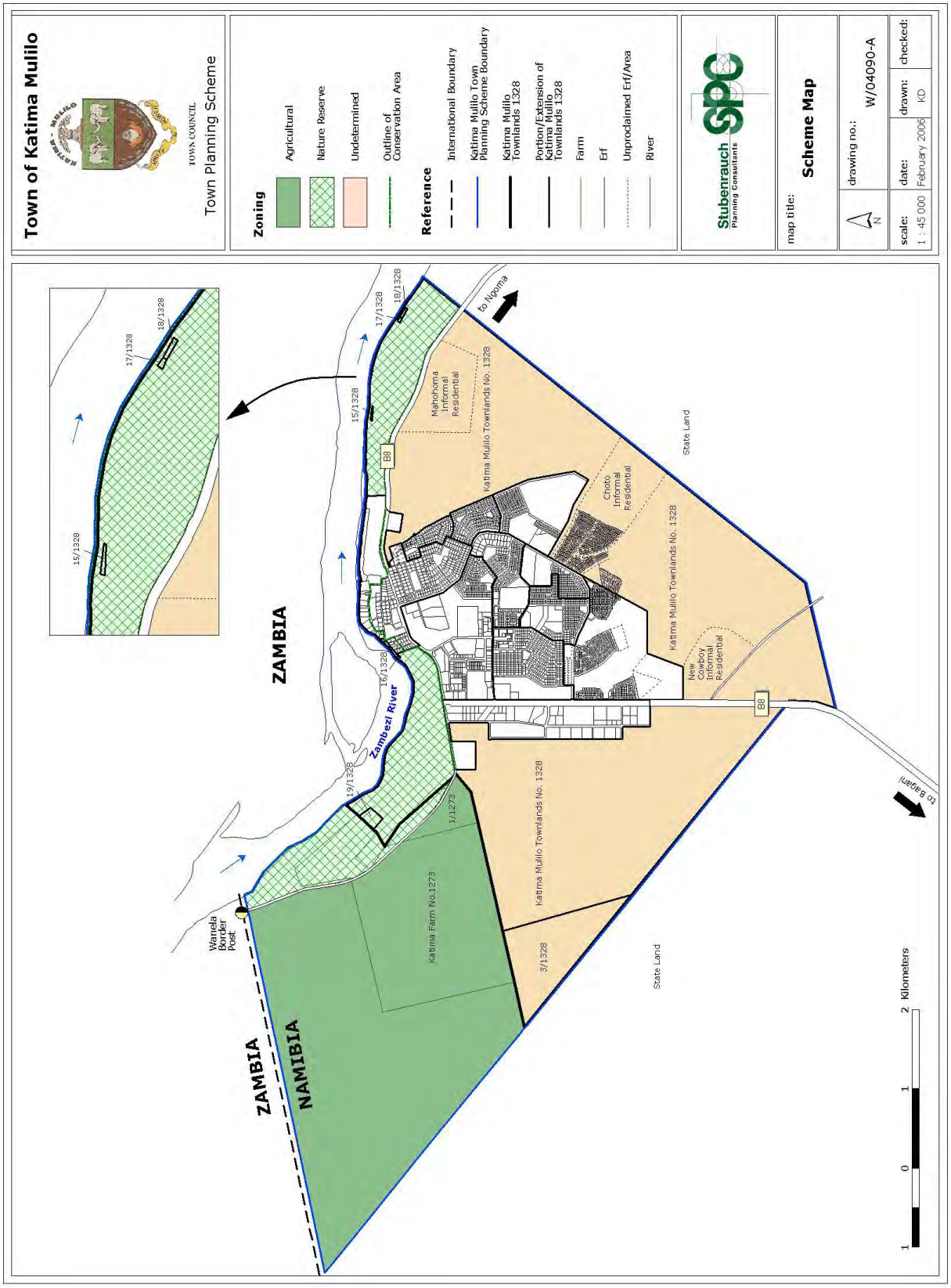
Regional Growth Points

Katima Mulilo is a regional growth point. It already has the necessary infrastructure and services in place. There are a number of challenges that the town will have to address for this to become a properly functioning regional growth point. For example, some of these challenges are, the management of the town, a lack of sense of place within the town, a poorly defined business area and not fully utilising the advantage of the riverfront.

Recommendations for the town of Katima Mulilo:

- An updated urban land use/structure plan is to be prepared for the town. This land/structure plan must evaluate the potential of the different areas in town and spatially indicating the proposed growth of the town.
- The riverfront should be protected from normal businesses such as shops, supermarkets and shebeens. This high value land should rather be reserved for accommodation establishments with a possible river walk adjacent to the river that can be utilised by the public and visitors.
- According to the Katima Town Planning Scheme, the majority of the riverfront is already zoned 'Nature Reserve'. According to them, a 'Nature Reserve' means, 'national park, or some other nature park or conservancy, which consists of an area, utilised as a game park or reserve for fauna and flora in their natural habitat and can include holiday accommodation and a tourist facility with the special consent of Council'. Therefore any other use on this area as indicated in Figure 16, needs to be advertised in the newspapers and obtain approval from the Council for such activity.
- A river walk is to be established next to the river, as there are no real recreational activities within town. Such a river walkway can be in the form of an esplanade such as in Walvis Bay at the Walvis Bay lagoon. There can even be safe places for the community to fish.
- Public access to the river should be promoted. In other words, properties should not be allowed to go up to the river which will then restrict access to the river by the communities.
- The CBD area of the town needs to be defined. Currently there is no real edge to the CBD and uncertainty of where the business area is.
- The increased deforestation of important woodlands in and surrounding Katima Mulilo urban and peri-urban areas is a major concern. It is recommended that a Community Forest be established with consultation between DoF and communities for protection and sustainable utilisation of the woodlands in and surrounding Katima Mulilo. Areas needing protection in Katima Mulilo itself can be identified and zoned accordingly for Nature Reserve purposes in the Town Planning Scheme.

FIGURE 16: KATIMA MULILO TOWN PLANNING SCHEME



Sub-regional Growth Points

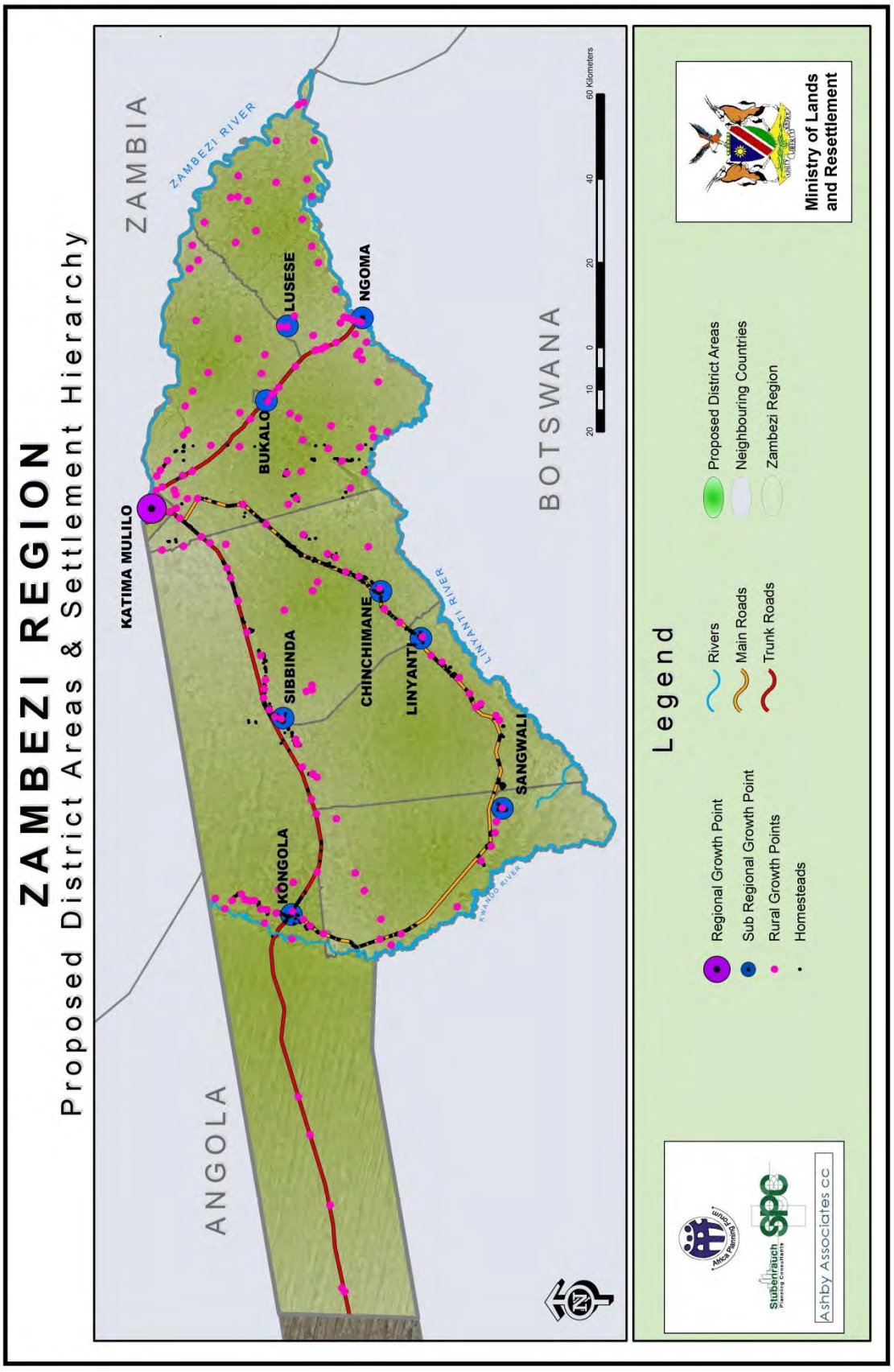
Sub-regional growth points or development nodes are important to focus economic development and service delivery in. Such sub-regional growth points or urban nodes will comprise of major service delivery, and should eventually become towns with their own economic base to support the town. These sub-regional growth points will become the major growth point within each of the six (6) planning areas (Katima urban and rural constituencies will fall within one planning area). The following sub-regional growth points are recommended for the Zambezi Region:

- Bukalo
- Kongola
- Chinchimani
- Linyanti
- Sibbinda
- Ngoma
- Sangwali
- Lusese

It is important that urban land-use plans be drawn up for these sub-regional growth points in which the future growth of the areas is depicted. Furthermore, larger service provision such as clinics and schools, businesses etc are to be established within these nodes and sufficient serviced and surveyed erven should be made available. The following additional recommendations are made on the sub-regional nodes:

- service provision shall take place within the identified sub-regional growth points;
- priority given to provision of services in major growth points and in locations that meet at least three of the following criteria;
  - nodes situated on transit routes (such as Kongola and Bukalo)
  - adjacent to existing and proposed major employment areas (tourism areas – such as Kongola and Ngoma)
  - redevelopment and intensification opportunities within existing urban areas (Katima Mulilo)
  - major border crossings for such activities such as trade and dry-port activities (Katima Mulilo and Ngoma)
- it is important that the Regional Councils Act be amended to provide for the sale of properties within settlements. Only through such sale of land can a settlement become economically independent.

FIGURE 17: RECOMMENDATIONS ON THE URBAN SECTOR



Roads/corridors

Interlinked synergies with the trade sector need to be supported and explored, such as dry ports, accommodation establishments, truck ports etc. Katima Mulilo and Ngoma are the most suitable localities for such activities and priority for such trade activities is to be focused within these two nodes with preference given to Katima Mulilo.

Additional road connections such as the road from Sibbinda to Linyanti (D3501), Kongola to Kamenga Border Post (D3502), Katima Mulilo to Luhonono (D3508) and the D3524 to Impalila are to be upgraded to bitumen roads.

Trade corridors can be important economic boosters for a region. The urban areas that are on these corridors, such as Kongola, Katima Mulilo, Bukalo and Ngoma are to be ready for such activities through the provision of serviced and surveyed business and industrial land. This surveyed land should be marketed through an investor's conference on the region, where the different potentials of each of the urban areas are shown to interested investors.

Power/electricity/solar

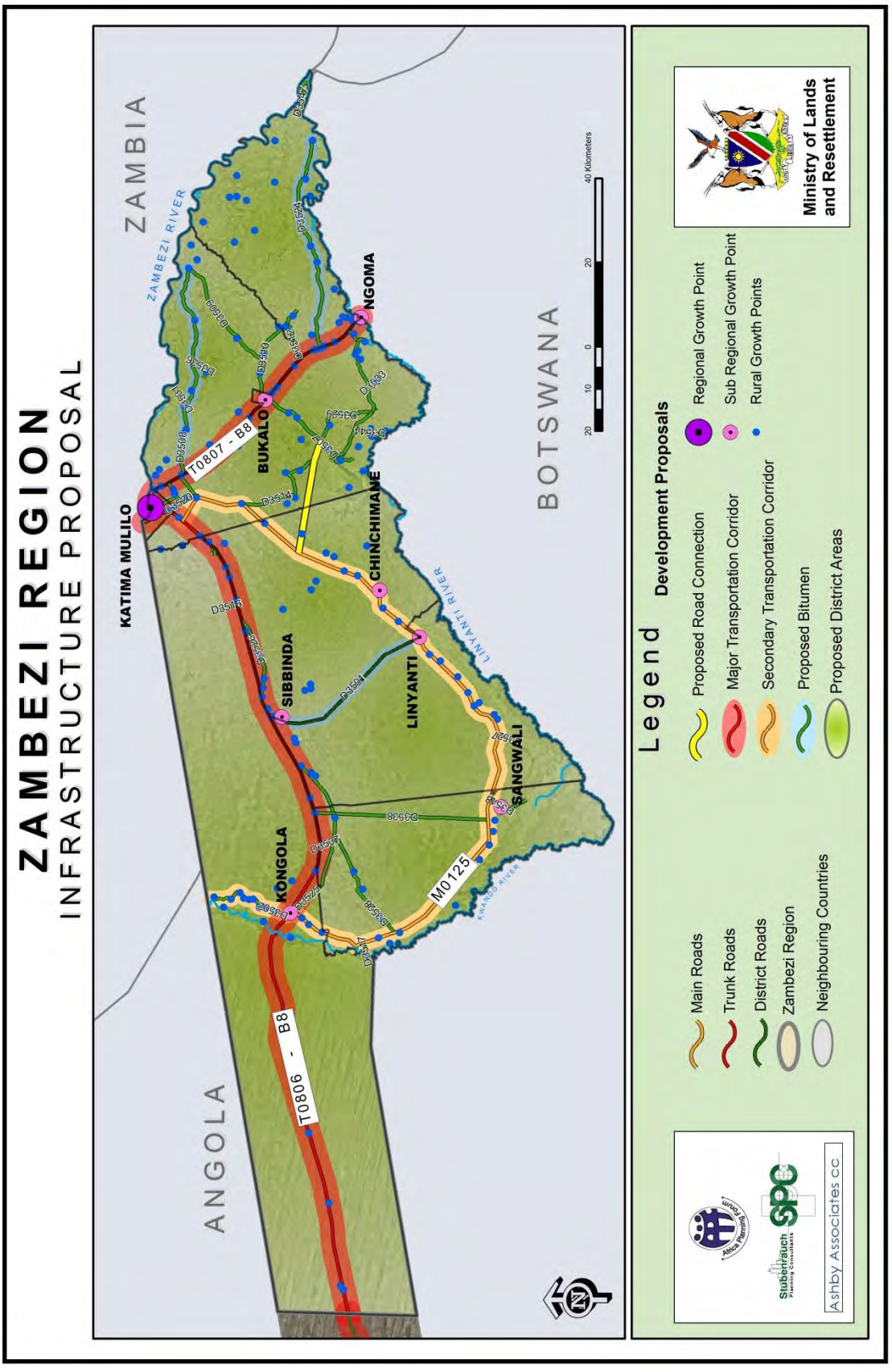
The Zambezi Region, as with all the other regions in Namibia, is blessed with abundant sunshine. This is perfect for solar generation, not only on a household level, but also on a larger commercial scale either for power generation or for generation of electricity for larger businesses. The Zambezi Regional Council should promote the utilisation of solar power by companies, businesses, government institutions and households in the region.

The Zambezi Region is also home to the Elephant Energy Trust. This is an organisation aiming to assist communities with a variety of energy products such as micro-solar lights and cell phone chargers. ((African Ventures: Elephant Energy, 2015)

Water

Water is important for the livelihoods of the communities in the region. Communities depend on water for consumption, water for livestock; water for crops and water for fishing. This resource needs to be protected at all cost, and water pollution and wastage should be prevented.

FIGURE 18: RECOMMENDATIONS ON THE INFRASTRUCTURE SECTOR



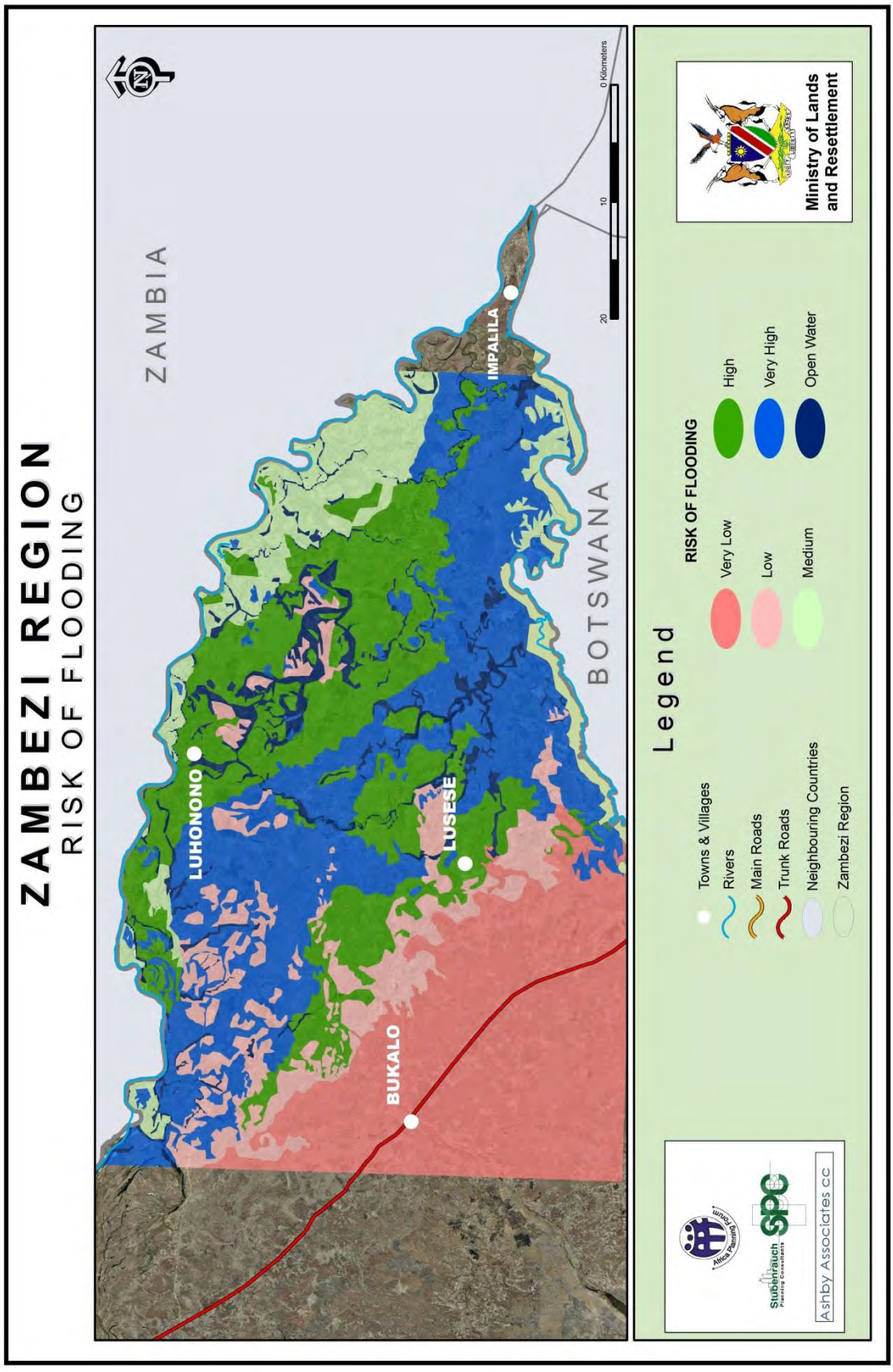
4.4.5 EASTERN FLOODPLAINS

Annually, large parts of the eastern Zambezi Region are inundated by floods, displacing communities that are then assisted by central government through emergency flood relief. This costs the Government of Namibia millions of dollars, but despite this vast annual expenditure, the government has not yet carried out a flood analysis of this particular area. This means that each year communities move back into the floodplains only to be assisted by government when it floods.

Without such a flood analysis, it is difficult for the relevant development agencies and institutions to provide development support within this area of the region. As there is no detailed assessment of areas that flood annually and areas outside the annual flood, ad-hoc development will continue to take place and flooding of such development will continue to take place. Communities will also continue to settle in areas that flood annually which will lead to government having to provide flood relief support to these communities. A study done by (Mendelsohn & Nathanael, 2013) on the flood risk in the Zambezi shows areas of high, moderate and low risk of flooding. Although this is not a detailed study, it gives broad indications of the higher flood risk areas. Due to a lack of detailed flood analysis for the region, the following recommendations are based on the work done by Mendelsohn (2013). It is recommended that:

- until such time that a detailed flood risk analysis has been done for the region, no development, services or settlements be allowed within either the medium, high and very high risk areas as shown in Figure 17;
- a flood risk analysis, assessment and detailed flood mapping be completed for the eastern floodplains. Assessing the flood risk, areas of no development and the study should also highlight areas of lower impact developments and possible solutions to the floods.
- 'Up-earthing' of small areas for schools, clinics etc, is a good initiative, although this should not be seen as a long term solution. A long term solution for the development in the eastern area will be to undertake investigative studies into possibilities of developing the eastern flood plains through analysing the flood patterns, possible channeling of flood water and so forth. Until such time that an in-depth analysis has been done for this area with various options on making the area developable, these types of small islands created through 'up earthing' of small areas, are a short term solution.

FIGURE 19: FLOOD RISKS AREAS WITHIN THE EASTERN ZAMBEZI



Diversification of Livelihoods

Being that the majority of households in the region are dependent on subsistence livelihood activities, it is realised that there is a need for these households to diversify their incomes. Such diversification activities can include harvesting of natural resources such as Devil's Claw, grass, reeds and fishing, arts and crafts, tourism and hunting. For the 2014 harvesting year, the 9 PPOs registered for harvesting had a revenue of N$3.2 million, which indicates the economic potential of such a livelihood (K Nott; January 2015, personal communication).

Indigenous products such as harvesting of Devil's Claw is an important contributor to the livelihood of communities within the region. Currently the Devil's Claw supply in Namibia is still informal and unorganised. But if Namibian exporters decide to join forces, this will put them in a better position to negotiate prices with buyers overseas and in return will mean higher prices for the harvesters. Another aspect to consider is adding value to the Devil's Claw before it is exported. Currently the product is cut and dried in Namibia and then exported. There are certain pre-processing procedures that could be carried out within the region before it is exported. It is recommended that this pre-processing procedure is done in the region in order to add value to the product locally.

A Local Economic Development (LED strategy needs to be carried out for the region, not only assessing small scale economic opportunities, but also detailed marketing and implementation strategies to assist communities in these economic endeavours.

5. CONCLUSION

Livestock and crop farming are still the most important source of subsistence income for communities in the region, supplemented with income from fishing, gathering of natural products such as reeds and grass, benefits from conservancies and employment within the tourism industry. These activities are all equally important in the region and great care should be taken when allocating large tracts of land to developments without proper consultation with communities, and feasibility and environmental impact studies. The subsistence livelihood of the people in the region is dependent on availability of land for continuance of these activities. Abstraction of water from rivers for projects such as large scale irrigation projects should be carefully investigated. This is to ensure water abstraction rates will not damage the downstream flow, impacting on the fishing sector, reducing the amount of water within the river systems or pollution of the water systems.

Allocating land next to the rivers needs to be carefully planned with open access corridors between developments. This is to ensure that communities have access in between developments to the river. Small scale irrigation schemes inland supported by underground water is an excellent complimentary livelihood for villages, as is community fish farms where communities can supplement their income and food by means of fish farms.

As part of valuation of the ecosystem services that was done by Barnes et al (2015) for the Zambezi Region, the following main findings with regards to the economic monetary value of the land uses within the Zambezi Region was calculated. The table below provides a summary of the main conclusions on the economic monetary value of the main land uses.

TABLE 13: MODELLED ESTIMATES FOR CURRENT ANNUAL ECONOMIC DIRECT USE VALUES IN THE ZAMBEZI REGION (N$, 2013)

Current Annual Values Zambezi Region	
Provisioning Services	**N$ (million)**
Livestock grazing	27.27
Soils/crop	152.27
Game	27.49
Fish	92
Fuel/energy	124.58
Thatching grass/ building poles and timber	16.46
Craft production	0.28
Cultural services: tourism and recreation	226.05

Current Annual Values Zambezi Region	
Provisioning Services	**N$ (million)**
Total	**579.23**

(Barnes, Suich, & Tarr, 2015)

These annual values indicate the contribution of each of the activities towards the economy of the region. It can be seen from these, that each and every sector plays a vital role within the economy of the region.

If the suggested land-use proposals are implemented, it is unlikely that these will cause significant changes in the land cover for proposed activities. The next section will look at the possible spatial implications that certain sectors will have on land allocation.

Irrigation: The current irrigation schemes cover an area of approximately 22km². With the schemes identified by stakeholders, as well as the irrigation zoned areas, it is estimated that the irrigation areas can increase to approximately 320km². This will then cover 2.18% of the region.

Towns/Urban: The current local authorities in the region cover approximately 0.59% of the Zambezi Region. If the urban areas are to expand in the future, it is estimated that these areas will expand with about 100km² each (10km by 10km), in other words 600km² in total. This 600km², plus the existing 86.62km² will then increase the urban areas to approximately 686km² by 2030. This covers 4.7% of the region.

Tourism Lodges*:* The region currently has approximately 17 accommodation establishments (excluding establishments in Katima Mulilo). These establishments cover roughly an area of 92 hectares or 0.92 km². As it is difficult to predict the additional lodges that will be developed in the tourism industry by 2030, an estimate was done. It is estimated that by 2030 the number of accommodation establishments within the region (excluding Katima) will increase to 25, with an estimated total size of 150 hectares or 1.5km² (approx. 6 hectares per establishment – 300m x 200m). Even if the current figure doubles by 2030 (34 establishments of 6 hectares each). This will mean roughly an area of 204 hectares or 2.04km². In terms of percentage this will mean that with both scenarios the lodges will cover 0.01% of the region.

Core Conservation Areas: Please note that communal conservancies, are not a land use, but rather a management system that regulates certain land uses. The land uses will be core areas; hunting areas or multiple use areas. There are six emerging conservancies within the region, and as the management plans (zonations) of these emerging conservancies were not

available by the time of this report, it is difficult to predict with accuracy the size of the core conservation areas. In this instance an estimate was made based on the current trends seen within the existing conservancies. The current registered conservancies cover an area of 4,007km² of which about 973.80km² is restrictive, in other words, where settlements, cropping and livestock is not permitted. The rest of the conservancy is either zoned for tourism, hunting or multiple purpose areas. Therefore the 'restricted' areas make up 24% of the total current conservancy area. This 24% was therefore used as a baseline percentage to calculate the emerging core areas and to calculate the areas that will be restricted for settlements, cropping and farming. Based on this calculation, it is estimated that with the six emerging conservancies, approximately 244 km² will be reserved for core areas. This then brings the total of core conservation areas within conservancies to 1,217 (registered and emerging), covering approximately 8.3% of the total area of the region, compared to the current 6.64%. It is unlikely that the national parks or state forest will be expanded, and it is expected that the status quo of these two will remain.

Communal Land: The area remaining for communal activities such as settlements, livestock and cropping will then be the land not covered by core conservation areas, national parks, irrigation schemes, urban areas, state forest and quarantine camps. This leaves approximately 6,922km² or 692,200 hectares of land that will cover approximately 45% of the region for communal farming purposes. The table below provides a spatial scenario for the proposed land uses for 2030:

TABLE 14: SPATIAL SCENARIO'S FOR 2030

LAND COVER TYPE	TOTAL AREA (km²)	TOTAL AREA (km²)	PERCENTAGE COVER %
Programme for Communal Land Development (PCLD)		1,499.74	10.23
Registered and Emerging Community Forests *		2,173.11	14.82
Registered and Emerging Communal Conservancies (inclusive of all zones)	34.63%	5,078.36	
Projected Communal Conservancies - Core Areas & Hunting Areas (settlements, cropping and livestock not preferred) **24% estimate used		1,217.80	8.30
Projected Communal Conservancies - (mixed use areas, where settlements, grazing and cropping it permitted)		3,860.56	26.33
National Parks (MET)		4,243.32	28.94
Estimated lodge areas (increase from 17 to 25 lodges x 6 hectares each)		1.50	0.01

LAND COVER TYPE	TOTAL AREA (km²)	TOTAL AREA (km²)	PERCENTAGE COVER %
Local Authorities / Settlements (Kongola, Linyanti, Sangwali, Katima, Chinchimane, Bukalo) (estimate 100km² per settlement)		682	4.65
Projected irrigation areas (plus existing)		320	2.18
Quarantine camps (Kopane, Katima)		111.49	0.76
State Forest (excludes Katima Quarantine Camp area)		1,421.62	9.69
Communal land for communal farming, settlements and cropping purposes and PCLD		6666.06	45.46

*Community Forest and Conservancies areas overlap

**Estimate of 24% for core conservation areas used (based on current figures)

The table below provides a summary of the main land use proposals:

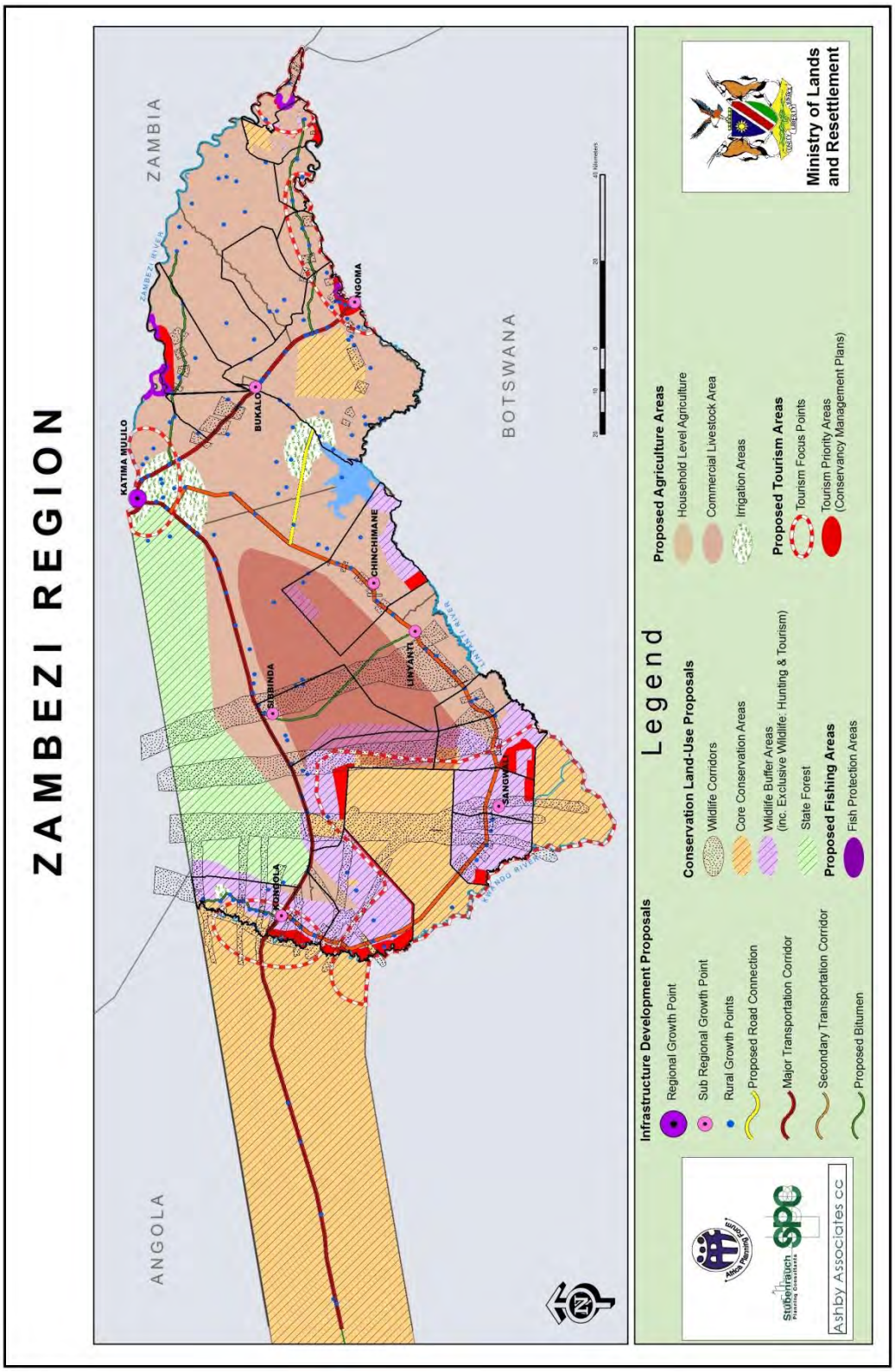
TABLE 15: SUMMARY LAND USE TABLE

Land use	Higher preference	Lower preference
Communal support livestock area (PCLD)	Livestock farming	Mining
	Crop cultivation	Private irrigation schemes
	Co-operative irrigation, intensive agriculture	No livestock farming to take place on areas zoned as wildlife exclusive areas/ breeding areas by conservancy management plans
	Conservation farming	
	Conservancies	
	Hunting (per agreed management plan)	
Multiple Use Areas (cropping and livestock)	Communal livestock	
	Communal cropping	
	Settlements	

Land use	Higher preference	Lower preference
	Irrigation/ small gardens/ horticulture	
Irrigation Areas	Commercial irrigation	Hunting
	High value crops	Mining
	Irrigation to receive priority above livestock and subsistence crop cultivation	
	EIA; feasibility studies; down stream water flow studies; underground water abstraction studies	
Tourism Area	Tourism activities	Mining
	Livestock (outside lease areas)	Hunting (except where community conservancy management plan states otherwise)
	Crop farming (outside lease area)	
	Harvesting of natural resources (outside lease area)	
	Fishing (outside lease area)	
	Access corridors between lodges, for community access to rivers	
Buffer Areas	Hunting	Crop farming
	Harvesting of natural resources	
	Tourism activities	
	Fishing	
	Existing settlements	
	Livestock farming	
Core Conservation Areas	Tourism activities such as sightseeing, canoe, bird watching	New settlements (except for Bwabwata National Park – see

Land use	Higher preference	Lower preference
		management plan)
	Wildlife breeding	Crop farming
	Existing settlements	Livestock farming; irrigation
		Fishing
		Natural resource harvesting
		Mining
Wildlife/ Ecological Corridors	Wildlife	New settlements
	Natural resource harvesting	Crop farming
	Tourism	Irrigation
	Livestock (herded cattle)	Mining
	Fishing	Schools, clinics, water points
	Existing settlements	
State Forest	Livestock (with permission from MAWF as per a management plan and only herded cattle)	Mining
	Devil's Claw harvesting with permits	Irrigation or large scale agriculture development
	Wildlife – wildlife breeding	Crop farming, settlements
Fish Protection Areas	Breeding of fish	Harvesting of fish by nets
	Catch and release	Any harvesting of fish
Lake Liambezi	Fish harvesting with permits	Illegal fishing nets
	Fishermen to be registered	Non- registered fishermen

FIGURE 20: ZAMBEZI LAND USE PLAN



6. STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) EXECUTIVE SUMMARY

This Strategic Environmental Assessment (SEA) Report accompanies the report for the Zambezi Integrated Regional Land use Plan (Zambezi IRLUP), and should be read in conjunction with Volumes 1 and 2 of that report.

The aim of the IRLUP and SEA is to bring cohesion to the plans and developments that are envisaged for the region. The SEA, in particular, assesses the environmental impact of the suggested zonations and the sustainability of the projects that are envisaged. Focusing on avoiding conflicts between sectors, minimizing negative impacts, and suggesting synergies that will enhance the overall development programme of the Zambezi Region.

METHODOLOGY OF THE SEA

The SEA process ran parallel with the IRLUP process.

- Scoping of environmental and other issues was done during the startup to the IRLUP, and a short Scoping Report was compiled. These issues are reported in Section 3 of this report.
- Baseline information was gathered by consulting relevant literature and experts. This is compiled in Volume 1 of the main IRLUP Report.
- Participatory Land Use Planning (PLUP) meetings were held with local communities in each constituency. These were led by the IRLUP team, and had representation of the SEA by the local SEA consultant, Beaven Munali.
- The main principles for land use in the Zambezi Region and issues of sustainability were addressed during Focus Group Discussions and follow-up meetings in Windhoek. A strategic assessment of each sector is presented in Sections 5 – 7 of this report, noting the likely future developments, the cumulative impacts, risks and conflicts with other sectors, and suggestions of synergies and opportunities for development.
- The main cumulative impacts of the current and future land-use activities are described in Section 8.
- Recommendations for reducing these long-term and cumulative impacts are presented in section 9, the Strategic Environmental Management Plan for the region.

AGRICULTURE

Most households in the Zambezi Region rely, to differing extents, on crops, livestock and fishing. Conflict with wildlife can have a significant impact on livelihoods. Hence there is

some tension between conservation initiatives and agriculture, but it is important to note that the presence of wildlife is a reality that the region cannot deny. At the same time, wildlife and tourism pose a major opportunity for diversifying livelihoods and coping with future climate extremes.

LIVESTOCK

The 140,000 head of cattle in the Zambezi Region are owned by just over half of the people. Offtake is only at about 10% through the export abattoir in Katima Mulilo and through 'home' slaughtering. Cattle in the Zambezi Region are given considerable attention from the government to minimise the incidence of Foot-and-Mouth Disease (FMD). This is a constant threat from the proximity of wildlife, especially buffalo. The measures implemented by the Directorate of Veterinary Services (DVS) include surveillance of the livestock for disease indicators, vaccination of all cattle, and quarantine before being accepted at the Katima Mulilo abattoir. The MLR is implementing the Programme for Communal Land Development (PCLD) to improve livestock production. This will provide infrastructure support to an area of about 150,000 ha in the central part of the region, together with advice and training in commercial production. Detailed implementation plans for the PCLD are still being discussed.

Grazing pressure on the Zambezi Region rangelands is most intense on the eastern floodplains, where an independent study states that vegetation productivity is being negatively affected by the multiple pressures of cattle, wildlife and burning practices. While there is some negative impact on overall biodiversity and on rangeland health, most of the impacts of the livestock sector are neutral to positive. The land-use zoning for livestock and mixed farming in the IRLUP is supported by this SEA.

There is conflict between this sector and wildlife. The most important is that the presence of wildlife, especially buffalo, increases the incidence of FMD. When FMD is reported in the region, movements of cattle are prohibited, and the export abattoir at Katima closes down. The second important impact is the loss of livestock to predators such as lions and hyenas.

These problems are serious, but can be mitigated to some extent:

- The vigilance and prevention activities of DVS reduce disease outbreaks.
- Secondly, Commodity Based Trading (CBT) offers the opportunity to market meat that is declared safe, even if the area it comes from is not guaranteed FMD-free. CBT is gaining acceptance in Namibia.
- Thirdly, grazing management systems at village level, with greater emphasis on herding by day and kraaling the animals safely at night, can significantly improve the overall health and safety of cattle against predation, as well as reducing theft and other losses of livestock.

- Finally, partial compensation for losses to predators is offered through MET's Game Products Trust Fund.

HOUSEHOLD CROPPING AND SMALL-SCALE IRRIGATION

Crop cultivation is an important agricultural activity in the Zambezi Region, both for household consumption and for commercial sales. Maize is the main crop grown and about 5,000 tonnes are marketed annually. Smaller amounts of mahango and sorghum are also produced and some are marketed. These are grown as dryland crops relying only on rain. On the floodplains, the fields are supplemented with soil moisture from the seasonal flooding. Small-scale irrigated production also takes place under the auspices of the Zambezi Horticultural Producers, growing vegetables such as tomatoes, onions, cabbages and pumpkins. Although very small in total area, the 21 registered gardens, market substantial produce in Katima Mulilo.

Dryland cropping is carried out as a 'low input – low output' activity, with little effort to improve or retain soil fertility, so crop yields are generally very low (30 – 700 kg/ha) and the soil soon becomes exhausted of nutrients. When this happens, a new field is cleared. This shifting, or 'slash-and-burn' agriculture is unsustainable because of its low yields, vulnerability to long dry periods, and dwindling availability of land.

The crops grown and stored, and the excess that is sold, makes an important contribution to household self-sufficiency and income generation. This SEA therefore supports the IRLUP zonation for this activity. This still takes place over all of the Zambezi Region, outside of national parks and the core conservation areas of conservancies. Nevertheless, this activity carries significant negative environmental impacts. These arise from the loss of natural habitat as new fields are cleared, declining soil productivity, and fires that get out of control after being started to clear fields.

These negative aspects can be significantly reduced or prevented with Conservation Agriculture techniques. These techniques greatly improve crop yields, retain soil fertility, and diversify crops through rotation with legumes such as cowpeas or groundnuts. Irrigated vegetable gardens could also improve productivity by adopting Conservation Agriculture techniques. This SEA therefore urges greater uptake of Conservation Agriculture methods, with promotion and support from MAWF and NGOs.

There is conflict between this sector and wildlife, mainly from the damage done to crops by elephants, hippos and bushpigs. People can reduce this damage by measures such as stringing tin cans on the fences around fields, lighting fires and smouldering chilli-bombs around the fields. Human wildlife conflict (HWC) incidents are currently recorded and monitored through the CBNRM Event Book system, implemented by staff of conservancies

and MET. This monitoring, together with details of compensation paid out from the Game Products Trust Fund, should be maintained, as it can inform the process of finding ongoing solutions to the problem.

LARGE-SCALE IRRIGATION

Although the abundant water resources might indicate great potential for irrigation in the Zambezi Region, this is not the case. This is because the Zambezi River downstream of Kalimbeza has wide floodplains which are seasonally flooded, and the Kwando-Linyanti-Chobe River system also has floodplains and is a much smaller river system, with low volumes of water (less than 3% of the volume of the Zambezi River). Therefore the only areas really suited for large-scale irrigation are close to Katima Mulilo. The IRLUP also marks an area on the north-eastern edge of Lake Liambezi for irrigation, but this would only be viable during periods when the lake holds water, when pumping from the lake would be possible. During the intervening periods, lasting up to 30 years when the lake is dry, water would have to be withdrawn from the Chobe/Linyanti River, which is not advised because of the small volumes available.

The SEA also advises against large-scale irrigation farms that involve extensive clearing of woodland or riverine habitat, for the area to be replaced by monocrops. It is far less environmentally damaging, and generates more employment and local empowerment to have many small-scale irrigation plots. These form a patchwork of cleared and cultivated land, can avoid chopping down ecologically useful large trees and patches of woodland, and allows co-existence with wildlife. Government support, instead of investing in large mechanised sprinklers, centre-pivots and harvesting machinery, could offer robust protection measures against crop damage by wildlife such as electric fencing (this is needed for crops of any kind anyway). Yields could be considerably increased by adoption of conservation farming methods, generating significant income for local farmers.

Namibia's agriculture and water policies, and Vision 2030 explicitly state that large-scale commercial irrigation projects should grow high-value crops. This is because they have better economic viability and generate more employment than low-value cereals and vegetables. The SEA suggests that the Kalimbeza Rice Project and the proposed Green Scheme at Liselo should diversify with high value crops as well.

Features of large-scale irrigation projects proposed for the Zambezi Region are pipelines or canals carrying water a long distance to get out of the floodplains, and heavy abstraction during periods of the year when flows are at their lowest. These features carry significant environmental impacts. Firstly, the impact on wildlife movements would be severe. This jeopardises the conservation and tourism sector, on which many people depend. Secondly, heavy abstraction during the low flow period will have major impacts on the fisheries, which

will directly affect people's livelihoods, and have international consequences on downstream states such as Zimbabwe, which uses the water for hydropower generation at Victoria Falls.

As an alternative to large-scale irrigation schemes, small-scale irrigation plots (such as those practiced by Zambezi Horticulture Producers) do not involve permanent establishment of pipelines and large irrigation infrastructure. Therefore such schemes are more suitable on floodplains that are seasonally inundated with water. The SEA cautions that the proposed large-scale irrigation schemes, suggested for Kongola, Singalamwe and Chinchimane by Zambezi Region residents, will need feasibility and environmental impact assessments to properly assess their viability and impacts.

CONSERVATION AND TOURISM

Wildlife is an essential and growing sector in the Zambezi Region economy. This is facilitated by the Kavango – Zambezi Trans-Frontier Conservation Area (KAZA TFCA) initiative established in 2011, creating the largest multi-state conservation area in the world. The Zambezi Region lies at the centre of the KAZA TFCA. Many animals move in and out of the Zambezi Region following routes to seasonal feeding areas. Wildlife numbers in the overall region are increasing, although they are still lower than historically recorded prior to Namibian Independence. Residents in the Zambezi Region's rural areas benefit from employment at tourist establishments, joint ventures set up with conservancies, as well as from wildlife through own-use hunting and trophy hunting. Services offered to tourists such as fuel, rentals, crafts and stocking up contribute significantly to the growth of centres such as Kongola, Katima Mulilo and Ngoma. The tourism sector in the Zambezi Region is growing but is still under-utilised. It is often just a transit area for tourists headed to, or from the better known sites such as Victoria Falls and the Okavango Swamps.

Conservancies and community forests appear to be at a threshold at the moment. While new conservancies are waiting to be registered and there is enthusiasm for this form of land use, there is also discontent about the benefits that members receive and the problems arising from human wildlife conflict (HWC). Despite these problems, and opposition to wildlife by some Zambezi farmers, the general consensus is that conservancies and community forests do benefit rural communities. They are pro-poor, they empower people to manage their wildlife and woodland resources sustainably, and they generate substantial income from wildlife and other natural resources. They also help to diversify economic activities which will improve the resilience to future droughts and floods.

Therefore it is likely that the conservation, wildlife and tourism sector will grow in the future. The IRLUP promotes this form of sustainable and diversified development by:

- recognizing tourism priority areas around the wetlands, but at the same time ensuring access of local communities to wetland resources;
- suggesting 'buffer areas' around the national parks and conservancy core areas, to reduce HWC;
- suggesting settlement and cropping areas avoid known wildlife movement corridors, also to reduce HWC;

The SEA supports these zonations and recommendations.

Many of the impacts of the proposed conservation and tourism zonations in the IRLUP are positive. But, at the same time there are important negative impacts arising from the presence of wildlife in the region. The SEA notes that the wildlife and tourism sector needs very careful management, and greater emphasis on bringing significant benefits for people who suffer the disadvantages of living with wildlife.

FISHERIES

Zambezi Region has extensive river and floodplain systems supporting fisheries of vital importance for food security for local communities. Fish contribute greatly to the economic and social well-being of communities, as they are the major animal protein source for people. Estimates of the direct value of annual catches in the eastern floodplains and in Lake Liambezi amount to close to N$100 million.

There is great concern over the decline in fish stocks, especially the larger more valuable species in the Zambezi Region. This is following the trend of other fisheries that have recently been very depleted, such as those on the Kafue and Barotse floodplains in Zambia. Important causes of over-fishing are:

- the recent increase in commercial offtake by foreigners (i.e. fish being harvested for export businesses rather than for local consumption);
- a switch of many fishermen to monofilament nets ('gauze nets') which are much more effective but very environmentally destructive;
- increasing use of drag-nets that target all fish species and life stages, and destroy aquatic vegetation so that fish breeding habitat is reduced;
- inadequate enforcement of fishing regulations and controls.

Other threats to the fishery sector are excessive water abstraction for irrigation projects, and introduction of alien fish and fish diseases, which harm local fish populations. Declines in fish catches leads to further pressure on other resources, as people struggle to feed themselves.

The IRLUP recognises the serious situation and suggests Fish Protection Areas (FPAs) as a measure to protect the resource. Two FPAs have already been established with full

community consultation and support, and another is emerging. The IRLUP also recognizes household fishing areas on all the rivers, and emphasizes the need for improved control over fishing activities at Lake Liambezi. The SEA fully supports these recommendations. The assessment of impacts of fisheries notes the potentially severe consequences of fish over-exploitation. There are many aspects such as biodiversity, livelihoods and economic development in the Zambezi Region.

FORESTRY AND INDIGENOUS NATURAL PRODUCTS

9.69% of Zambezi Region is state forest. There are seven registered community forests in the Zambezi Region, and 12 more that are emerging. This illustrates the high demand for legal community participation in managing the woodland resources, notably timber and Devil's Claw, as well as many indigenous plant products used for food, medicinal purposes and making crafts. The various resources and ecosystem services derived from woodlands are critically important to livelihoods, and provide the habitat for livestock and wildlife.

Fire destroys much of the region's woodlands every year, and is probably the greatest threat. Additionally, illegal harvesting of firewood and cutting timber for poles is particularly rife. There are also concerns over the rapidly increasing harvesting of Devil's Claw, especially by destructive methods.

The IRLUP recommends co-management of community forests and conservancies, and clarification of the status of the state forest, which this SEA fully supports. It makes no direct proposals for land use dedicated to this sector. The SEA notes mostly positive impacts of this sector, and the empowerment of local communities to manage woodland resources through community forests.

INFRASTRUCTURE, URBAN DEVELOPMENT AND MINING

The Zambezi Region's main towns, Katima Mulilo, Kongola and Ngoma are expanding as the population grows and people migrate to towns. Also, much settlement is concentrated along the main roads linking these towns and along the newly upgraded Liselo-Linyanti-Kongola road. This ribbon development is discouraged in the IRLUP, in preference for development being concentrated in towns. This allows service provision to be more economically and effectively provided. Furthermore, it prevents roads with associated settlements and human activities becoming barriers to wildlife movements.

The SEA supports the recommendations to encourage urban development, and to focus provision of services in nodes so ribbon development along the main roads is discouraged.

There are no mineral deposits likely to be viable in the Zambezi Region, therefore the SEA finds no threats or conflicts from this sector.

PREVENTION OF FUTURE FLOODING DISASTERS

The IRLUP suggests that the Zambezi Region needs a thorough flood risk analysis with detailed flood mapping. This would identify areas where development should not occur and settlement should not be allowed, so that flooding disasters are avoided. The SEA supports this recommendation to prevent the need for large-scale earth-moving schemes to create artificial islands.

CUMULATIVE IMPACTS OF PRESENT AND FUTURE LAND USES

The land use suggestions in the Zambezi IRLUP could have the following cumulative impacts:

- **Water consumption** from large-scale irrigation projects could increase the total abstraction to a high proportion of the low-flow volume of the Zambezi River. This could jeopardise the fisheries, and downstream states might be disadvantaged in hydropower and irrigation projects of their own.
- **Slash-and-burn agriculture** is unsustainable because crop yields are poor, the productivity of the soil is reduced, and availability of land is dwindling. The cumulative impact of this farming method is increasing poverty from poor crop yields and rising competition for new land.
- **Over-exploitation of fish** is heading towards a collapse of the fisheries resource. Rural communities are heavily dependent on fish for daily livelihoods, and fish are a safety net when crops are poor.
- **Fire** destroys much of the woodland resources every year, which then has a negative impact on livestock and wildlife, as well as veld foods. Soil fertility is lost through fires that are too frequent and that burn hotter towards the end of the dry season.

These problems are likely to intensify as the population grows and as the climate becomes more variable. Solutions are available, as suggested in Sections 8 and 9 of the SEA.

RECOMMENDATIONS AND STRATEGIC ENVIRONMENTAL MANAGEMENT PLAN (SEMP)

The cumulative impacts identified above are the likely outcome of land-use activities that happen at present, and are likely to continue under the IRLUP. The zonations suggested in the IRLUP are supported by this SEA as they can contribute to reducing conflict between sectors and over-exploitation. Recommendations made in this SEA focus on improving management of the land use activities, so that natural resources are not depleted. These principles are repeated in the Strategic Environmental Management Plan, with identification of the parties that would be responsible for implementation.

- **Water abstraction from the rivers should be regulated and monitored**, so that depletion of the Zambezi River flows during the low flow period is avoided. Abstraction is authorized through the permit system managed by DWA, and this

information should feed in to the Zambezi Water Course Commission (Zamcom) that is the forum for managing the internationally shared water resources.

- **Crop production methods should be improved**, so that the need for 'slash-and-burn' practices is removed, and soil fertility sustained. Greater uptake and roll-out of Conservation Agriculture techniques can achieve this.
- **Fisheries management should be improved**, with greater implementation of Fish Protection Areas, to promote local regeneration of fish stocks and the protection of fish-breeding habitats. This must be accompanied by more effective law-enforcement against illegal fishing practices, and aligning Namibian regulations with those in Zambia and Botswana.
- **Fire management should be improved**. Implementation of the pending fire management strategy is urgently required.
- **Human-wildlife conflict** will always be an issue in the Zambezi Region. It can be reduced through the suggestions made in the IRLUP to reduce contact between settlements and cropping areas on the one hand, and wildlife movement corridors on the other. In addition to this, pro-active prevention methods and support to communities who are most vulnerable from wildlife damage need greater support.

Overall, the IRLUP and SEA present suggestions that build on the natural potentials of the Zambezi Region, and attempt to reduce conflicts and the over-exploitation of resources that are critical to livelihoods and development in the region.

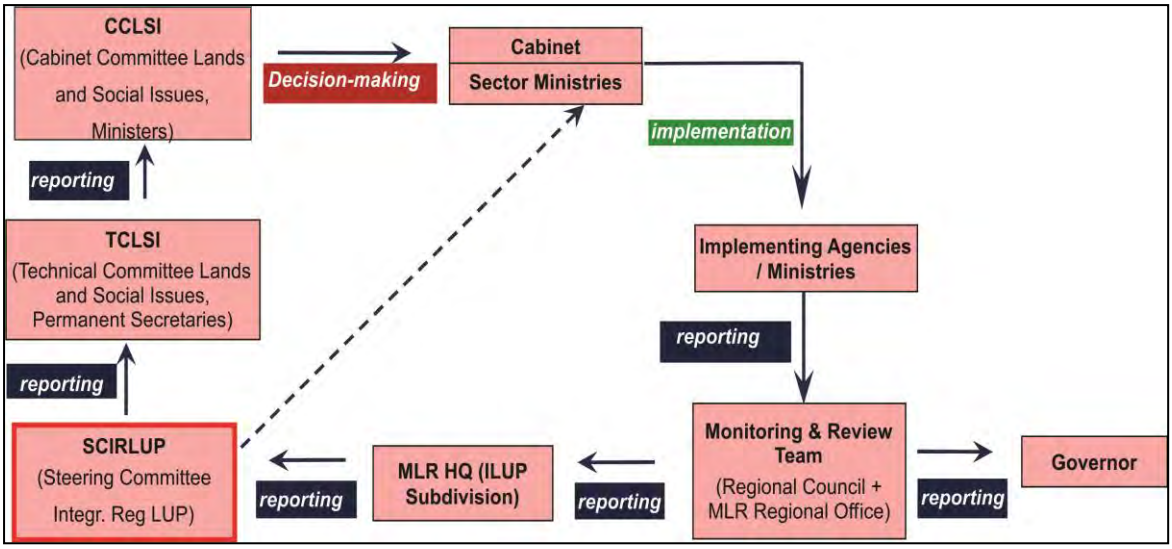
7. IMPLEMENTATION AND MONITORING OF THE ZAMBEZI IRLUP

Given the lack of an overarching legislation, dealing with integrated regional land use planning and the administration thereof in Namibia, the MLR has developed a framework for dealing with the administration and monitoring of the IRLUPs.

The main driver for the coordination of the IRLUP process is the Sub-Division Integrated Land Use Planning under the Ministry of Lands and Resettlement. This Sub-Division was especially created after the realisation that such a division is of high necessity for the proper coordination of such large-scale projects. The Cabinet Committee on Lands and Social Issues (CCLSI) as per Cabinet Decision established the SCIRLUP on 28 September 2010. The SCIRLUP was established as a subcommittee of the Technical Committee on Lands and Social Issues (TCLSI) and the members of this committee consist of the Permanent Secretaries of the 13 Cabinet Ministries. As such, with the SCIRLUP being a subcommittee of the TCLSI this provides the SCIRLUP with direct access to the Cabinet of Namibia.

Figure 21 below provides an overview of the proposed framework for the IRLUP established by MLR:

Figure 21: Institutional and administrative framework of IRLUPs



(Haub & Mujetenga, 2012)

Once the IRLUP has been finalised and submitted to the regional council it becomes the responsibility of the respective Regional Councils to regularly monitor any new development initiatives within the region, or to monitor the existing initiatives identified within the IRLUP. The regional council should appoint a Monitoring and Review Team (MRT) consisting of at least two members from the regional council and two members from the MLR regional office. This MRT should report to the Governor of the Zambezi Regional Council and MLR headquarters with any updates on the plan. It will then be the responsibility of MLR headquarters (LUPA division) to convey any changes and updates to the SCIRLUP committee in Windhoek. The SCIRLUP committee will then provide regular feedback to the TCLSI. Through the TCLSI these new projects/initiatives and reports will be given to the CCLSI. The CCLSI must then make a decision on the projects and programmes identified which are then conveyed to the various sector Ministries for implementation. Once in implementation stage, the sector ministries are to convey the implementation process to the regional ministry office. They in turn, must report to the MRT of the Zambezi Regional Council.

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ANNEXURE A: ISSUES AND RESPONSES

Comments made by participants during the November 2014 and February 2015 workshops were grouped and short responses are given below.

Comments on lack of statistics within the presentation

Response: The presentation is merely an introduction and brief overview of the findings. For detailed statistics readers are advised to read Volume 1 of the report that provides statistics on sectors and sector trends as well as the Volume 2 conclusion. The presentations are not the platform on which stakeholders should take a decision. Stakeholders need to read the reports and then take an informed decision.

Comments on irrigation in general and irrigation schemes along the Kwando River

Response: Stakeholders identified a number of potential irrigation schemes along the Kwando River. These proposals were discussed with experts in the water sector and they state that there is simply not enough water in the Kwando River for large scale irrigation. Furthermore, these schemes would be harmful for the fishing sector due to large abstraction of water that will limit the water in the river, and thereby impact on fish breeding.

The land-use plan does support irrigation. The land-use plan proposed two large areas of irrigation: areas in proximity to Katima Mulilo and at Lake Liambezi. The consideration of irrigation areas at Kongola and Singalamwe has now been included in the land use plan. Please note that a land-use plan is not a project or development plan, and will therefore not indicate the precise localities and names of the irrigations schemes. It will show a general area for irrigation.

Any such irrigation schemes must be preceded by detailed flow of the river studies; feasibility studies as well as environmental impact assessments. These studies are necessary to determine the economic and environmental sustainability of such schemes. The maximum amount of extraction water has to be calculated, to give an indication on the type of crops under irrigation and the required water quantity for sustainable fishing. These studies are not to hamper development, but rather to provide the planners and politicians and traditional authorities with proper answers before taking a decision.

Comments on irrigation with underground water

Response: Irrigation with underground water is a possibility in areas with an aquifer to provide sufficient water. Irrigation, especially smaller schemes for communities, is an excellent way to diversify the economies of the local villages. Different ways of undertaking such projects can be looked at, for example, a village entering into a PPP with a private developer. The developer brings capital, knowledge and the resources to the benefit of the community. Such activities are fully supported by the IRLUP. By law (Environmental Management Act, 2007) these projects require an EIA and feasibility study.

Comments on channelling of water

Response: Although the channelling of water is not a land use issue but rather a project issue, it has been raised several times. It should be clarified that land-use planning is not project planning or development planning and would not address projects, but rather land uses. The SEA is a separate independent process that evaluates the land-use plan proposals and the matters discussed by the SEA and red flags by the SEA are independent from this IRLUP.

The IRLUP recognises the possible need for channelling of water for irrigation purposes. By law any such projects requires an EIA and feasibility study. Loss of water through evaporation from channels is usually an issue with channels, so a closed system will most likely be a better option for the region, but such a system will have to be investigated by experts in the field. The IRLUP suggests focusing on possible irrigation closer to Katima Mulilo, where such channels will be shorter, and impacts less severe. The cost-benefit ratio of 15 – 30km long channels needs to be established in feasibility studies.

Comments on harvesting of flood water/damming of flood water

Response: This issue is outside the scope of this land-use plan. The land-use plan does not address harvesting of water. Engineering, downstream flow of the water studies, feasibility and environmental studies will have to be done prior to giving any feedback on such an issue. Harvesting of flood water is always an option in any part of the country, but the impacts, feasibility and cost implications have to be assessed.

Harvesting of water will obviously bring forth numerous potentials such as irrigation, fish farms, livestock farming and so forth, which will in turn lead to income generation. These real impact, economic and otherwise will however be speculation by any party until feasibility assessments have been completed.

Comments on ‘up-earthing’ of small areas for schools, clinics etc

Response: Up-earthing is not a land use issue and outside the scope of an IRLUP.

Up-earthing of small areas for schools, settlements, clinics and so forth is not prohibited by this land-use plan. These are all short term solutions for a much bigger problem the eastern floodplains faces. The IRLUP is consistent in its approach, in that it recommends that detailed studies ought to be done by the government to find long term solutions for this area. These solutions can be anything from the channelling of water to create land, the reclamation of land through diverting rivers, or upearthing of larger areas of land. These are all aspects that must be investigated through detailed expert studies. Therefore the IRLUP is not against such smaller scale up-earthing projects as a short term solution.

Comments that IRLUP report is biased towards tourism and conservation

Response: Although the report refers to the potential for the tourism and conservation sector, it still acknowledges the importance of the livestock and cropping sectors, as well as the fishing and other sectors. The land-use proposals made in the plan also follow the current trend of the land uses, and does **not prevent or limit** communal livestock and cropping from taking place in the region. In fact, the report reiterates several times the importance of the livestock and cropping as a subsistence income for communities and that access for communities to the river is vital.

Comments on KAZA and why the region has not benefited from KAZA

Response: This is an issue with respect to the management of conservancies. This is not a matter for a land use plan. If benefits from conservancies do no reach the people, it is a matter of the management plan of the conservancy.

Comments on agriculture – diversifying livelihoods

Response: The concern was raised that diversification of livelihoods only brings poverty as less land is available for agriculture. What really would be needed is capacity building and training to increase crop production. This is a concern that is shared by the IRLUP and a recommendation that is also supported by the IRLUP. Training, capacity building and awareness of various methods to increase productivity is imperative to farming.

Comment on wildlife and diseases

Response: Wildlife diseases are a problem that will not be solved by killing or stopping wildlife coming to the region. There are solutions that the government and Meatco are busy investigating to ensure that farmers can still export meat such as commodity based trading. Instead of declaring a region FMD free, the idea is to make sure that the meat is FMD free by using certain slaughtering methods, canned meat, deboned meat etc. These are all

proposals that are being investigated by the government and Meatco, and being discussed with export partners.

Comments on tourism and high capital cost

Response: This is unfortunately a drawback to tourism establishments; it is expensive to provide high-end establishments. This is also not a land-use planning issue, but rather an issue of security of tenure and financial viability.

More benefits from tourism: this is a management issue that should be discussed with tourism operators. This does not relate to land use planning. Agreements should be reached between traditional authorities and operators when land is allocated.

Comments on land-use planning vs project/ development planning

Land-use planning is often confused with project planning or development planning. Some stakeholders only want to be involved in planning when there are discussions about what project will come to the region. This is development planning. Land-use planning is evaluating the land uses and making recommendations on what suitable and viable land uses there are for an area. Land use refers to the utilisation of land by an activity. For example in the Zambezi Region, there are a number of land uses:

- Livestock farming
- Crop farming
- Irrigation farming
- Urban areas
- Tourism areas
- Core conservation areas

Land uses do not refer to management systems, in other words, conservancies are not land uses. They are the management system that oversees a number of land uses. The land uses in a conservancy will be: multiple use area, livestock area, trophy hunting area, tourism area and so forth. It refers to the physical utilisation of the land.

That is why many of the issues raised by stakeholders are dealing with projects, rather than land uses. For example, creation of a channel to bring water inland. This is a project and not a land use issue. Although, bringing the water to a specific area will have an impact on the land use, as it will mean irrigation can be done in an area, in such cases the land use plan can merely identify an area (eastern floodplains) as being problematic in terms of flooding and recommend that certain studies ought to be done in order for development such as settlements, towns, schools etc to happen in this area.

Comment on flood mitigation

Response: Addressing the flooding issues is not a land-use planning issue. This is a technical project issue that needs to be addressed through expert studies and investigations. The problems with earth-moving/up-earthing areas for schools etc, was not something that was mentioned by the IRLUP. This is a specific concern raised by the SEA and addressed by the SEA.

Comment on illegal fishing and poaching

Response: This is a management and enforcement issue that is not related to land use planning. Stronger policing and enforcement should take place in these cases as land use planning cannot address these issues.

Comment on Human Wildlife Conflict (HWC)

Response: HWC can be minimised through mitigation measures such as chilli bombs, guards, tin fences and so forth and naturally through land-use planning. Proposals by this plan aim to reduce such conflict through minimising the attraction for wildlife – such as crops fields and boreholes next to areas with high wildlife numbers. Areas next to national parks have the highest conflict because of the high numbers of wildlife within the parks. By placing a land use, such as tourism, trophy hunting or wildlife viewing in areas next to the national parks, it will reduce the chances of people 'meeting' wildlife. These areas do not have to be large areas and can be anything from 5 to 20km. By being cognisant of wildlife corridors and allocating land uses accordingly, HWC can be minimised.

Comment on the deepening of the Bukalo Channel

Response: This is not a land use issue and will not be addressed by the land-use plan. It is mentioned and addressed in the SEA report.

Comment on urbanisation

Response: The trend of urbanisation will continue, despite the concern of Zambezi stakeholders. The younger generation will want formal employment. This will be within urban areas and will attract young people to move to towns. A positive aspect of urbanisation is that it keeps young people in the region.

Miscellaneous

The land-use plan (map) will not show the projects such as quarantine camps and development centres. These are projects that will be shown in Volume 1 of the report under agricultural projects.

Programme for Communal Land Development (PCLD)

This is a specific project run by MLR. Any comments on the project and inputs into the PCLD must be addressed directly to MLR .