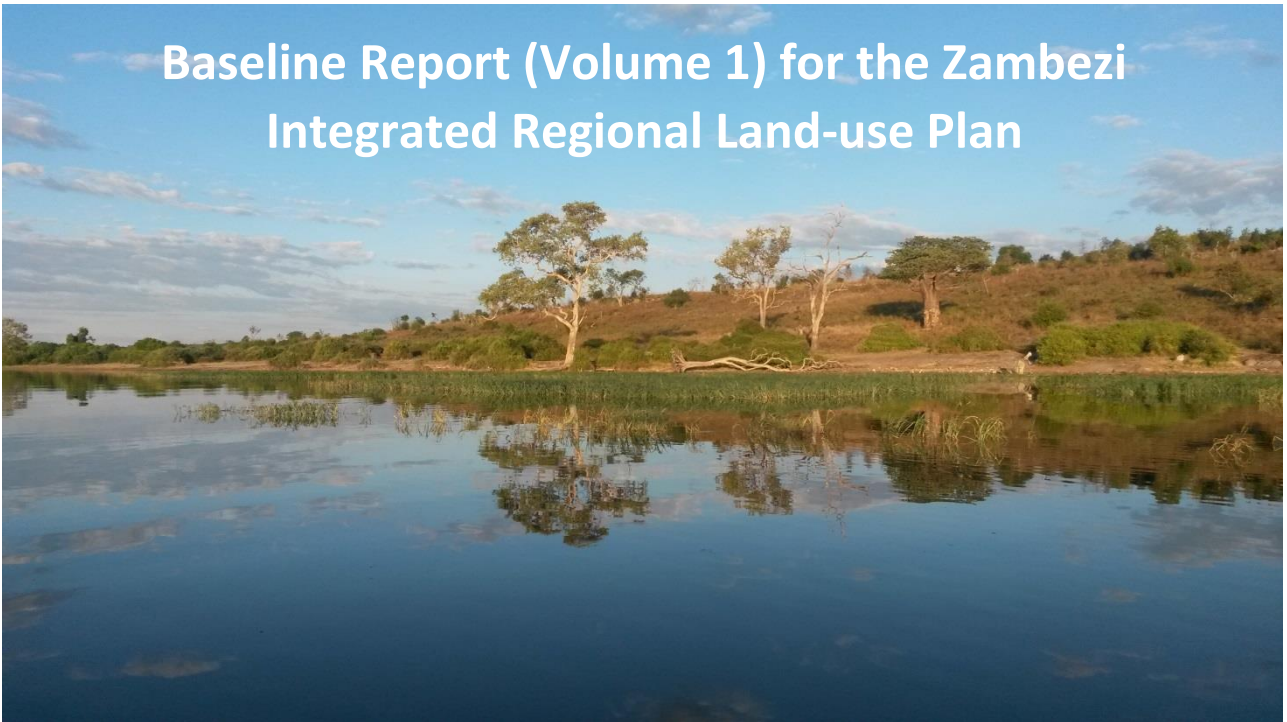




MINISTRY OF LANDS AND RESETTLEMENT

Baseline Report (Volume 1) for the Zambezi Integrated Regional Land-use Plan



Ashby Associates cc

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List of Abbreviations and Acronyms

APF	Africa Planning Forum
ARI	acute respiratory infections
CBT	Commodity-based Trade
CCLSI	Cabinet Committee on Lands and Social Issues
CC	Communal Conservancies
CF	Community Forests
EIA	environmental impact assessment
EPL	Exclusive Prospecting Licence
ESKOM	Electricity Supply Commission of South Africa
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FMD	Foot and Mouth Disease
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRN	Government of the Republic of Namibia
HWC	human wildlife conflict
IDP	Integrated Development Plan
INP	Indigenous Natural Products
IRDNC	Integrated Rural Development and Nature Conservation
IRLUP	Integrated Regional Land-use Plan
KAZA TFCA	Kavango Zambezi Transfrontier Conservation Area
KfW	Kreditanstalt für Wiederaufbau
LED	Local Economic Development
LLPP	Local-level Participatory Planning
LSU	large stock unit
LUPA	Land Use Planning and Allocation
MAWF	Ministry of Agriculture, Water and Forestry
MCA	Millenium Challenge Account
MEAs	Multilateral Environmental Agreements
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
MRLGHRD	Ministry of Regional and Local Government, Housing and Rural Development
MRT	Monitoring and Review Team
MUA	Multiple Use Area
MWTC	Ministry of Works, Transport and Communication

NAB	Namibian Agronomic Board
NamPower	Namibia Power Corporation
NamWater	Namibia Water Corporation LTD
NEWFIU	Namibia Early Warning and Food Information Unit
NNF	Namibia Nature Foundation
NORED	Northern Namibia Regional Electricity Distributor
NPC	National Planning Commission
NSA	Namibia Statistics Agency
NTA	Namibia Training Authority
PCLD	Programme for Communal Land Development
PPO	Producer and Processor Organisation
SADF	South African Defence Force
SAIEA	Southern African Institute for Environmental Assessment
SCIRLUP	Steering Committee for Integrated Regional Land-Use Planning
SEA	strategic environmental assessment
SPC	Stubenrauch Planning Consultants
SSCF	small-scale commercial farms
TCLSI	Technical Committee on Lands and Social Issues
UNAM	University of Namibia
VTC	Vocational Training Centre
ZESA	Zimbabwe Electricity Supply Authority
ZESCO	Zambia Electricity Supply Corporation
ZIZABONA	Zimbabwe/Zambia/Botswana/Namibia

EXECUTIVE SUMMARY

The Zambezi Integrated Regional Land-use Plan (IRLUP) is one of five land-use plans based on the new modelling process adopted by the Ministry of Lands and Resettlement (MLR). One of the main objectives of an IRLUP is to find the land use that is most sustainable for a region, in terms of both environmental and economic sustainability. The various advantages and disadvantages of land use needs to be weighed against factors such as environmental protection and economic growth. Ultimately, the land use should bring benefits to the people living in the region. A land use bringing perceived benefits to the people of the region might not always be the best land use in terms of sustainability, thereby an equal balance needs to be found when assessing the most suitable land use for an area.

The subsistence livestock farming, cropping, and fishing remains the most important contributors to the subsistence livelihood income for residents of the region. A second important and growing economy is from conservancy benefits, devil's claw harvesting, fishing, collection and sale of grass and reeds and income from tourism enterprises and spin-off industries from these tourism activities.

Combined with the growth potential in the tourism industry, the region also has economic potential in the trade sector, due to its excellent location with Southern African Development Community (SADC) neighbours. The importance of infrastructure corridors such as the Trans-Caprivi Highway will continue to grow, giving the region an ideal advantage. The region has three potential focal target areas linked with the fourth National Development Plan (NDP 4).

- Logistics: especially in the border towns of Katima Mulilo and Ngoma;
- Tourism: with the increased conservation status and protection of resources, the tourism industry will grow;
- Agriculture: despite no commercial agriculture in the region, subsistence farming is still the biggest supporter of communal livelihoods. This livelihood, combined with benefits from the tourism and conservation sector and other spin-off benefits, will lead to diversification of livelihoods in the communities.

There are a number of factors that plays a role in the development of the region. Tourism enterprises and formal business enterprises such as private irrigation projects are hampered by insecure land tenure in the communal areas and conflict between communities and tourism operators. Most of these issues are manageable and can be resolved with proper consultation and awareness creation.

The role of subsistence communal livelihood in the communities is an important aspect to consider within the development for the region. Around 69% live in the rural area and practise subsistence cattle and crop farming. Other livelihood activities supplement their

income, such as gathering reeds, fruits, grass, Devil's Claw and fishing . Tied to this strong rural population and subsistence livelihood is the linear settlement pattern that can be seen in the region along the main roads and rivers. This type of settlement pattern leads to a weakened planning system and a costly service provision. A further challenge is the annual flooding within the eastern part of the region and along main rivers. These floods annually displace thousands of households that then rely on flood relief. These flood-inundated areas have weak infrastructure and development, and as yet, no proper flood analysis has been carried out by the government to investigate the various possibilities of alleviating this situation.

Illegal fishing and overfishing within the Zambezi and Chobe Rivers are a threat to subsistence livelihoods of the communities. Such illegal fishing and overfishing can be controlled by proper implementation of the legislations, in addition to the creation of fish protection areas.

The region has some wonderful opportunities for generating additional income for communities from the benefits gained by conservancies, harvesting of Devil's Claw, recreational fishing and wildlife viewing. With the creation of KAZA, the Zambezi Region is in an ideal position to reap benefits from the accompanying synergies and marketing that will flow from the full implementation of such an initiative. With the increase opening of trade opportunities within Africa and SADC neighbours, the role of the region, as a gateway, stopover and logistical hub should not be underestimated.

1. INTRODUCTION TO INTEGRATED REGIONAL LAND-USE PLANNING

Land-use planning is defined by the Food and Agriculture 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).

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 of where such a development is to take place. Additionally, authorities can utilise the land-use plan to strategise for their projects and to put forward action plans on how to achieve the most suitable land use. A land-use plan reflects the existing land-use situation within a region and proposes certain recommendations for land use change in the future in order to optimally utilise the land. A land-use plan assesses the current land use situation, potential conflict areas and then recommends an alternative in order to achieve optimum use of the land.

The Zambezi Integrated Regional Land-use Plan 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 Integrated Regional Land-use Plans (IRLUP), as set out by MLR, is to correct previous deficiencies in land-use planning in Namibia. 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: Karas and Hardap. The process was then tested, refined and put into practice in the third land-use plan for the Kavango Regions. The Zambezi IRLUP is the fourth land-use plan based on the new approach of bottom-up planning involving local stakeholders in the planning approach and creation of a 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 inputs into the IRLUP by stakeholders from the constituencies;
- Geographical Information System (GIS) database;

- strategic environmental assessment (SEA) on the proposals made by the Zambezi IRLUP.

Stubenrauch Planning Consultants (SPC) together with Ashby Associates cc and Africa Planning Forum (APF) were appointed by MLR 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 plan is divided into two volumes. The preparation of volume 1 has input from SPC and the Southern African Institute for Environmental Assessment (SAIEA). It focuses on providing baseline information related to the Zambezi Region.

Volume 2 is based on the findings from the participatory land-use planning workshops and the recommendations from participants and experts on the land uses for the region and the analysis of these recommendations. The final recommendations are a combination of recommendations from the stakeholders and an analysis of these recommendations.

Volume 1:

Chapter 1 provides a general overview of the IRLUP process. This includes the history, the objectives and principles, the legal and administrative framework for the IRLUPs. In addition to this, the international laws, treaties and conventions that may have an impact on land-use planning.

Chapter 2 is the methodology section in which the IRLUP process is briefly described. This chapter discusses the community and stakeholder participation process, main desktop studies, a brief overview of the GIS process followed during the Zambezi IRLUP and studies and programmes operating within the Zambezi that can influence land-use planning.

Chapter 3 focuses on the description of the Zambezi Region with reference to the locality of the region in terms of the rest of Namibia and SADC countries, the land administration in the Zambezi Region, the biophysical characteristics and socio-economic profile, predicted climate change and environmentally sensitive areas.

Chapter 4 continues with the baseline information and discusses the economic drivers within the Zambezi Region, the present land uses and general sector trends of these land uses.

1.2.OBJECTIVES AND PRINCIPLES OF THE INTEGRATED LAND-USE PLAN

Integrated land-use planning is a sector-overlapping and integrative decision-making process that facilitates the allocation of land to the uses that provide the **greatest sustainable benefits**. As part of this process, the participation of communities was seen as an integral part of the process and as such, the land uses and recommendations within this document are the result of participatory and consultative processes and an analysis of these participatory inputs.

Land-use planning aims at sustainability by balancing social, economic and environmental needs both now, and for the future. In order for an IRLUP to be sustainable, it must incorporate the framework of infrastructure projects, natural resource availability, social impacts, human resources, and government and private institutions. The following questions are typically addressed during the process of formulating a land-use plan:

- How should the land look in the future?
- What types of land uses are needed?
- What types of land should be protected?
- Where should the different types of land use be located?

Integrated land-use planning is an integral part of the of land and resource management of a specified area. It helps to facilitate the delivery of public programmes by identified resource management agencies.

Recommendations and proposals on future land uses for the Zambezi Region as contained in volume 2 were formulated by assessing the information obtained from the local, regional and national stakeholders. The IRLUPs are based on bottom-up rather than top-down planning, and as such, the participation of communities in identifying visions, goals, and development initiatives is seen as a vital part of this process.

Generally, the new process for integrated regional land-use planning is based on the following basic principles:

- Sector-integration and sector overarching collaboration in the planning and implementation of land use related strategies and projects.
- Participatory planning and civic society involvement through bottom-up planning instruments.
- Systematic utilisation of geographic data and establishment of a unified Regional Planning GIS.
- Strategic environmental assessment of Integrated Regional Land-use Plans.
- Monitoring of the Integrated Regional Land-use Plan (Haub & Mujetenga, 2012).

1.3. INSTITUTIONAL FRAMEWORK OF IRLUP

Given the lack of overarching legislation dealing with integrated regional land-use planning and the necessary administration, the MLR has developed a framework to address 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 within the MLR. This sub-division was created after the realisation that such a sub-division is of high necessity for the proper coordination of such large-scale projects. This sub-division is responsible for the facilitation of tender procedures and ensures procedures, as set out for the formulation of the IRLUP, are followed.

As the land-use planning process needs close cooperation between regional and local stakeholders, it is important that a link is established between the national and local decision makers. This link has a dual purpose. Firstly, it will ensure that recommendations from the IRLUPs can be applied by national decision-makers in planning and approval of capital projects. Secondly, it will ensure that land-use conflicts identified by the IRLUP can be addressed at a higher level. For this reason, a national Steering Committee for Integrated Regional Land-use Planning (SCIRLUP) was established.

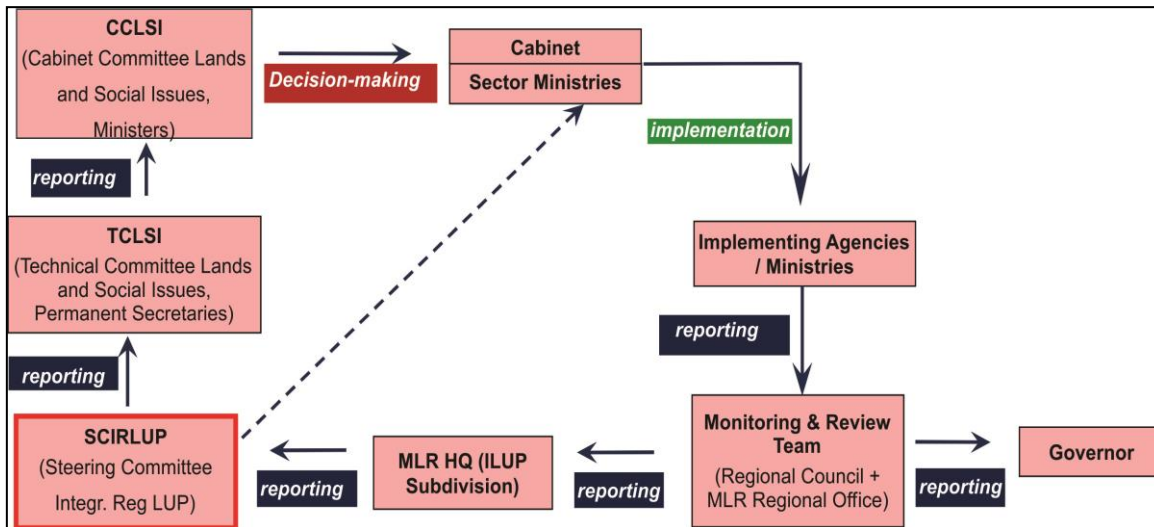
The SCIRLUP was established by the Cabinet Committee on Lands and Social Issues (CCLSI) as per a Cabinet decision made on 28 September 2010. It was established as a sub-committee of the Technical Committee on Lands and Social Issues (TCLSI). The members of the TCLSI include the permanent secretaries of the line ministries. With SCIRLUP being a subcommittee of the TCLSI, this provides direct access to the Cabinet of Namibia.

The SCIRLUP has the following key tasks and function:

- to discuss and agree upon the regional land-use zoning, development strategies, programmes, projects and other activities identified through the IRLUP process and communicate them to the political decision-making levels;
- to liaise with respective ministries to ensure that strategies, programmes and projects identified in the final IRLUP are included in the respective operational plans and budget plans of the relevant ministries;
- to ensure that all sector plans, development plans and other relevant plans are aligned and harmonised with the IRLUP;
- to ensure the smooth and fast provision of all relevant data for the IRLUP to be provided from different sectors and institutions;
- to liaise and cooperate with the respective regional council;
- to confirm the IRLUP as a whole and submit the final IRLUP for approval to Cabinet (Haub & Mujetenga, 2012).

Figure 1 outlines the administrative framework for the IRLUP.

FIGURE 1: INSTITUTIONAL AND ADMINISTRATIVE FRAMEWORK OF IRLUPS (HAUB & MUJETENGA, 2012).



Once an IRLUP has been finalised and submitted to the relevant regional council it becomes the responsibility of that regional council to regularly monitor existing initiatives and any new development initiatives within the region. 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 regional governor, regional council and MLR headquarters with any updates on the plan. It will be the responsibility of MLR headquarters (Land Use Planning and Allocation Division (LUPA)) to convey any changes and updates to the SCIRLUP in Windhoek. The SCIRLUP 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 then makes a decision on which identified projects and programmes will be conveyed to the various sector ministries for implementation. The sector ministries must convey the implementation process to the regional MLR office, which in turn reports to the MRT. This is a continuous cycle of monitoring and review.

1.4. ADMINISTRATIVE AND LEGAL FRAMEWORK RELEVANT TO ZAMBEZI IRLUP

This section deals with an overview of the administrative and legal framework relevant to the Zambezi IRLUP and focuses on relevant legislation and policies that may have an impact on land-use planning within the region.

1.4.1 OVERVIEW OF NATIONAL LEGISLATION AND POLICIES RELEVANT TO THE ZAMBEZI IRLUP

The Government of the Republic of Namibia (GRN) recognises the need for integrated efforts to coordinate the development of the country. In spite of efforts to achieve and implement the goals set out by the decentralisation law and policy, sectoral and top-down planning on

regional and local levels is still common practice. This commonly leads to situations where regional development initiatives are not harmonised between national, regional and local levels of administration. This also results in the failure of the national development plans (NDPs) to take the needs of communities and initiatives at the grass-roots level into account in planning and budget allocation. Another problem related to this is, Namibia does not have a single comprehensive and overarching legislation dealing with land-use planning. Instead, each line ministry dealing with land and its resources (for example, Ministry of Environment and Tourism (MET), Ministry of Agriculture, Water and Forestry (MAWF), MLR, Ministry of Mines and Energy (MME) and Ministry of Regional and Local Government, Housing and Rural Development (MRLGHRD)) has its own legislation dealing with land-use planning. Harmonisation of the different legislation is lacking. Table 1 provides an overview of the legislations and policies relevant to the Zambezi IRLUP.

TABLE 1: LIST OF NATIONAL LEGISLATION AND POLICIES RELEVANT TO IRLUP

Regulations and Laws Relevant Authority	Summary of Legislation	Comment
<p>The Constitution of Namibia</p> <p>The Government of the Republic of Namibia</p>	<p>Article 16 of the Constitution provides for all persons to acquire, own and dispose of all forms of immovable and movable property in any part of Namibia. It further states in article 21 that all persons shall have the right to freedom of speech and expression and; to reside and settle in any part of Namibia. Furthermore, it requires in article 95 (l) that the state shall actively promote and maintain the welfare of the people by adopting, <i>inter alia</i>, policies aimed at the following, among others; Maintenance of the ecosystems, essential ecological processes and biological diversity of Namibia and utilisation of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future.</p>	
<p>The Environmental Management Act 7 of 2007</p> <p>Ministry of Environment and Tourism</p>	<p>This Act serves as an overall governing instrument to promote co-ordinated and integrated management of the environment, to give statutory effect to the compilation of environmental assessments and to enable obligations under international environmental conventions. This Act establishes a Sustainable Development Commission and Environmental Commissioner to implement the provisions of this legislation. In addition to everybody else, the state, including all government institutions, will be subject to the provisions of this Act.</p>	
<p>Water Act 54 of 1956</p> <p>Ministry of Agriculture, Water and Forestry</p>	<p>This Act provides for the control, conservation and use of water for domestic, agricultural, urban and industrial purposes and for the control of certain activities on or in water in certain areas.</p> <p>Section 23(1) states that it is an offence to commit any act which could pollute any public or private water, including underground water, or sea water in such a way as to render it less fit for the purposes for which it is or could be ordinarily used by other persons, for the propagation of fish or other aquatic life or for</p>	

Regulations and Laws Relevant Authority	Summary of Legislation	Comment
	recreational or other legitimate purposes.	
<p>The Regional Councils Act 22 of 1992</p> <p>Ministry of Regional Local Government Housing and Rural Development</p>	<p>This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning point of view, their duties include, as described in section 28 ‘to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.’</p>	<p>It is clear that the Regional Councils have a significant duty to compile a regional land-use plan for each relevant region. The Zambezi Regional Council should therefore form an integral part of the planning process throughout the development of a project such as this one.</p>
<p>The Traditional Authorities Act 25 of 2000</p> <p>Ministry of Regional Local Government Housing and Rural Development</p>	<p>This Act recognises Traditional Authorities (TAs) as legal entities. Among the duties of the TAs with respect to land use are; to assist and cooperate with the Government, Regional Councils and Local Authority Councils in the execution of their policies and to keep the members of the traditional community informed of the developmental projects in their area. Furthermore, to ensure that the members of his/her traditional community use the natural resources at their disposal on a sustainable basis and in a manner that conserves the environment and maintains the ecosystems for the benefit of all persons of Namibia.</p>	<p>Traditional Authorities must be fully involved in the planning of land use and development for their areas. Indeed, Section 30 of the Communal Land Reform Act requires that the TAs must be consulted and consent to leaseholds for agricultural purposes.</p>
<p>Forest Act 12 of 2001</p> <p>Ministry of Agriculture, Water and Forestry</p>	<p>The Act states that the aim of forest management is to conserve natural resources and biological diversity and to use forest produce in a way which is compatible with the forest’s primary role as the protector and enhancer of the natural environment. The Act enables the registration of classified forests, namely state forest reserves, regional forest reserves, community forests and forest management areas. The Act also enables the protection of vegetation on sand dunes and within 100 metres from a river outside an urban area. Vegetation in these areas may not be removed without the necessary licence. Furthermore, forestation and deforestation is not allowed on any land larger than 15 hectares without a permit. The Minister may require an environmental assessment to be undertaken for such projects.</p>	
<p>White paper on the Responsible Management of Inland Fisheries in Namibia</p> <p>Ministry of Fisheries and Marine Resources</p>	<p>This policy of the Ministry of Fisheries and Marine Resources (MFMR) allows for the exploitation of inland fish resources on a sustainable basis and at an optimal level. It also protects the resource from activities other than fishing that may have a negative impact on the sustainability and biological integrity of the resource.</p>	<p>Whenever actions that may have an impact on inland fish are planned, the Minister will have to be consulted and environmental impact studies conducted to the satisfaction of the Minister.</p>
<p>The Parks and Wildlife Management Bill 2009</p>	<p>The Bill provides for the declaration of protected areas and the steps that must be taken before declaration.</p>	<p>This proposed legislation is still in draft form, but</p>

Regulations and Laws Relevant Authority	Summary of Legislation	Comment
Ministry of Environment and Tourism	Protected areas may be classified into wilderness areas, national parks, natural monuments, nature reserves, protected landscapes and conservation areas. Each protected area shall have a Management and Development Plan, including a vision, management objectives, zoning, determination of utilisation levels, etc. Game parks and Nature Reserves are presently proclaimed in terms of the Nature Conservation Ordinance of 1975. It also controls hunting of wildlife, fish and inland waters, as well as picking, transporting and sale of indigenous plants.	will eventually replace the Nature Conservation Ordinance of 1975 (as amended).
The Nature Conservation Amendment Act 5 of 1996 Ministry of Environment and Tourism	This Act made provision for the establishment of conservancies and Wildlife Councils in communal areas. The Act uses conservancies as the means by which limited rights to manage and benefit from wildlife and tourism are given to a specific group of people living in communal areas. The main aim is to promote sustainable wildlife management and tourism activities in communal areas.	
Namibia Tourism Board Act 21 of 2000 Namibia Tourism Board	This Act provides for the establishment of the Namibia Tourism Board. It aims at, <i>inter alia</i> , the promotion of tourism and the development of the tourism industry and to promote environmentally sustainable tourism by actively supporting the long term conservation, maintenance and development of the natural resource base of Namibia.	The Ministry of Environment and Tourism is compiling tourism development plans for the regions. These plans will be overseen by the Board.
Pollution Control and Waste Management Bill Ministry of Health and Social Welfare/Ministry of Environment and Tourism	The aim of this prospective legislation is to prevent and regulate the discharge of pollutants to the air, water and land, through the establishment of a Pollution Control and Waste Management Agency. It establishes an appropriate framework for integrated pollution prevention and control; regulate noise, dust and odour pollution, as well as providing a system for waste planning and management. Applicants proposing activities which will imply the discharge of polluting substances into the air or water body will have to apply for air or water pollution licences at the authority to which such powers have been delegated. An integrated approach to pollution control may be followed, whereby those activities posing a risk to more than one resource may be subject to one application for an Integrated Pollution Control Licence.	Coordination with the Pollution Control and Waste Management Agency will be required if the bill is enacted. The Zambezi IRLUP process must keep abreast with developments in waste management planning and incorporate relevant data and management guidelines at the regional level.
National Heritage Act 27 of 2004 Ministry of Youth Sports and Culture	This Act provides for; <i>inter alia</i> , the protection and conservation of places and objects of heritage significance and the registration of such places and objects. The categories of registration include places of heritage significance. These places are defined to mean “aesthetic, archaeological, architectural, cultural, historical, scientific or social significance. The procedure for recommendation for a place as a heritage place is set out in Section 28.	In light of the powers and functions of the Heritage commission, any land-use plan must also take account of the potential significance of a place, insofar as its potential as a place of heritage significance is concerned.

Regulations and Laws Relevant Authority	Summary of Legislation	Comment
<p>Namibia's Draft Wetland Policy (November 2004)</p> <p>Ministry of Environment and Tourism</p>	<p>Namibia's Wetland Policy's vision is to manage national and shared wetlands wisely by protecting their vital ecological functions, life support systems for the current and future benefit of people's welfare, livelihoods and socio-economic development.</p>	<p>The basic principles intended for the development of the framework for all water - related policies including the Wetlands Policy are also discussed in the National Water Policy.</p>
<p>The National Agriculture Policy (1995)</p> <p>Ministry of Agriculture, Water and Forestry</p>	<p>The Policy recognises that water resources in Namibia are limited and that growth within the agriculture sector should not be at the expense of the natural environment. Furthermore, it encourages the use of environmental assessments for agriculture projects and proposes a review of legislation related to agrochemical use.</p>	
<p>The National Drought Policy and Strategy (1997)</p> <p>Ministry of Agriculture, Water and Forestry</p>	<p>The National Drought Policy shifts the onus of drought management from government aided relief to appropriate farming techniques aimed at empowering farmers to better cope with droughts themselves.</p>	
<p>The Nature Conservation Ordinance, 1975</p> <p>Ministry of Environment and Tourism</p>	<p>This ordinance covers game parks and nature reserves, the hunting and protection of wild animals (including game birds), problem animals, fish and the protection of indigenous plants.</p>	<p>This ordinance will be replaced by the Parks and Wildlife Management Bill.</p>
<p>Soil Conservation Act 6 of 1969</p> <p>Ministry of Agriculture, Water and Forestry</p>	<p>This Act covers the prevention and combating of soil erosion; the conservation, improvement and manner of use of the soil and vegetation; and the protection of water sources.</p>	
<p>Communal Land Reform Act 5 of 2002</p> <p>Ministry of Lands and Resettlement</p>	<p>The Communal Land Reform Act provides for Communal Land Boards (CLBs) to assist in the administration of communal land. Such boards have been established in all the 12 out of the 14 regions (recently added Kavango West Region) in Namibia with communal areas. The Communal Land Boards are expected to make environmentally sound decisions in their land allocations. The Land Boards take few direct decisions regarding land allocation, but when ratifying the decisions of traditional authorities and considering lease applications, the CLBs should apply sound land-use planning and environmental conservation principles.</p>	
<p>Water Supply and Sanitation Policy, 2008</p> <p>Ministry of Agriculture, Water and Forestry</p>	<p>The first Water Supply and Sanitation Policy (WASP) was adopted in 1993. However due to several developments in the water sector which necessitated a review, it was replaced by this WASP of 2008. Its principles are in line with Integrated Water Resources Management (IWRM). The policy aims to provide improved water supply, improved sanitation and irrigation at affordable prices</p>	

Regulations and Laws Relevant Authority	Summary of Legislation	Comment
	to all the users and Namibians in particular and that such developments are environmentally sustainable. The Policy places strong emphasis on community involvement, participation and responsibility. Communities or beneficiaries determines their water supply and sanitation service levels and contribute to costs.	
Draft Bill on Access and Benefit Sharing (ABS)	This Bill will set out to achieve the objectives of the Nagoya Protocol (see table 2).	Still in draft form.

1.4.2 INTERNATIONAL LAWS, TREATIES AND CONVENTIONS RELEVANT TO THE ZAMBEZI IRLUP

International law includes the international agreements signed and ratified by Namibia, as well as the rules of customary international law (referring to ‘the general rules of public international law’). Article 144 of the Namibian Constitution states that; ‘unless otherwise provided by this Constitution or Act of Parliament, the general rules of public international law and international agreements binding upon Namibia under this Constitution shall form part of the law of Namibia’ (LAC, 2009).

International environmental treaties (also known as Multilateral Environmental Agreements (MEAs) regulate relationships between states pertaining to the environment. International environmental law may be established on the global level, containing rules applicable for the entire, or at least almost the entire, international community. On the regional level, international law creates a legal framework for a specific region, such as the African Union. A regional or continental scope may again be subdivided into smaller regional blocks, such as the SADC legal framework, often referred to as the sub-regional level. Namibia is a state party to a large number of environmental related MEAs. This emphasises Namibia’s strong environmental commitment.

While some international instruments are legally enforceable provided they have been ratified by the state, most policies and conventions are simply guidelines. These conventions, policies and plans (Table 2) describe the direction the policy makers want to take for sustainable development. They provide background information and are not necessarily prescriptive measures for the proponent to follow. However, knowledge of the background to the environmental sustainability process is valuable in interpreting the actual prescriptive laws applicable in Namibia relating to Environmental and Development issues (LAC, 2012).

TABLE 2: INTERNATIONAL CONVENTIONS RELEVANT TO ZAMBEZI REGION

Relevant International Convention	Summary of the Conventions and Requirements/Obligations to be made	Comment
Convention on Biological Diversity (CBD), 1992	As party to the treaty, Namibia is obliged to integrate the conservation and sustainable use of biodiversity into plans, programmes and policies. The objectives of this convention are; the conservation of biological diversity, the sustainable use of biological resources and fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.	As a signatory of the CBD, Namibia is committed to conserving its biodiversity, particularly its endemic species (those that occur only in Namibia).
Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable sharing of Benefits Arising from their Utilisation (2010)	This Protocol aims to achieve equitable access to useful plant products and fair distribution of the benefits amongst the people who harvest them. This provides a framework for a key principle of the CBD (see above).	
Helsinki Rules	The International Law Association developed the Helsinki Rules of 1966 on the Uses of the Waters of International Rivers. The Helsinki Rules outlined principles related to the “equitable utilization” of shared watercourses and the commitment not to cause ‘substantial injury’ to co-riparian states.	
The Revised SADC Protocol on Shared Watercourses Systems	The SADC Protocol on Shared Watercourses provides a framework for the negotiation of river basin agreements. Further instruments under this protocol are the Regional Water Policy and the Regional Water Strategy. The issue of sovereignty is the first to be addressed and Article 1 provides that SADC states are entitled to use water resources in their territory ‘without prejudice to their sovereign rights’.	The SADC Region signed and ratified this protocol in 1995 and was revised in 2002.
UN Convention on the Non-navigational Use of International Watercourses	The United Nations General Assembly adopted the UN Convention in 1997. It represents the ‘codification’ of the rules of customary international law in regards to shared watercourses. It establishes three critical principles in the use of shared watercourse and these are addressed in articles 6, 7&12. These principles deal with social and environmental factors, compensation and issues around prior notification respectively.	This Convention is not yet in force and therefore not legally binding, but Namibia, Angola and Botswana have ratified this Convention.
The Ramsar Convention on Wetlands	This is an intergovernmental treaty signed in Ramsar, Iran in 1971 and Namibia is a signatory to this Convention. It provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources.	
United Nations Framework Convention on Climate	The object of this Convention is to achieve stabilization of greenhouse gas concentration in the	Namibia has ratified this instrument.

Relevant International Convention	Summary of the Conventions and Requirements/Obligations to be made	Comment
Change, 1992	atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a timeframe sufficient to allow ecosystems to adapt naturally to climate change; to ensure that food production is not threatened; to avoid adverse health effects; and to enable economic development to proceed in a sustainable manner.	
Kavango Zambezi Trans Frontier Conservation Area (KAZA TFCA) Treaty	The goal of the KAZA TFCA is 'to sustainably manage the Kavango Zambezi ecosystem, its heritage and cultural resources based on best conservation and tourism models for the socio-economic wellbeing of the communities and other stakeholders in and around the eco-region through harmonization of policies, strategies and practices'. A Memorandum of Understanding (MOU) was signed by the ministers responsible for environment, natural resources, wildlife and tourism of the five partner countries in 2006. These countries are Angola, Botswana, Namibia, Zambia and Zimbabwe. The KAZA TFCA Treaty was signed on 18 August 2011. Both article 4(1) of the MOU and article 8 (1) of the treaty alludes to the issues regarding the obligations of each partner state. Article 8 (1) (a) States that partner states shall 'ensure the protection and management of those parts of the Kavango Zambezi ecosystem falling directly under their jurisdiction'. The KAZA TFCA has some of the worlds renowned natural features, including the Okavango Delta, the largest Ramsar site in the world.	

2 METHODOLOGY

The development of the Zambezi IRLUP took place from April 2014 to August 2014. The project not only focused on the existing land uses in the Zambezi Region, but through stakeholder consultation and participation, it also identified potential future land uses, projects and initiatives in the region.

This continuous cooperation with stakeholders and the client included:

- formal and informal meetings and discussions with the client, MLR;
- a kick-off workshop with regional stakeholders in the Zambezi Region;
- a planning workshop with regional stakeholders in the Zambezi Region to identify existing and potential future projects;
- in-depth local constituency workshops to identify the natural resources, land-use conflicts and proposals to the land-use conflicts;
- focus group discussions with national stakeholders in Windhoek;
- planning workshop with regional stakeholders to present the draft land-use proposals for the Zambezi Region and obtain comments from stakeholders on the draft proposals (6 November 2014);
- a closure workshop with regional stakeholders to present the final land use proposals for the Zambezi Region (2015).

Information assimilated through the participatory workshops, existing studies and reports on the region, focus group discussions and the GIS data, forms the basis of the Zambezi IRLUP Volume 1. The analysis on the participatory workshops and recommendations from the participations form the integral component of volume 2.

Participatory inputs and recommendations were assessed and analysed through utilisation of existing GIS data, technical information on the region and discussions with experts in the different sectors. Final land-use recommendations were then made based on this analysis.

2.1 COMMUNITY AND STAKEHOLDER PARTICIPATION

The main component of the IRLUP is to obtain inputs from the communities during the land-use planning process. During the inception and kick-off workshop with regional stakeholders, the IRLUP process was explained to the stakeholders. A regional workshop then focused on gathering information from stakeholders about the current and possible future status quo of the region, based on current and potential projects, goals and objectives.

As part of the second round of participation, constituency-planning workshops were held within each of the constituencies. During these participatory local level workshops stakeholders were asked to:

- identify resource potential within each constituency. In other words – where is the best grazing land – where are the highest number of wildlife that needs protection and so forth;
- identify conflicting land uses in the constituency. In other words – where are there existing conflicting land uses within the constituency and why is it causing a conflict;
- identify the advantages and disadvantages of each of the conflicting uses;
- assess the strengths and weaknesses of each of the land uses, then rank each of the land uses in terms of benefits to the community, environment and economic benefits.
- think about the future of the region, and considering their own analysis, provide possible solutions to some of the identified conflicting issues.

*Separate workshop reports are available with detail on the workshop proceedings and outcomes.

National stakeholders were also consulted through focus group discussions held with stakeholders from the various sectors in Windhoek. During these focus group discussions, the existing regional situation of the specific sector, as well as proposals on the future regional situation were discussed. Table 3 provides an overview of the community participation workshops and focus group discussions held with stakeholders from the Zambezi Region as well as from national level.

TABLE 3: 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
Planning workshops	8–24 May 2014	Identify potentials for the region; identify conflicting land uses or critical underutilised land uses; ranking of critical issues/conflicts; and recommendations on future land use
Focus Group Discussions	29 July –1 August 2014	Focus group discussions with experts in the fields of agriculture, livestock farming, irrigation, conservation, tourism, fisheries, forestry, water, power, roads, infrastructure and urban developments

Workshop	Date and Venue of Workshop	Objective of Workshop
Presentation of draft IRLUP findings to national stakeholders	31 October 2014	Presentation of the draft SEA findings to national stakeholders in Windhoek
Presentation of draft IRLUP and SEA findings to regional stakeholders	6 November 2014 (Katima)	Presentation of the draft IRLUP and SEA findings to regional stakeholders
Comment period	Until 15 December 2014	Stakeholders will be given until 15 December to provide comments on the draft IRLUP
Final presentation	February 2015	Presentation to the regional stakeholders with the final IRLUP proposals

2.2 DESKTOP STUDIES

A number of studies and reports were reviewed for volume 1 to provide background information on the following; history, climatic and soil conditions, fauna and flora, the people, the existing status of land uses, the trends for each land-use sector and possible recommendations on land use for the Zambezi. These reports and studies were referenced in the document accordingly.

2.3 GEOGRAPHICAL INFORMATION SYSTEMS

The use of spatial analysis through GIS is one of the tools that can be used by land-use planners. Similar to the //Karas and Hardap IRLUPs, the use of spatial analysis techniques and tools available through GIS were utilised during the Zambezi IRLUP. The process documentation *Establishing a Regional Planning GIS* by Geocarta Namibia (2013) for the Kavango, Hardap and //Karas Regions provides detailed accounts of establishing a Regional Planning GIS for IRLUPs.

The process of developing a regional planning GIS database can 'broadly be divided into a data acquisition and collection phase that is followed by basic geodatabase development and integration work' (Geocarta Namibia, 2013) and this phase is followed by geospatial analysis and general desktop mapping for the purpose of the reports. The utilisation of GIS during participatory planning workshops was one of the important elements in the production of the final land-use map. The maps produced by the participants during the planning workshops were captured into the GIS database system and further refined and analysed. A regional GIS database will be handed over to the Regional Council and MLR. It will include various datasets, conflict and land use potentials related to the region that the land-use planners and MLR could utilise for their work.

2.4 PREVIOUS STUDIES, PLANS AND PROJECTS

The Zambezi Region, its rivers and surrounding neighbours, has been the subject of numerous studies and projects in recent decades. This has led to an abundance of plans and recommendations on how the area should or could develop. The more recent and relevant ones are listed in Table 4, with a brief comment on their content and relevance to this land-use plan.

TABLE 4: STUDIES, PLANS AND PROJECTS WITHIN THE ZAMBEZI REGION

Study, Plan or Project	Broad Content	Relevance to the Zambezi IRLUP
Integrated Land-use Plan for Caprivi (2000)	An Integrated Land-use Plan for the Zambezi Region with some broad recommendations on land uses.	Relevant – completed in 2000 and mostly based on expert analysis with no participatory planning.
An Environmental Profile and Atlas of Caprivi (Mendelsohn and Roberts, 1997)	Atlas of Zambezi Region based on the landscapes, climate, land use types, history, traditional authorities, soils, vegetation, type of farming methods, wild animal resources, rivers, wetlands and water supply and considerations for the future for Zambezi.	Relevant – excellent source of baseline information with certain recommendations on the future land uses.
SEA of the Tourism Sector for the Mudumu Landscapes	Assessment of tourism scenarios for the protected landscape conservation area.	Information on likely tourism developments and impacts in the Mudumu North Complex and surroundings .
Bwabwata National Park Management Plan (2013)	Management plan with descriptions of the management zones.	Relevant – the management plans gives the rules and guidelines for the national parks.
Mudumu National Park Management Plan (2013)	Management plan with descriptions of the management zones.	
Nkasa Rupara National Park Management Plan (2013)	Management plan with descriptions of the management zones.	
Caprivi Regional Development Plan (2001)	Identifying the development needs for Caprivi/ Zambezi.	Slightly relevant – outdated.
Wildlife Management and Utilisation Plan for the following conservancies: <ul style="list-style-type: none"> • Bamunu • Dzoti • Kabulabula • Kasiki • Sobbe 	Management and utilisation plan to ensure sustainable utilisation of the resources and equal distribution of resources within conservancy. Zonation plan gives rules and regulations for each of the land uses (only these plans were available by the time of this report).	
Fish Ranching Programme by Namibia Nature Foundation (NNF)	Assisting communities with fingerlings and training for fish ranching in the region.	Relevant – one of the community projects that works for food security options .

Study, Plan or Project	Broad Content	Relevance to the Zambezi IRLUP
Communal Land Development Programme by MLR	See report.	
National Development Plan 4 (NDP4)	The NDP4 that focuses on tools to direct and coordinate development in order to reach Vision 2030.	The NDP4 has a number of focus issues with three overarching goals: high and sustainable growth; increase income equality; employment creation. To reach these goals the NDP 4 has identified key areas of focus these being logistics, tourism, manufacturing and agriculture.
Kavango- Zambezi Transfrontier Park (KAZA)	Supporting conservation within the KAZA area.	Relevant – KAZA can lead to opportunities for all countries involved either indirectly through awareness and increased tourism or through project support for conservation.
Fingerling hatchery at Katima Mulilo	The Ministry of Fisheries and Marine Resources (MFMR) is busy constructing a fingerling hatchery to provide for a source of fingerlings.	

3 DESCRIPTION OF THE ZAMBEZI REGION

The Zambezi Region (previously known as Caprivi Region) is located in the most eastern part of Namibia and is bordered by Botswana, Angola, Zambia and Zimbabwe. The Zambezi Region is one of the 14 political regions in Namibia and covers an area of 14,785 km², making up 1.79% of the country's total land surface (Figure 2) The region is administratively divided into eight constituencies. A large part of the region is floodplains while other areas of the western parts are covered by national parks.

What is now the Zambezi Region, was added as the Caprivi Strip to the then South-West-Africa during the end of the 19th century. This was a result of the negotiations between Germany and other colonial powers during the Berlin Conference (Mendelsohn & Roberts, 1997).

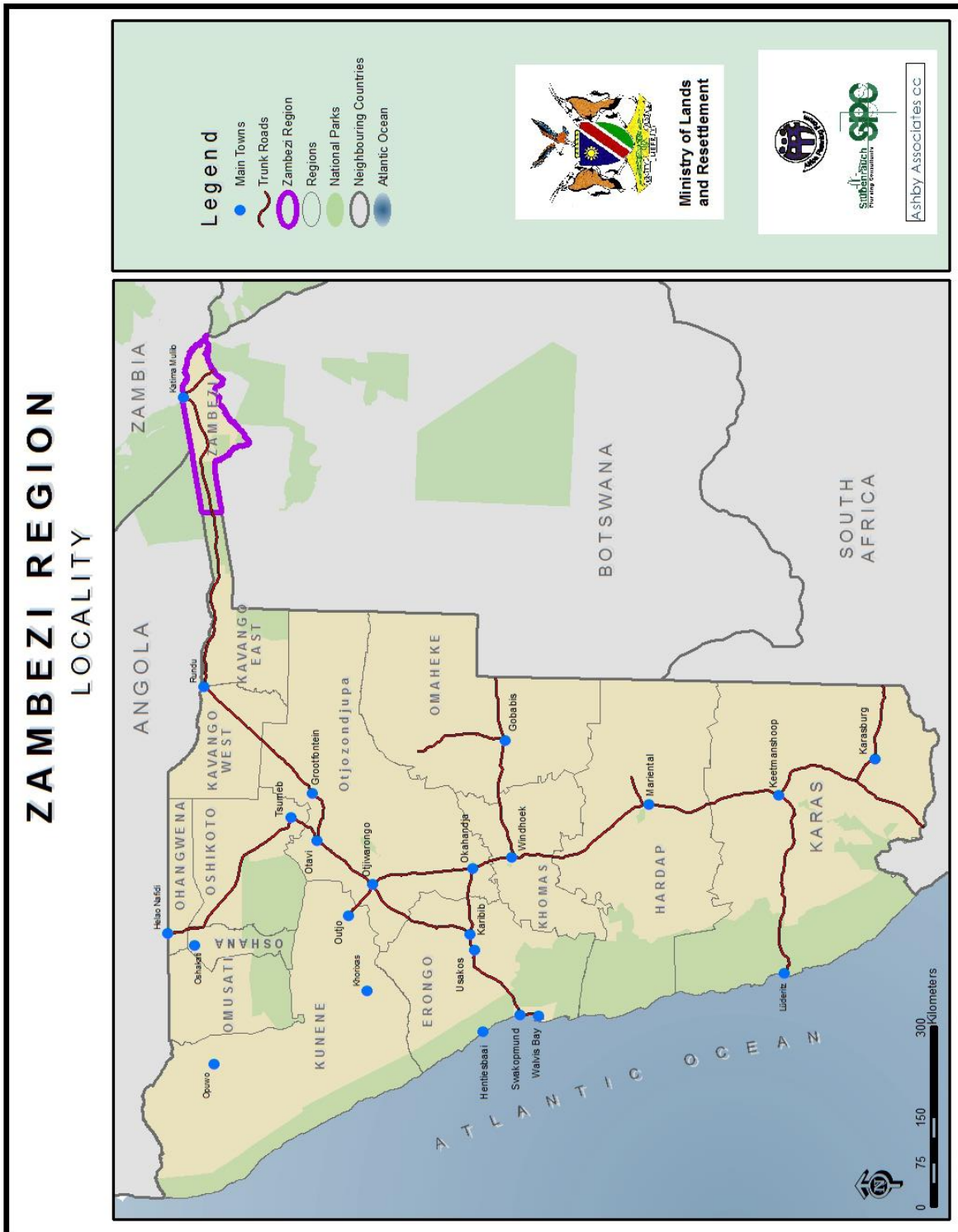
Perhaps one of the biggest advantages the Zambezi Region has, is the network of rivers on the southern (Linyanti River), eastern (Zambezi River) and western (Kwando River) parts. These rivers have potential for food security for communities, and also provide water and other life sustaining functions for communal communities, livestock and wildlife.

3.1 STRATEGIC ROLE AND IMPORTANCE OF THE ZAMBEZI REGION

The strategic role and importance of the Zambezi Region is often forgotten. In colonial times, the importance of the region for trade opportunities and access to one of the largest rivers (Zambezi River) in Africa was seen as crucial. Over the years, the region has been relatively isolated from the rest of Namibia due to its remoteness and political situations. The importance of the region in terms of connectivity and trade has changed over the years. New transportation corridors, such as the Trans-Caprivi Highway, being promoted and developed, increased air travel from Windhoek to Katima Mulilo by Air Namibia, as well as increased tourism marketing and conservation efforts encouraging tourist to visit the region. Furthermore, transportation corridors leading into the rest of Africa will also amplify the importance of Zambezi Region.

The Zambezi Region's economy is mainly subsistence from nature with an income diversification into tourism and conservation. The Zambezi Region is not only in terms of economics strategically located, but also in terms of conservation. It is in the centre of one of SADC's largest conservation initiatives – KAZA. Supported by its geographical locality, the region is also well advanced in conservation efforts with an ever-increasing number of communal conservancies developing.

FIGURE 2: ZAMBEZI REGION IN CONTEXT



These factors all contribute to the important role the Zambezi Region plays within the SADC conservation efforts. Combined with the institutional support such as conservancies and community forest, the region is also rich in biodiversity, wildlife and birdlife. The fact that wildlife in the national parks is not fenced off, gives the region an added advantage by giving the feeling of untamed Africa. Proximity to neighbouring conservation and tourist attractions such as Victoria Falls, Chobe National Park and the Okavango Delta further adds to the many potentials of the Zambezi Region.

Figure 3: SADC trade corridors



3.2 LAND OWNERSHIP, TENURE AND ADMINISTRATION OF LAND WITHIN THE ZAMBEZI REGION

Land tenure in Namibia is based on three categories of land ownership: private ownership (freehold land), central government (communal areas, resettlement farms and protected parks) and local authorities (urban land). In the Zambezi Region, the largest part, with the exception of the national parks and proclaimed towns and settlements, are communal land governed by traditional authorities (53%). Table 5 gives a breakdown of the percentage cover by the various administrations in the region.

A management system, for example a conservancy or a community forest, is not a land use, but rather a management system that operates a set of land use activities. It is the allocated land use within such a management system, which is referred to as land use. Therefore, the table below will depict the various management systems, but will also depict the land uses within the management systems to get an idea of the cover of each of the land use zones and management systems. Due to the duplicity of the figures the percentage and total area will not amount to 100%. For example: Conservancies, registered conservancies, cover approximately 27% of the region - however, this does not mean that the entire 27% is allocated only for conservation purposes. Instead, the more important factor to look at is what percentage is usable for communal cropping or settlements. Each conservancy has an approved management plan with a set of zonations and these zones are mostly classified as: core conservation areas (where no human or livestock are allowed); settlements and cropping (where human settlement, cropping and livestock farming are allowed); hunting areas and tourism areas. Therefore, what is important to determine is rather what percentage is free for communal usage and these will be the areas zoned as settlements, cropping and livestock or multiple use areas.. The same concept applies to Community Forest – a community forest is a management system –and within such a system settlement and livestock farming is permitted.

The result given at the bottom of the table “Communal land” then refers to all land within the region, whether it falls within a management system such as a conservancy or forest or any other, which is still available for communal purposes and will thus include the community forest; the multiple use areas of conservancies; the remaining communal land as well as the PCLD area. This means that land available for communal purposes in the Zambezi Region amounts to approximately 53% of the total land cover (7,790km² or 779,000hectare).

TABLE 5: ADMINISTRATION OF LAND WITHIN ZAMBEZI REGION

LAND COVER TYPE	TOTAL AREA (km ²)	TOTAL AREA (km ²)	PERCENTAGE COVER %
Programme for Communal Land Development		1499.74	10.23
Registered Community Forests (areas overlap with CC)		885.77	6.04
Registered Communal Conservancies Total Area (this includes all the land use areas) *	4007.214753 (27.33%)		
Communal Conservancies - Only Core Areas & Hunting Areas (where human and livestock not allowed) **		973.80	6.64
Communal Conservancies - (mixed used areas where settlements, grazing and cropping permitted) **		243.48	1.66
Non designated areas within CC with no management zones		2,789	
National Parks (MET) (include Bwabwata National Park - settlements)		4243.32	28.94
Tourism Accommodation (digitised from aerial photography)		0.92	0.01
Local Authorities / Settlements (Kongola, Linyanti, Sangwali, Katima, Chinchimani, Bukalo)		86.62	0.59
Irrigation Schemes		18.78	0.13
Quarantine Camps (KOPANE, KATIMA)		111.49	0.76
State Forest ***		1421.62	9.69
Communal Land (inclusive of areas zoned for communal purposes in the conservancies; community forest and the PCLD area)	5083.49 (area not covered with any management system)	7805.02	53.22

*As conservancies are a management system the area covered by conservancies are not calculated as part of land cover, but rather the land uses of each of the conservancies are calculated as cover

** Not all conservancies had management plans by the time of this report and the total of core areas and multiple use areas will therefore not add up to the total area of registered communal conservancies.

***State Forest excludes the Katima Quarantine Area that falls within the SF

The data in Table 5 was extracted from the various GIS data obtained from Ministry of Environment and Tourism, Ministry of Lands and Resettlement and Ministry of Agriculture, Water and Forestry as well as the Government Gazette.

3.2.1 LOCAL AND REGIONAL AUTHORITIES

The Republic of Namibia is administered by three government tiers: central, regional and local. The local tier is governed by local authorities under the Local Authorities Act of 1992. Urban areas fall under the direct jurisdiction of the applicable local authority and governed by the Local Authorities Act of 1992. According to this Act, there are three different types of local government:

- municipality
- town councils
- village councils.

The members of a municipal, town or village council are elected at a general election. The local authority councils are then responsible for certain duties and tasks to ensure that the urban area is developed and maintained. Katima Mulilo is the only proclaimed town within the region and is therefore governed by an elected town council as per the Local Authorities Act.

The regional tier is governed by regionals councils as per the Regional Councils Act of 1992. The regional council is mostly responsible for the rural areas outside of the proclaimed local authority areas and for service provision within proclaimed settlements. A regional council consists of elected councillors from each of the constituencies within the region. The Zambezi Region has eight constituencies: Kongola, Judea Lyaboloma, Linyanti, Sibbinda, Kabbe North, Kabbe South, Katima Urban and Katima Rural. A proclaimed settlement is an area that the regional council declared in the Government Gazette to be a settlement area. Within a proclaimed settlement, the townlands boundaries have been demarcated and surveyed and a notice has been placed by the Regional Council in the Government Gazette that this area is now a settlement area. Bukalo was proclaimed a settlement area in 2002.

Please note: For the purpose of this report, (volume 1 and 2) localities that do not fall within the town or declared settlement category will be referred to as either 'rural village' or 'rural localities'. Rural villages will refer to a higher-level locality for which certain town planning statutory procedures have been completed and which have been identified by MRLGHRD as future settlements. Rural localities will refer to the lower tier localities that are a conglomeration of homesteads and for which certain government functions have been provided such as a school or clinic or water.

Chinchimani, Kongola, Ngoma, Linyanti and Sangwali are 'rural settlements' that are in the process of being planned. It is expected that upgrading to settlement or village status will

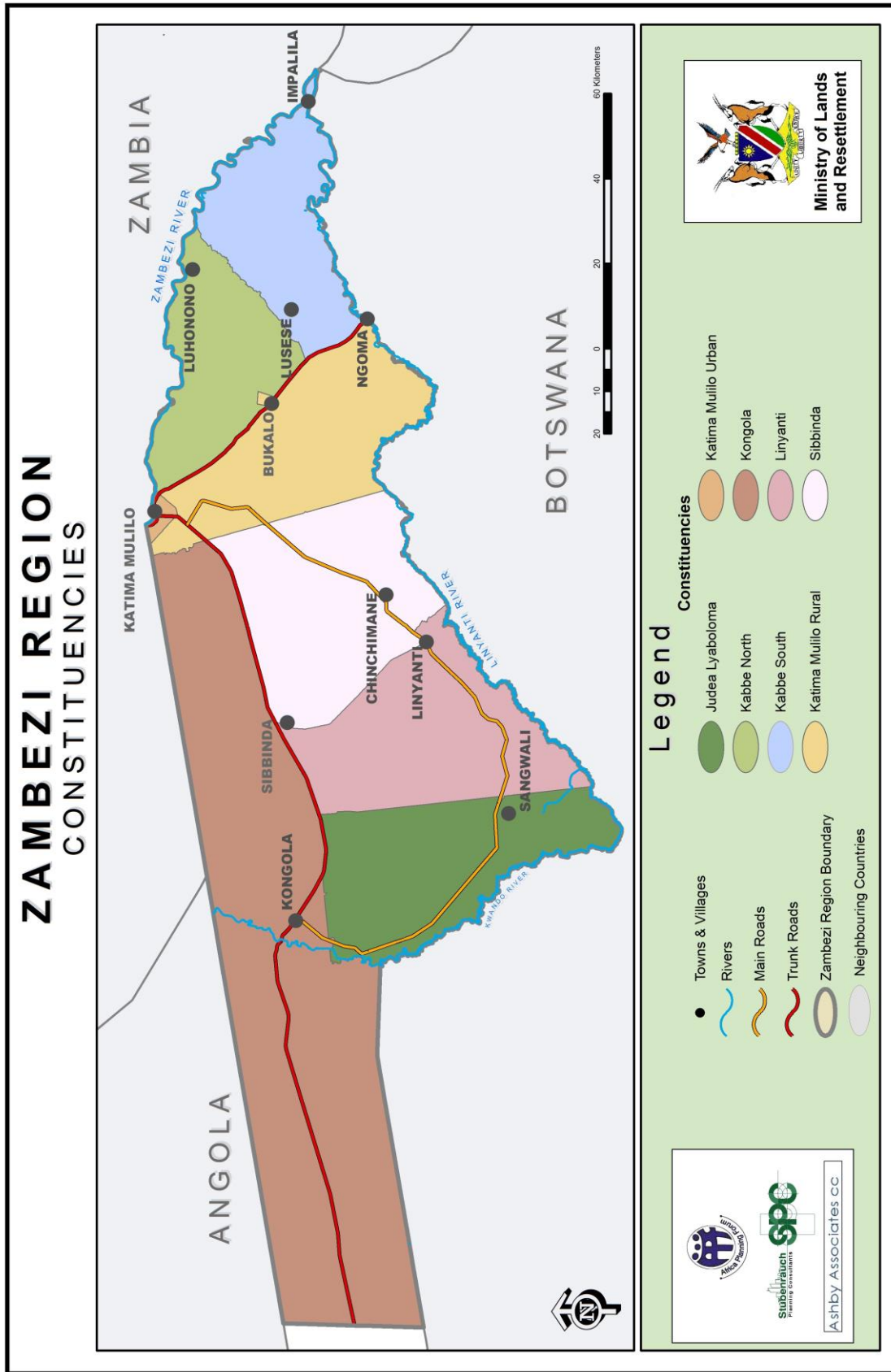
take place in the future as these have been earmarked by MRLGHRD for future upgrading to declared settlements or village status.

TABLE 6: URBAN AREAS AND THEIR STATUS

Municipality	Town	Village	Settlement Declared	Settlement Planned (rural settlements)	Settlement Identified (Rural Settlements)
None	Katima Mulilo	None	Bukalo	Chinchimani, Kongola, Ngoma, Linyanti	Sangwali

Source: MRLGHRD 2014

FIGURE 4: ZAMBEZI REGION CONSTITUENCIES, TOWNS AND SETTLEMENTS



3.2.2 COMMUNAL LAND/ TRADITIONAL AUTHORITY AREAS

‘Communal land is vested in the State by the Constitution. The State is under a duty to administer communal lands in trust for the benefit of the traditional communities residing on these lands and for promoting the economic and social development of the Namibian People. Communal land cannot be bought or sold’ (Malan, 2003).

Although communal land is owned by the State under the Communal Land Reform Act, the Act also makes provision for traditional authorities to have a certain degree of control over the communal land within their jurisdiction. As part of the authority over communal land traditional authorities gives the initial approval for leaseholds and for land allocation. Thereafter it is referred to the Communal Land Board of the respective region or the Minister, depending on the applied size and lease years, for final approval on the leasehold.

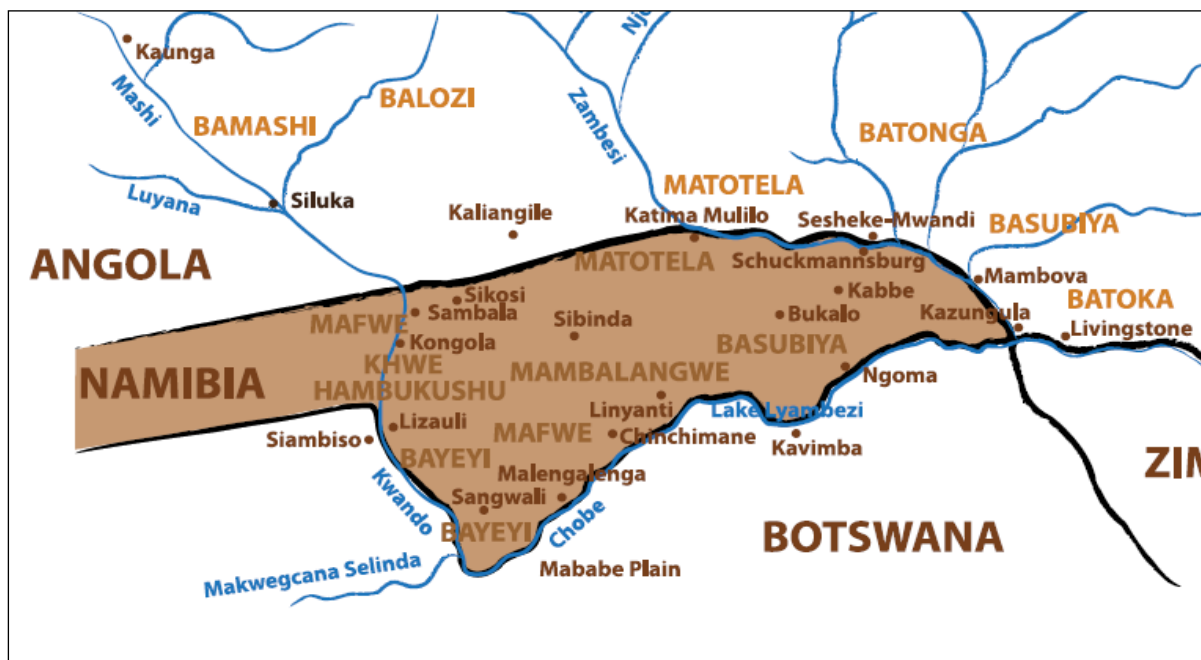
The traditional authorities in the Zambezi Region have several levels of authority with each village having a head who is usually the senior male member. This person advises the senior headman who represents a number of villages or wards. This senior headman then again acts as a local representative on the tribal council or *kuta*. The *kuta* is the highest legislative, administrative and judicial body in the tribal area. The *kuta* is presided over by the chief councillor (*ngambela*) who then communicates the wishes of the chief to the tribe through the headmen and vice versa (Mendelsohn & Roberts, 1997).

There are four traditional authorities in the region: the Masubia (sits in Bukalo), Mafwe (based in Chinchimani), Mayeyi (based in Sangwali) and Mashi (based at Choi) (Harring & Odendaal, 2012). The Mayeyi and Mashi were officially recognised by the Government a few years ago and originate from the Mafwe Traditional Authority. The Mafwe Traditional Authority considers these two traditional authorities as being illegitimate (Harring & Odendaal, 2012) leading to land conflicts and disputes between these traditional authorities.

Discussions in the Zambezi Region often mention the importance of one’s tribe and tribal affiliations, which reflects the influence this holds in day-to-day matters. This influence obviously extends to land use, and is actually very significant in land allocation by traditional authorities. For instance, local Zambezi residents mentioned that it can be difficult for people to move during flood events, as one cannot relocate to a new area if you are not from that tribe.

Figure 5 gives a rough indication of the main traditional areas in the region, as background information for the traditional authority factor that is often so important in land decisions.

FIGURE 5: AREAS OF MAIN TRIBES THAT RESIDE IN ZAMBEZI REGION AND THE SURROUNDING COUNTRIES



(Source: Otto & Goldbeck 2014)

Communal land may not be sold and individuals cannot own communal land, but may have customary land rights or rights of leasehold over areas of land (LAC, 2003). This provides for an unsecure land tenure form for communal inhabitants as a customary land right allocation or leasehold does not give ownership to the individual and therefore the individual cannot use the property to provide security for financial purposes. Communal Land Boards are the statutory body that ratifies the allocation of customary land rights given out by the traditional authority. A customary land right is issued to a successful individual for the natural life of that person. If the person to whom the customary land right was allocated dies, the land rights revers back to the traditional authority for re-allocation to either the surviving spouse or a child of the deceased (LAC, 2003). Any business enterprise such as lodge operators and irrigation schemes situated on communal land must obtain leasehold rights in terms of the Land Reform Act.

The majority of the land, with the exception of national parks and local authority areas, within the Zambezi Region is communal land governed by one of the traditional authorities and upon which the Communal Land Reform Act applies. Within the communal land, certain areas have been demarcated for community forests and community conservancies. Although being demarcated for a specific administration the land is still communal land (52.59%). The areas promulgated as a community forest or community conservancy will be governed by the Nature Conservation Ordinance No 4 of 1975 and community forests under the Forest Act No. 12 of 2001. Communities can still utilise communal conservancies for settlements, livestock grazing and have crop cultivation as long as these are within the relevant management zone of the conservancy.

3.2.3 PROGRAMME FOR COMMUNAL LAND DEVELOPMENT PROGRAMME (PCLD)

In terms of the Communal Land Reform Act, right of leasehold for agriculture purposes may be granted if such an area is situated within a designated agriculture area. Such a designated area is identified through consultations with the relevant Traditional Authority and the Communal Land Board (LAC, 2003). In 2007, MLR designated an area of 148,084 hectares in the Zambezi Region for the Small-Scale Commercial Farming (SSCF) project and as part of the SSCF project, 81 farming units were surveyed and gazetted. The SSCF project was initiated partly by MLR to assist communal farmers to become more commercialised. At the time of surveying and planning these 81 SSCFs overlapped with three conservancies and a community forest. Thus showing the lack of integration between line ministries when identifying projects. Shortly after the surveying of the farms, 15,000 ha were allocated to a private company - Namibia Agriculture & Renewables for irrigation purposes. This essentially reduced the availability of farming units available for residents of the area.

In 2012 the MLR changed its approach for the commercialisation of communal land, in the Zambezi Region as elsewhere. In 2014 the local-level participatory planning (LLPP) stakeholder consultations in the Zambezi Region yielded the decision to focus Programme for Communal Land Development (PCLD) support on infrastructure development of the communal commonage inside the designated area, instead of allocating and developing individual small-scale commercial farms.

The Programme for Communal Land Development Namibia is receiving financial and technical support from the Namibian-German Cooperation and the EU. Funding is provided in the form of a Basket Fund, administered and implemented by the MLR. The objective of the PCLD states that 'rural communities' land based livelihoods are improved through the development of communal lands and their better integration into the mainstream economy'.

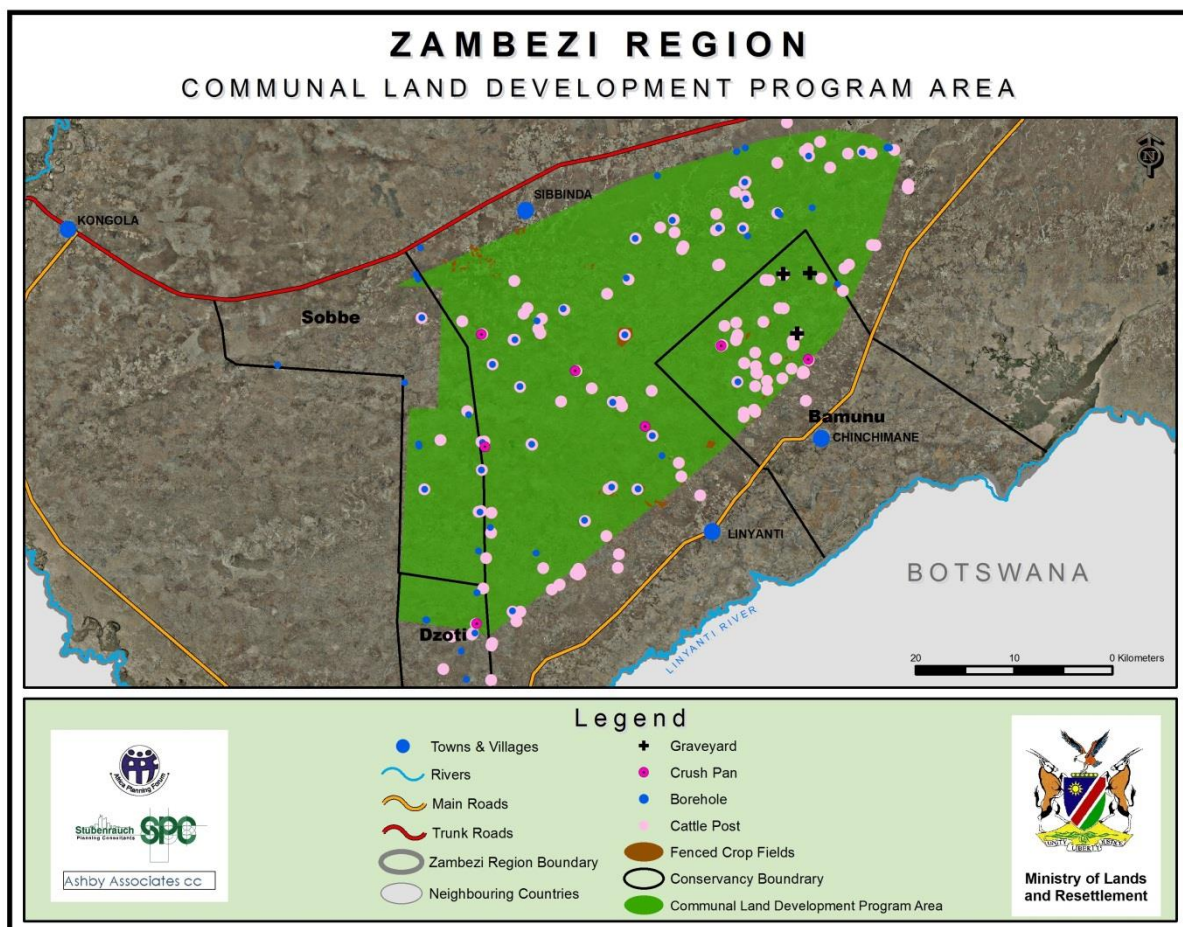
There is still uncertainty at this stage on the eventual management and allocation of land within the PCLD area, as this process is still under discussion between MLR and the involved communities. During a meeting held on 14 May 2014 between MLR and the relevant traditional authorities, different types of allocation and management methods proposed by MLR were:

- Method A: traditional SSCF methods where the area will be allocated to 81 beneficiaries;
- Method B: designated area is demarcated into various grazing areas, which is then allocated to groups. Each grazing area will then receive support for infrastructure development;

- Method C: commonage development. This method will ensure the current status quo where there are no fences, no borders and the inhabitants of the area will keep farming in the open commonage. Services will be provided in selected areas in the commonage according to a development plan for the PCLD area.
- Method D: combination of the above three methods.

As an outcome of this consultation, the traditional authorities indicated their opposition to a SSCF type (method A) model and supported a model that is based on either a communal commonage model or a grazing area system, as is currently practiced in the region. The meeting strongly opposed the idea of SSCF whereby only a handful of people will obtain land while the rest of the communities will have no benefit from such a model. It is unclear at this stage the way forward on this project as discussions are still underway between MLR and the communities. From a land-use planning perspective a combined model would be the preferred option as such a system will provide for a larger segment of the communal community in this area. Furthermore, such a model can make provision for a management plan to integrate with existing conservancies and community forests in the area, through a zonation and management plan.

FIGURE 6: COMMUNAL LAND DEVELOPMENT PROGRAMME AREA



3.2.4 PROTECTED AREAS (CONSERVANCIES, FORESTS AND PARKS)

The Nature Conservation Ordinance No. 4 of 1975 (and as amended) provides a 'regulatory framework for the protection, conservation and rehabilitation of species and ecosystems, the sustainable use and sustainable management of indigenous biological resources, and the management of protected areas in order to conserve biodiversity and in order to contribute to national development'. The Ordinance makes provision for the establishment of national parks and communal conservancies, as well as the rules and regulations pertaining to the management of these.

'Conservancies are legally recognised, geographically defined areas that have been formed by communities who have united to manage and benefit from wildlife and other natural resources' (Weaver & Petersen, 2008). A communal conservancy is a communally owned and managed area with registered members of which the boundaries of the conservancies have been demarcated and gazetted in the Government Gazette. Such a conservancy has a management committee with a management plan regulating land use within the conservancy. The main objectives of establishing conservancies are:

- to improve natural resource management within the conservancy and
- to generate income for the community through activities such as tourism, craft sales, trophy hunting etc.

There are currently 15 registered conservancies and six emerging conservancies and three national parks in the Zambezi Region. These will be discussed in more detail in later sections.

3.3 PHYSICAL CHARACTERISTICS OF THE ZAMBEZI REGION

The next sections will give a broad overview of physical characteristics of the region in terms of the topography, landscape and soils, surface and underground water resources, fauna, flora, the carrying capacity and the agro-ecological zones of the Zambezi Region.

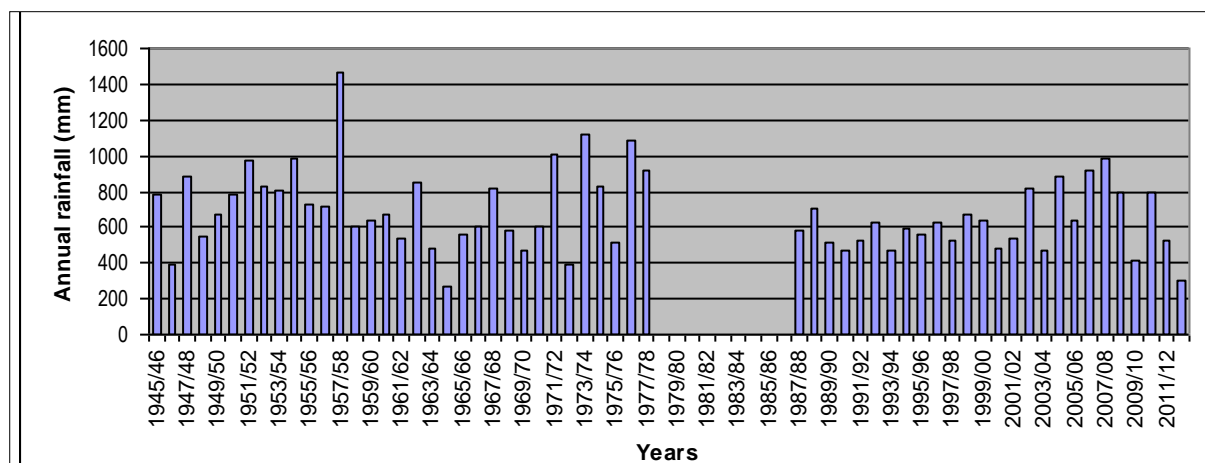
3.3.1 CLIMATE

The Zambezi Region has ‘a higher rainfall, less evaporation and a warmer winter than the rest of Namibia, providing a home to many tropical plants that are unable to survive elsewhere in Namibia’ (Mendelsohn & Roberts, 1997).

RAINFALL

Rainfall averages about 700 mm per year in the wetter north-east, and about 500 mm in the southern Zambezi Region. The climate can be divided into two main seasons – a dry season between April and November, and a shorter wet season which stretches from November to early April. Rainfall, as in the rest of Namibia, is highly variable, with standard deviation values from 30–40% (Mendelsohn & Roberts, 1997). For example, the long-term rainfall record from Katima Mulilo (1945–present, with a 9-year gap in the 70s-80s) shows annual totals over 1,000 mm in four of the years, and falls less than 400 mm in three years. This variability directly affects the livelihoods of farmers, exposing them to the risk of crop failure and poor grazing in some years, and floods in others.

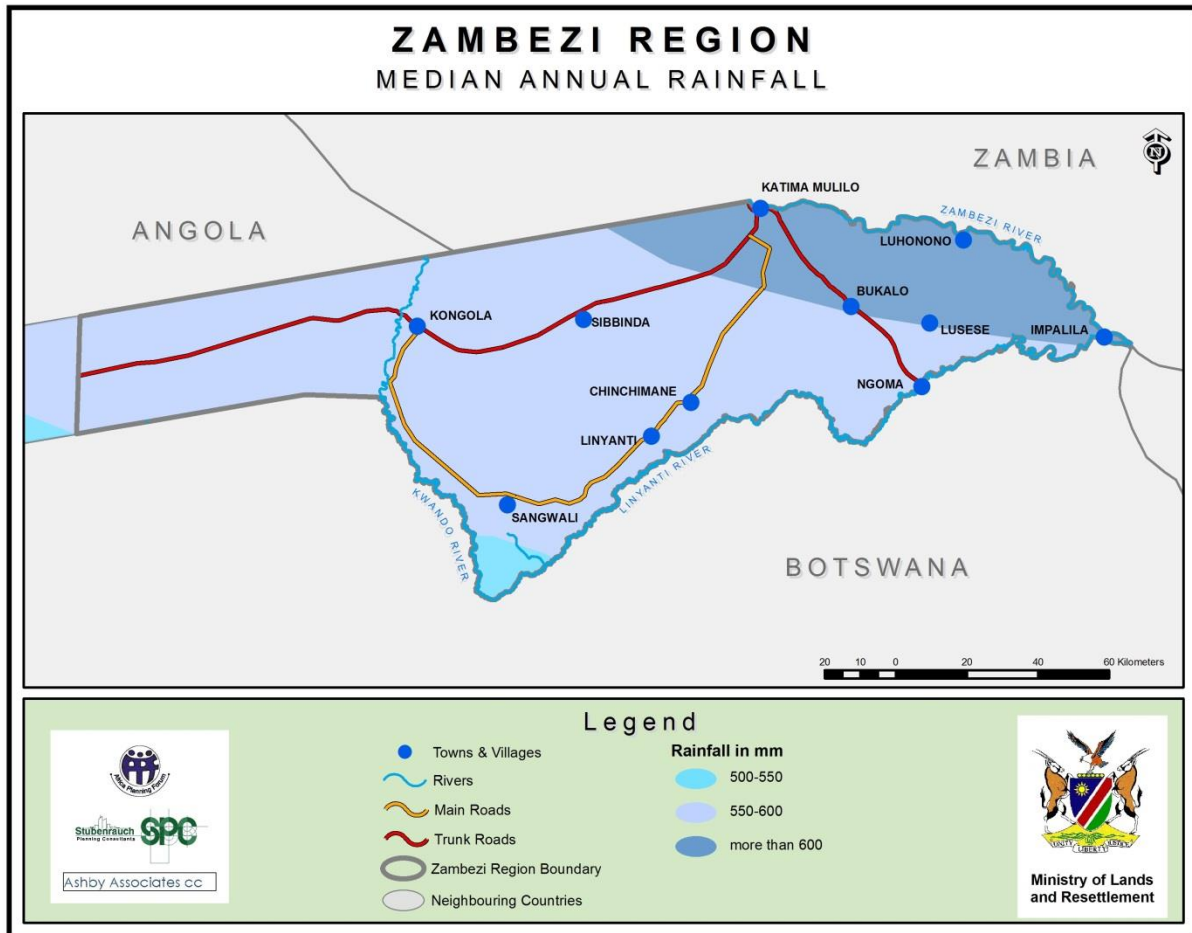
FIGURE 7: ANNUAL RAINFALL AT KATIMA MULILO FROM 1945 TO 2013.



NOTE: YEARS WITH ZERO IN THE 1970S AND 80S HAVE INCOMPLETE DATA. THE AVERAGE FOR THE 59 YEARS OF DATA IS 681 MM.

While Zambezi Region receives the most rainfall in Namibia, in an international context it is still considered dryland and this is manifested in the high evaporation rate (see below).

FIGURE 8: MEDIAN ANNUAL RAINFALL FOR THE ZAMBEZI REGION ((MENDELSON & ROBERTS, 1997)

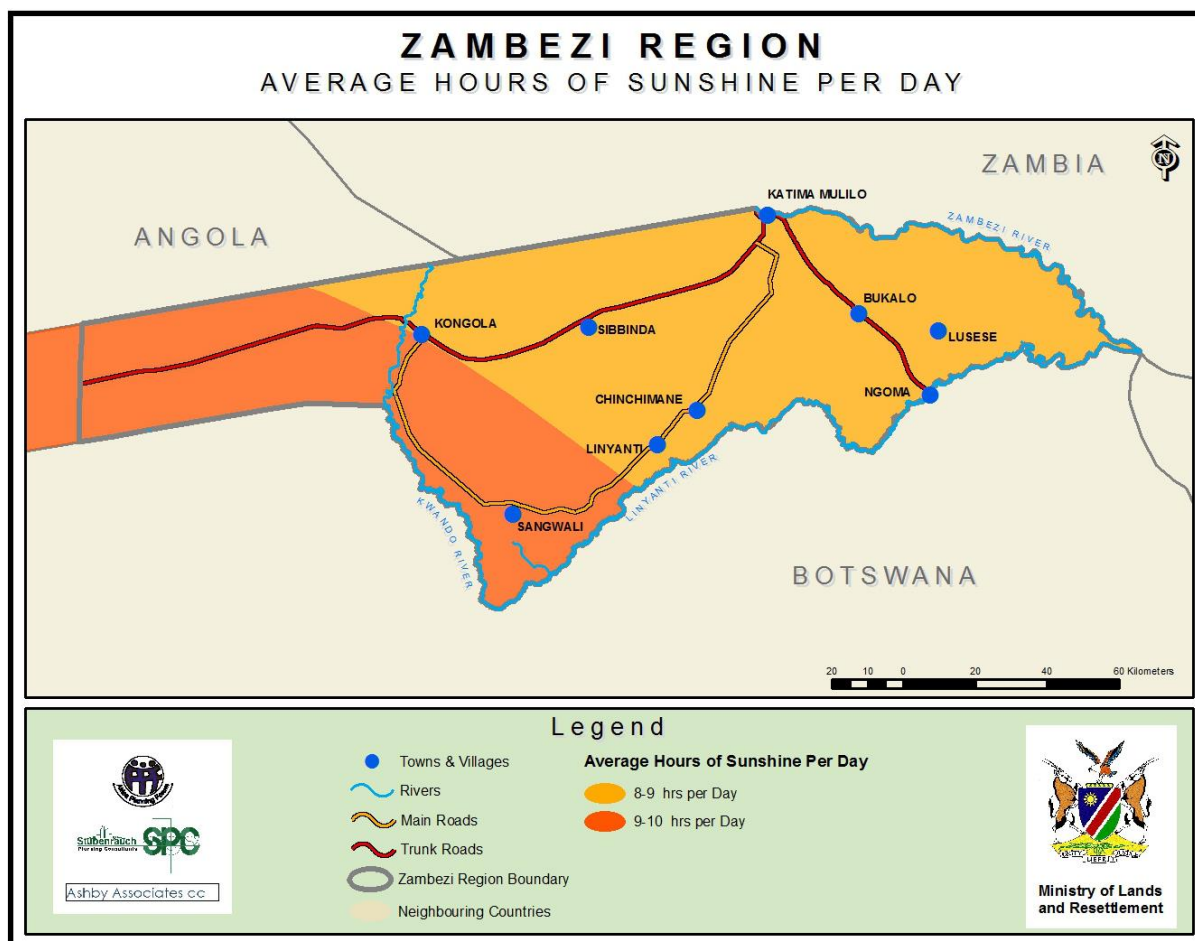


TEMPERATURE, EVAPORATION, WIND AND SOLAR

Temperatures are moderate during summer months in the Zambezi Region mostly due to cloudy conditions in these months. The highest temperatures are between September to November when there is less cloud cover and average daily maximums of 32-35°C can be reached. In the winter months, the region has a more moderate winter than the rest of Namibia with maximum daily temperature of between 18 -25 °C and minimum temperatures of 5 °C. Frost is unusual in the Zambezi Region, but may occur in some years in low-lying river valleys, especially in the western part of the region (Mendelsohn & Roberts, 1997).

The highest rate of evaporation takes place during September to October when it is hot, dry and clouds are sparse. The potential evaporation of 2,500mm is over four times the volume of water normally provided by rain (Mendelsohn & Roberts, 1997).

FIGURE 9: AVERAGE HOURS OF SUNSHINE FOR ZAMBEZI

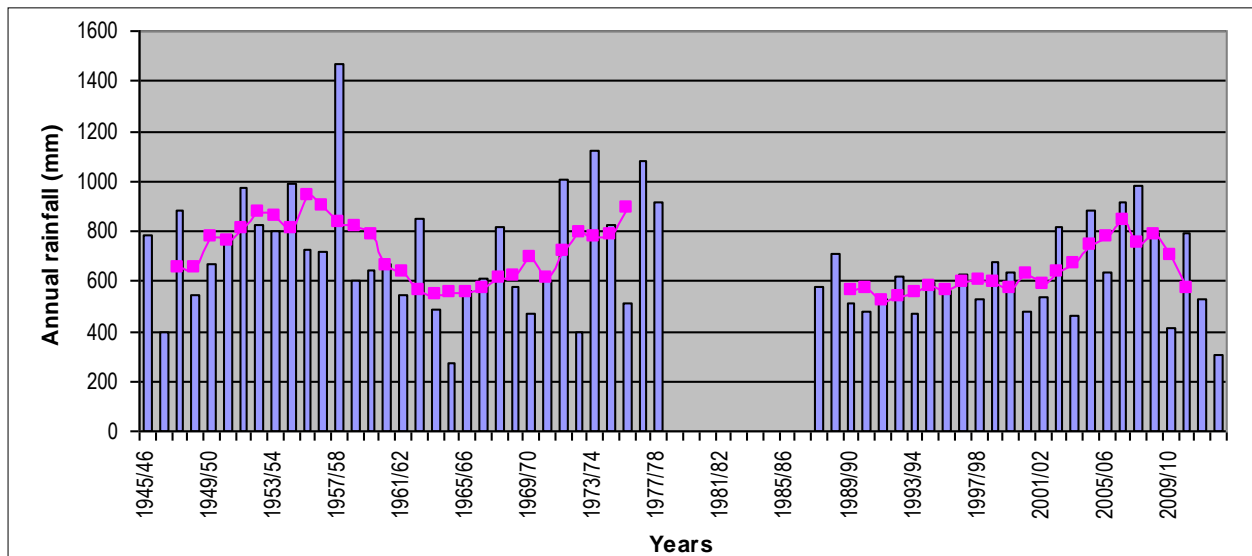


CLIMATE VARIABILITY

Like elsewhere in Namibia, annual rainfall is highly variable. As shown in Figure 10, recorded annual totals at Katima Mulilo have varied between 269 and 1,460 mm. While the average over the 59-year period is 681 mm, the 5-year moving average (averaged over the five years centred on the current year) shows that there have been oscillations in rainfall, with periods of mostly above-average rains alternating with periods of mostly below-average rains. This is responsible for some of the wide variations in total rain, but the cycles should not be used to make forward predictions of a season's rain! Take note that the 'wet 70s' included a very dry year with only 400 mm in the season of 1972/73. This variability makes rain-fed crop production very risky.

Climate variability and climate change are concepts that are closely linked, but clearly we cannot blame the present high variability on climate change. Climate change (see below) is expected to increase the variability, adding even more uncertainty and extreme weather for Zambezi farmers.

Figure 10: Annual rainfall at Katima Mulilo



Note: moving 5-year average (pink). Note the general above-average rains in the 1950s, 1970s and early 2000s.

3.3.2 TOPOGRAPHY, LANDSCAPE AND SOILS

The Zambezi Region is relatively flat with the highest areas being in the western part of the region (about 1,100m above sea level). The elevation steadily drops to 930m near Impalila in the east of the region. The region is covered in thick deposits of Kalahari sand, with very little of the underlying geology exposed, except along certain section of the river courses and on Impalila Island. 'The extensive Kalahari sands and the rivers with their associated floodplains, channels and deposits are the two major features which shape the landscape' (Mendelsohn & Roberts, 1997).

The Zambezi Region is classified according to six major land types.

- **Open Water:** the Kwando, Linyanti, Chobe and Zambezi rivers and their deeper channels.
- **Floodplains:** associated with the rivers. These are flat areas dominated by grasslands and old river channels. River waters flood over these areas when good rains cause river levels to rise.
- **Riverine woodlands:** in the Okavango and Kwando River valleys and in the Maningimanzi area on the Zambezi River east of Katima Mulilo are characterised by a high diversity of tall trees.
- **Mopane woodlands:** this lies in an area of old river drainage lines which are being covered by wind-blown sand deposits.
- **Kalahari woodlands** cover the largest area and are dominated by sand dunes and interdunes in the 'Caprivi Strip' and extensive sandy plains in eastern Zambezi.

- **Impalila woodlands** covers the island making a small but unique area. They are based on basal rocks rather than wind-blown sands or river systems (Mendelsohn & Roberts, 1997).

SOIL

The Zambezi Region is characterised by the Kalahari Basin, which consist of sand dunes. Soil types in the Zambezi were classified largely on the basis of their textures, with soils consisting of varying amounts of sand and clay having different textures. At the one end of the spectrum are the heaviest soils with a high content of clay in areas, which are regularly flooded. Water does not penetrate or drain away easily because the clay is so dense and therefore these areas hold water for longer periods. On the other end of the spectrum are the pure sands that do not hold moisture for long. Between these two extremes are a range of intermediate soils – loams, clay-loams, sandy clays- and such intermediate soils also offer the best opportunities for cultivating crops as they retain water to some degree and have fairly high levels of nutrients (Mendelsohn & Roberts, 1997).

FIGURE 11: SIX MAJOR LAND TYPES WITHIN THE ZAMBEZI REGION

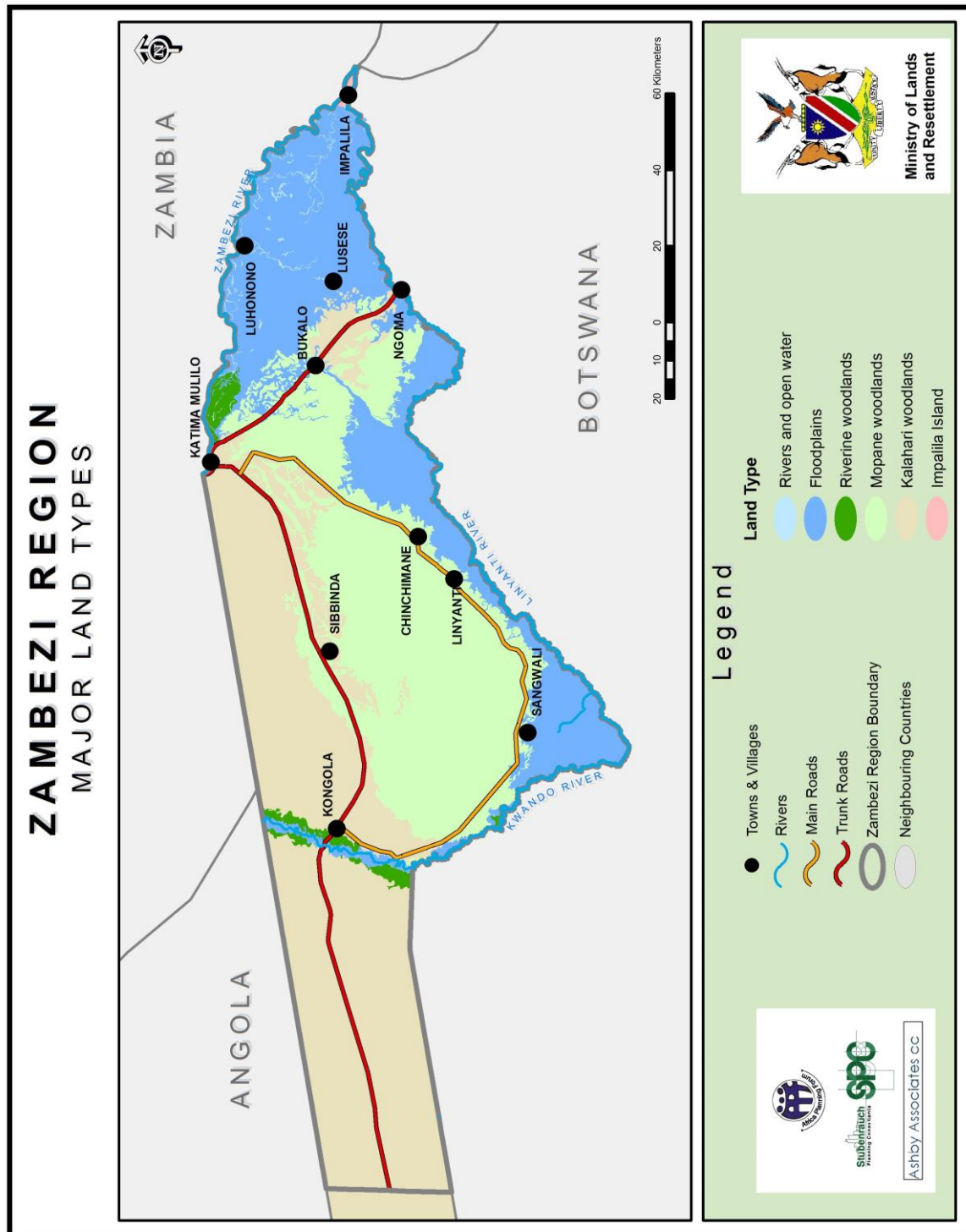
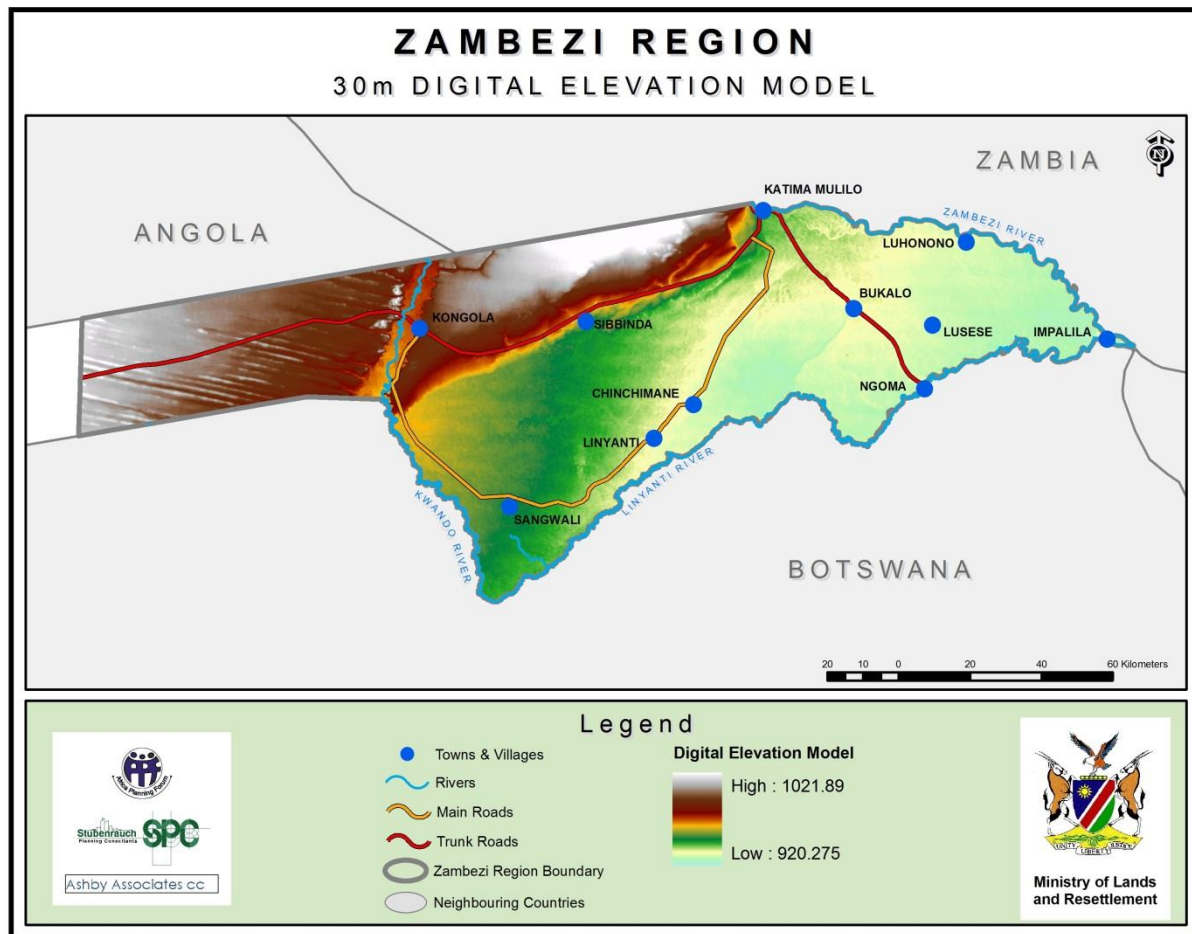
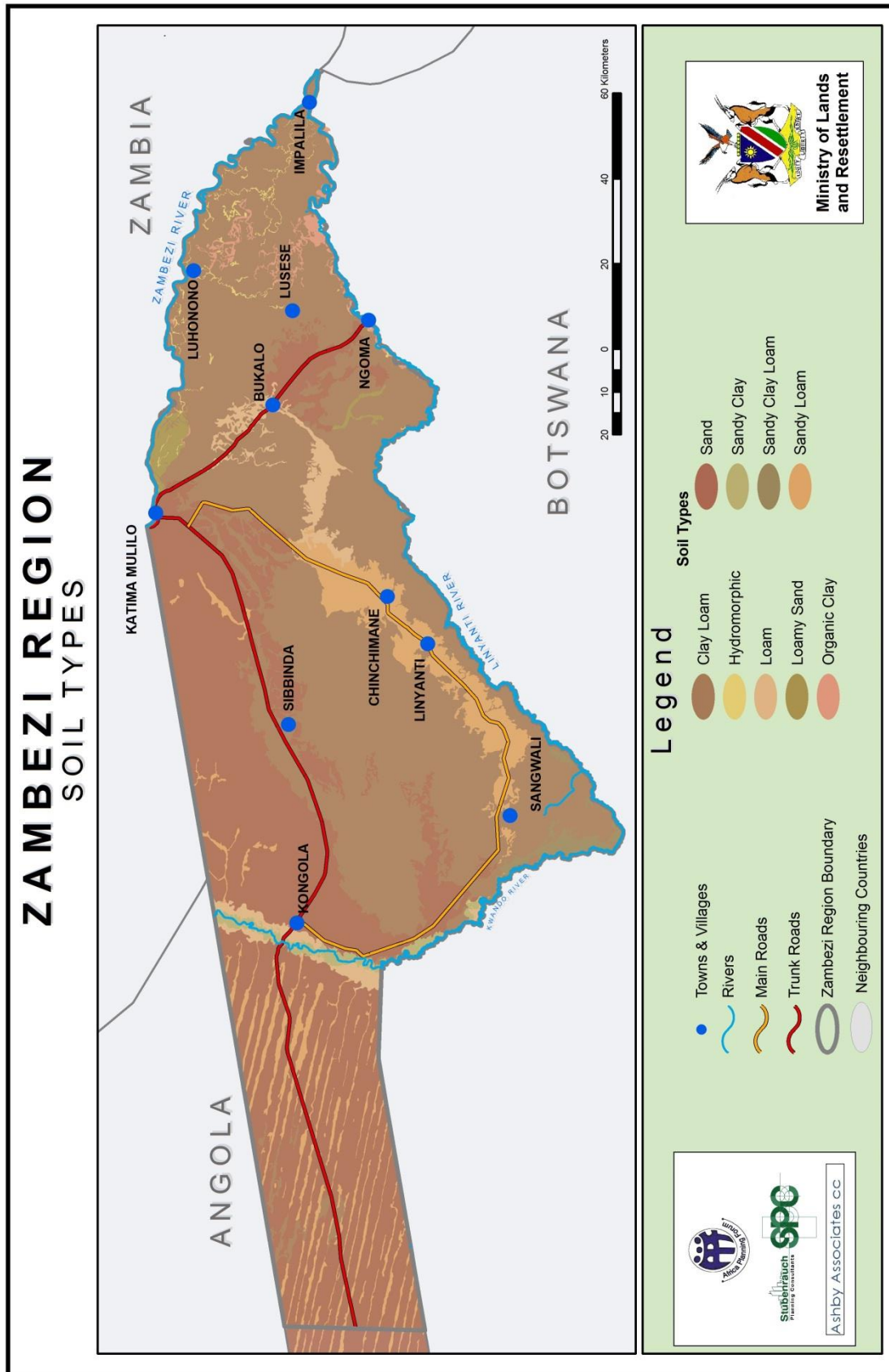


FIGURE 12: DIGITAL ELEVATION MODEL FOR ZAMBEZI REGION



The Zambezi Region is mainly dominated by clay-loam soils and Kalahari Sands. These soils are called arenosols and are extremely poor in nutrients as water drains through the sandy texture easily and little water is held in the surface layers where most plants have their roots. Fluvisols are found along the larger river courses and have relatively nutrient-rich soils for crop cultivation (Mendelsohn, 2006). Regrettably, this is also the low-lying areas, which flood annually, leaving areas flooded for up to 6 months.

FIGURE 13: SOIL TYPES FOUND IN THE ZAMBEZI REGION



3.3.3 SURFACE AND UNDERGROUND WATER RESOURCES

RIVERS AND SURFACE WATERS

The Zambezi River is the largest African river that flows into the Indian Ocean, and it is shared between eight Southern African countries. It is clearly an important regional feature for fisheries, irrigation and hydropower.

The Zambezi Region is topographically featureless and almost completely flat, which is what makes its hydrology so unusual. The region is mostly defined by four perennial rivers; the Zambezi, Kwando, Linyanti and Chobe. All of these connect with each other, and with the Okavango River further west, when water levels are high. At such times, their waters flood over large areas, forming extensive marshes and floodplains, and significantly influencing livelihoods and human activities.

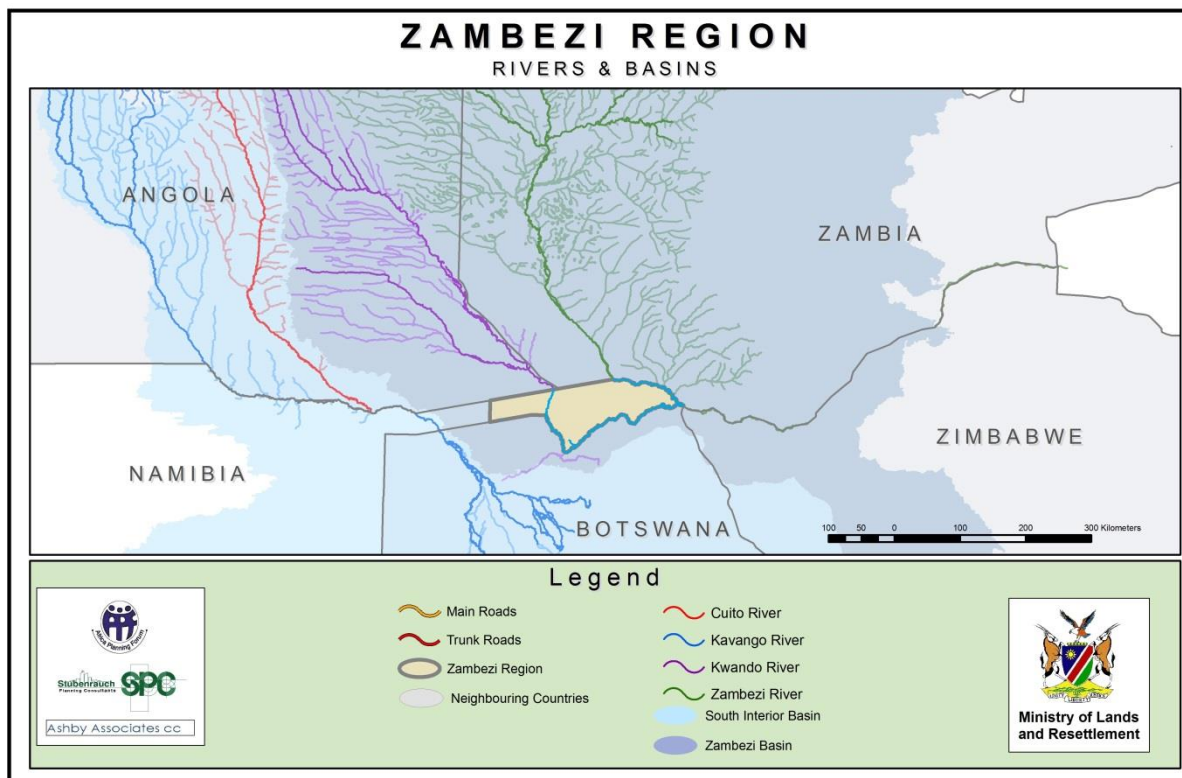
The catchment of the Zambezi River upstream of Katima Mulilo is in south-eastern Angola and western Zambia, which receive rain, as with the Zambezi Region, in summer. However the slow passage of water down the tributaries means that the flood pulse usually hits Katima and the downstream floodplains in March, April and May. Volumes of water carried by the Zambezi at this time are over 6,000 Mm³ per month. This is more than three times higher than the dry-season flows from August to December. The Zambezi floods typically last 4-6 weeks, before subsiding back into the main channels. However the lower-lying floodplains remain inundated for longer periods, and support vast beds of papyrus and reeds in a maze of small channels and islands. The Chobe Marsh stays permanently wet from water backing up along its course from the Zambezi River, or from outflow from the Linyanti Swamp and Lake Liambezi.

The Kwando River is a much smaller system, with mean annual run-off of about 1,200Mm³/a, which is less than 3% of the annual runoff of the Zambezi River at Victoria Falls (Schlettwein 1991). It is linked to the Zambezi River via the Linyanti Swamp, Lake Liambezi and the Chobe River which joins the Zambezi River at Kazungula. When the Kwando River is in flood, water pushes towards the Zambezi. When the Zambezi is in flood, the flow is reversed and water is pushed up the Chobe to Lake Liambezi.

The eastern floodplains are thus only intermittently inundated, while the Zambezi and Kwando Rivers, Linyanti Swamp and Chobe Marsh are permanent features. Flow rates in these rivers are extremely slow as the water has to percolate through extensive reed swamps. Water levels are linked to long-term cyclical wetter and drier periods (see Climate Variability above). For example, Lake Liambezi was dry from 1985 to 2002, during which time it became completely overgrown and part of it was farmed.

The Zambezi River system is managed at a regional level by ZamCom which has representatives from all the eight riparian states.

FIGURE 14: SADC WATER BASINS



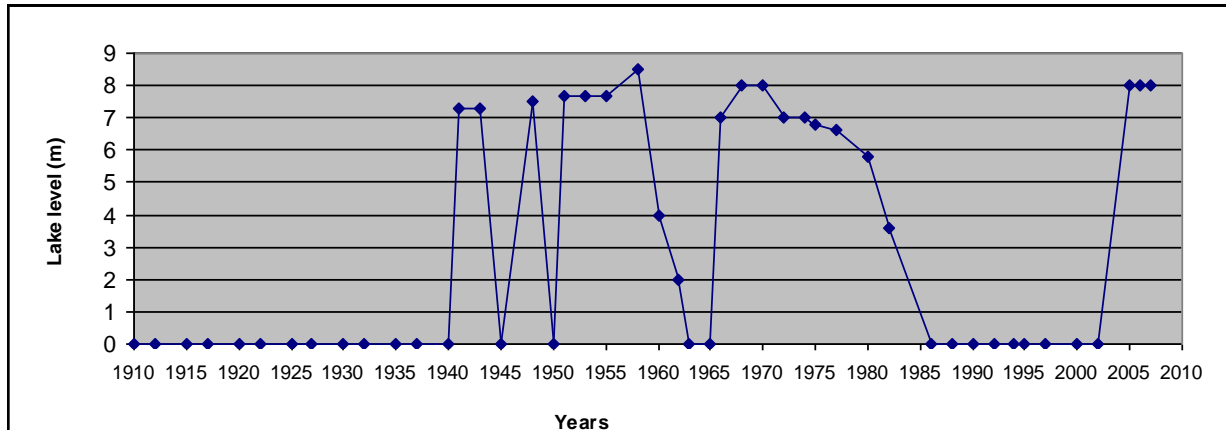
LAKE LIAMBEZI

Lake Liambezi is a large but ephemeral lake in the Linyanti-Chobe-Zambezi River system. It has a history of long periods of being dry, when it is an expanse of open grassland and fields. However, it then alternates from being dry, and holds water, several metres deep and covering an extent of over 100 km²! These dramatic variations depend on the water levels in the surrounding rivers, with flows coming in from a few possible sources, namely from the Zambezi down the Bukalo Channel, or by water backing up the Chobe River, or from the Kwando River via the Linyanti Swamps. Natural dry and wet cycles in this whole system drive the drying and wetting of the lake (see figure 15). At present the lake has held water since 2003.

The lake supports a high diversity and abundance of aquatic flora and fauna. The fishing industry was valued at N\$34 million per year in 2011 (Tweddle et al. 2011), although much of this goes on exports to Zambia and the DRC; little of the value stays in Namibia. The industry provides employment, livelihood support and cash income for households adjacent

to the lake and far afield, most importantly as a source of protein in the region to both fishing and non-fishing households.

FIGURE 15: RECORD OF DRY AND WET PHASES IN LAKE LIAMBEZI FROM 1910



When the lake dries up, people use the grassland for livestock grazing, and the clay-loam soil is fertile for crops. A commercial sugar cane plantation was proposed in the 1990s on the northern side of the lake (MAWRD, 1998), but very poor economic viability, the need for modification of the Bukalo Channel for a permanent water supply, and the risk of negative impacts on the fishery when the lake does hold water (MAWRD, 2003), were the main factors leading to the plans being dropped.

The Ministry of Fisheries and Marine Resources in 2000 assessed the feasibility of artificially filling the lake from the Zambezi River by deepening a short stretch of the Bukalo Channel between the Zambezi River and the lake. This was intended to re-establish the lake and consequently the fisheries industry too. It was found that the modifications would create only a very small, shallow lake, with very small fisheries potential, and anything bigger would require further modifications (an outflow gate) which would be very costly and harmful to the Chobe River downstream, with repercussions on Botswana's rights to this river. This plan has also been abandoned.

Lake Liambezi is a naturally dynamic and highly productive resource, whether it is dry or wet, and manipulation of the natural environment to make it more profitable is likely to carry significant negative environmental impacts.

GROUNDWATER

Groundwater quality in much of the region is generally good, especially within 5–20 km from the rivers, which recharge the aquifers. But the quality can be variable, and tends to deteriorate rapidly away from the rivers and with increasing depth (Christelis & Struckmeier, 2001). There are some large areas where it is unpalatable and unfit for human consumption, mainly in the area north of the Linyanti Swamps (Mendelsohn & Roberts, 1997).

Over the years, boreholes have been drilled in the region to provide water for people and livestock. These are concentrated along the main access roads, and serve as focal areas for increased settlement. Varying water quality and unreliable yields from these have resulted in water being supplied via pipelines. A pipeline supplies water along the Kongola-Katima Mulilo road, and another is under construction from Katima to Ngoma.

3.3.4 VEGETATION

The texture of soil, the depth, the nutrient content, the concentrations of salts and the ability to hold water affect the kind of plants found in an area (Mendelsohn & Roberts, 1997). Water drains through sand easily, washing nutrients away and leaving both the sands and many grasses low in nutrients. The six land types within the Zambezi Region form broadly six vegetation communities: open water, floodplains, riverine woodlands, Mopane woodlands, Kalahari woodlands and Impalila woodlands. Within each of the six broad vegetation communities, certain plant types exist better than in others.

THE CAPRIVI ATLAS SHOWS AN ASSESSMENT OF THE POTENTIAL VALUES OF EACH OF THESE VARIATIONS IN TERMS OF ITS POTENTIAL FOR CROP CULTIVATION, LIVESTOCK FARMING, CONSERVATION AND OTHER NON-AGRICULTURAL SUBSISTENCE VALUES OF THESE RESOURCES (MENDELSON, 1997). TABLE 7 PROVIDES A CONDENSED VERSION FROM THE CAPRIVI ATLAS, GIVING AN OVERVIEW OF THE AREA SUITABILITY FOR CERTAIN LAND USE ACTIVITIES.

Figure 16 provides a spatial indication of where these different types of vegetation can be found.

TABLE 7: VEGETATION TYPES AND THEIR POTENTIAL

Vegetation Unit	Potential Value for:			
	Crop Cultivation	Livestock Farming	Other	Conservation
Open Water	+	+	++	+++
Floodplains				
Bukalo-Liambezi grassland	+++	++	+	++
Chobe grassland-hummock mosaic	++	++	+	+
Chobe swamp grassland	++	++	+	+
Chobe wetland	+	+	++	++
Dry Mamili grassland	++	++	+	++
Kwando-Linyanti grassland	+++	+++	+	++
Okavango-Kwando grassland	++	+++	+++	+++
Wet Mamili grassland	++	++	+	++

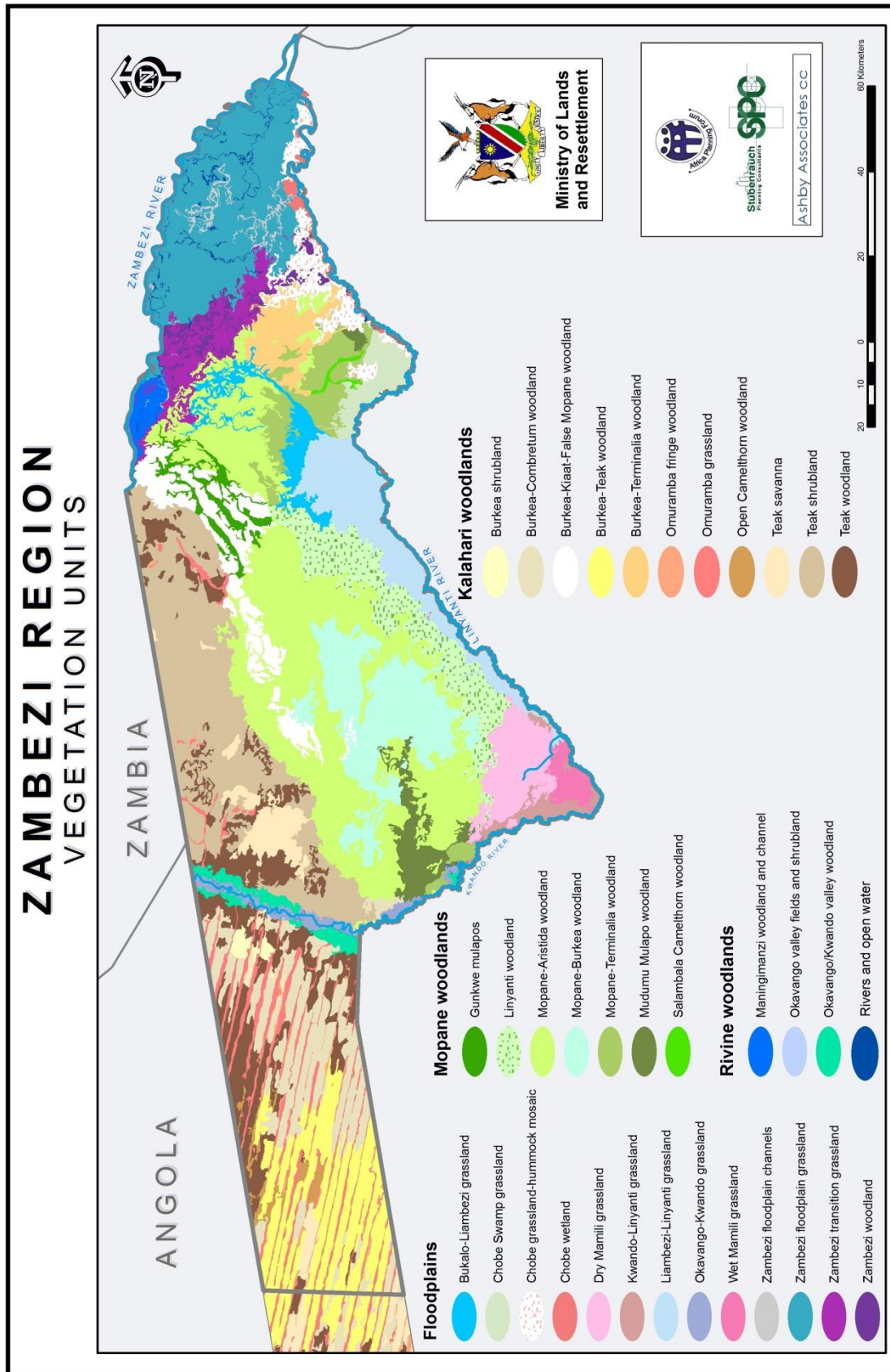
Vegetation Unit	Potential Value for:			
	Crop Cultivation	Livestock Farming	Other	Conservation
Zambezi floodplain channels	+	+	++	++
Zambezi floodplain grassland	++	++	+	+
Zambezi transition grassland	++	++	+	+
Zambezi woodland	++	+	+++	+++
Riverine woodlands				
Maningimanzi woodland and channels	++	++	++	+++
Okavango-Kwando valley woodland	+++	+++	+++	+++
Okavango valley field and shrubland	+++	++	+	+
Mopane woodlands				
Gunwe <i>mulapos</i>	+	++	+	++
Linyanti woodland	+++	+++	+++	+++
Mopane – <i>Aristida</i> woodland	+	++	+++	+
Mopane – <i>Burkea</i> Woodland	+	++	+++	++
Mopane – <i>Terminalia</i> woodland	+	++	+++	+
Mudumu <i>Mulapo</i> woodland	+	+	+	+
Salambala camelthorn woodland	++	+++	+++	+++
Kalahari woodlands				
<i>Burkea</i> – <i>Combretum</i> woodland	+	++	++	++
<i>Burkea</i> – kiat – false Mopane woodland	+	++	++	++
<i>Burkea</i> shrubland	+	+	+	+
<i>Burkea</i> – teak woodland	+	++	+++	++
<i>Burkea</i> – <i>Terminalia</i> woodland	+	++	++	+
Omuramba fringe	+++	++	++	+++

Vegetation Unit	Potential Value for:			
	Crop Cultivation	Livestock Farming	Other	Conservation
woodland				
Omuramba grassland	+++	+++	+	++
Open camelthorn woodland	++	+++	++	++
Teak savannah	+	+	+	++
Teak shrubland	+	+	+	+
Teak woodland	+++	+++	+++	+++
Impalila woodlands	+	+	+++	++

Potential values: +lowest; ++ medium; +++ highest

Source: (Mendelsohn & Roberts, 1997)

FIGURE 16: VEGETATION UNITS OF THE ZAMBEZI REGION



3.3.5 ANIMAL LIFE

The plants and animals found in the Zambezi Region also occur in adjoining areas of Zambia, Zimbabwe and Botswana. They represent Namibia’s only sample of tropical habitat, with the higher rainfall, humidity and wetland habitats being more typical of areas further north and east in the subcontinent.

MAMMALS

Mammal diversity reaches Namibia’s highest level in the Zambezi Region, with over 100 species found. Several of these are rare or endangered, including red lechwe, roan, sable and African wild dog. Eland, wildebeest and giraffe have also been successfully reintroduced into the area. The wildlife is dominated by a growing population of elephants that use the area during the dry season. Many of the large mammals in this environment depend on being able to move freely around this broader landscape, which includes parts of Botswana, Zambia and Angola.

TABLE 8: ESTIMATE OF WILDLIFE SPECIES IN ZAMBEZI REGION

Species	Conservation Status	Population estimate (2013)
Buffalo		1,123
Elephant	Vulnerable	8,401
Impala		12,676
Red lechwe	Vulnerable	319
Puku	Endangered	? (Very low)
Roan	Vulnerable	1190
Sable	Vulnerable	1090
Tsessebe	Vulnerable	287
Blue Wildebeest		1106
Burchells’ zebra		5800
Hippopotamus	Endangered	821 (2009)
Cheetah	Vulnerable	
Lion	Vulnerable	
African Wild Dog	Endangered	

Source: Conservation status from Griffin (2001) and Population estimates from IRDNC (2014) and Chase (2009)

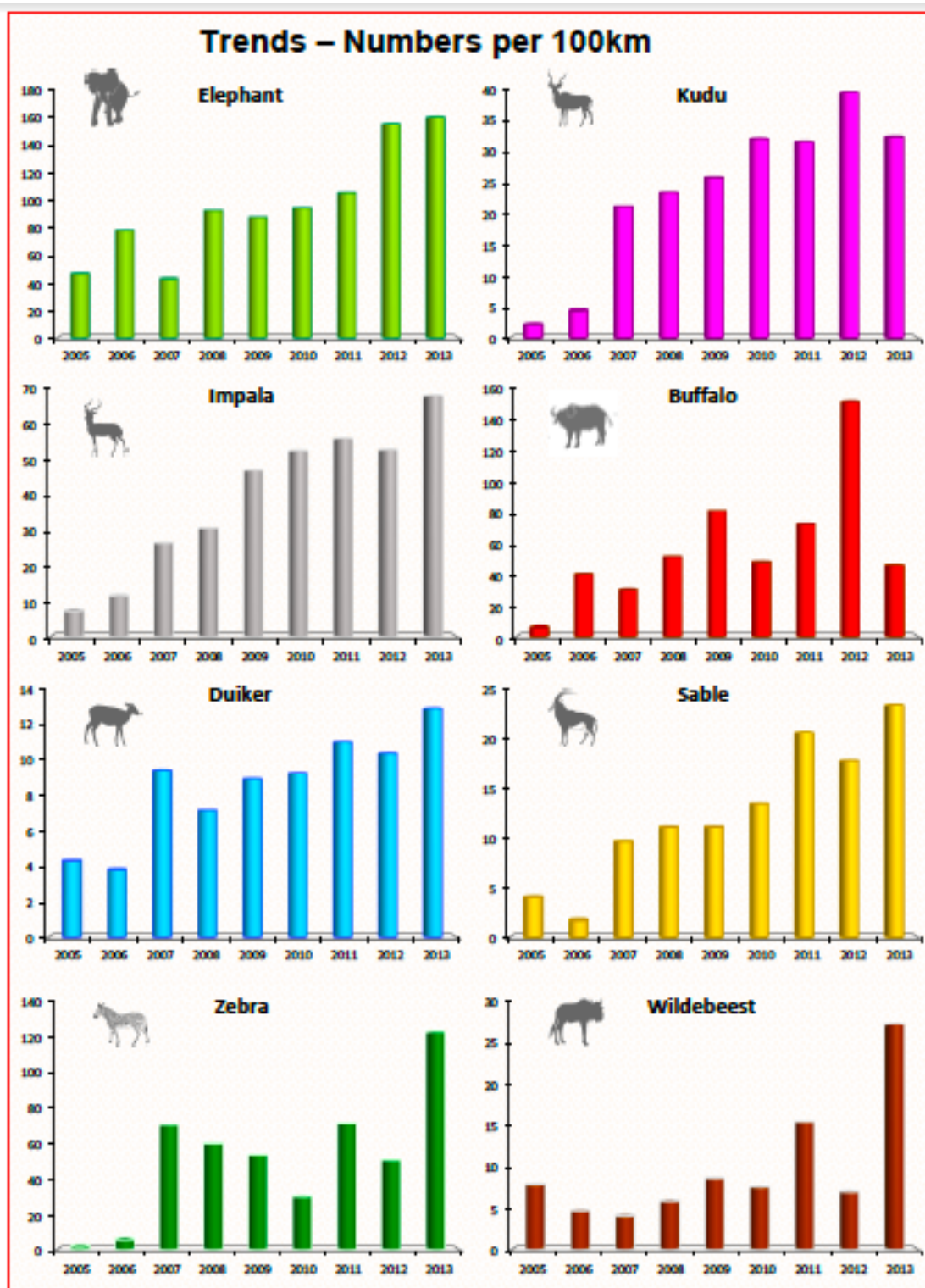
Wildlife is largely concentrated in the Protected Areas but increasingly is also distributed in the conservancies and areas outside the parks (Chase 2009). For instance, hippo, lechwe, elephant and buffalo were all recorded in the conservancies in higher numbers in 2009 than in previous years. Lechwe are concentrated in Nkasa Rupara and Bwabwata, but increasing numbers are found in the conservancies along the Linyanti and Chobe Rivers.

The State Forest supports surprisingly diverse wildlife and in numbers not previously recognised (Hanssen 2014 pers.comm.). For instance, packs of African wild dog have been identified that are more than previously realised, and also many eland, roan and sable have been recorded. These records underline the important conservation role played by the State Forest.

Namibia holds possibly 10% of the entire population of African wild dog, mainly in Kavango East and Zambezi Regions (MET 2004). This is Namibia's most endangered large mammal. The National Parks are obviously very important for providing protection for this species, but increasingly its survival will also depend on populations living outside of parks, such as conservancies and the State Forest.

Wildlife numbers are generally rising in the Region (Figure 17), as a result of the facilitation of transboundary movements through KAZA and the growing shift to diversify livelihoods towards wildlife, due to the improving benefits that rural communities can receive from this resource.

FIGURE 17 GAME COUNT GRAPHS FROM 2006 TO 2013.



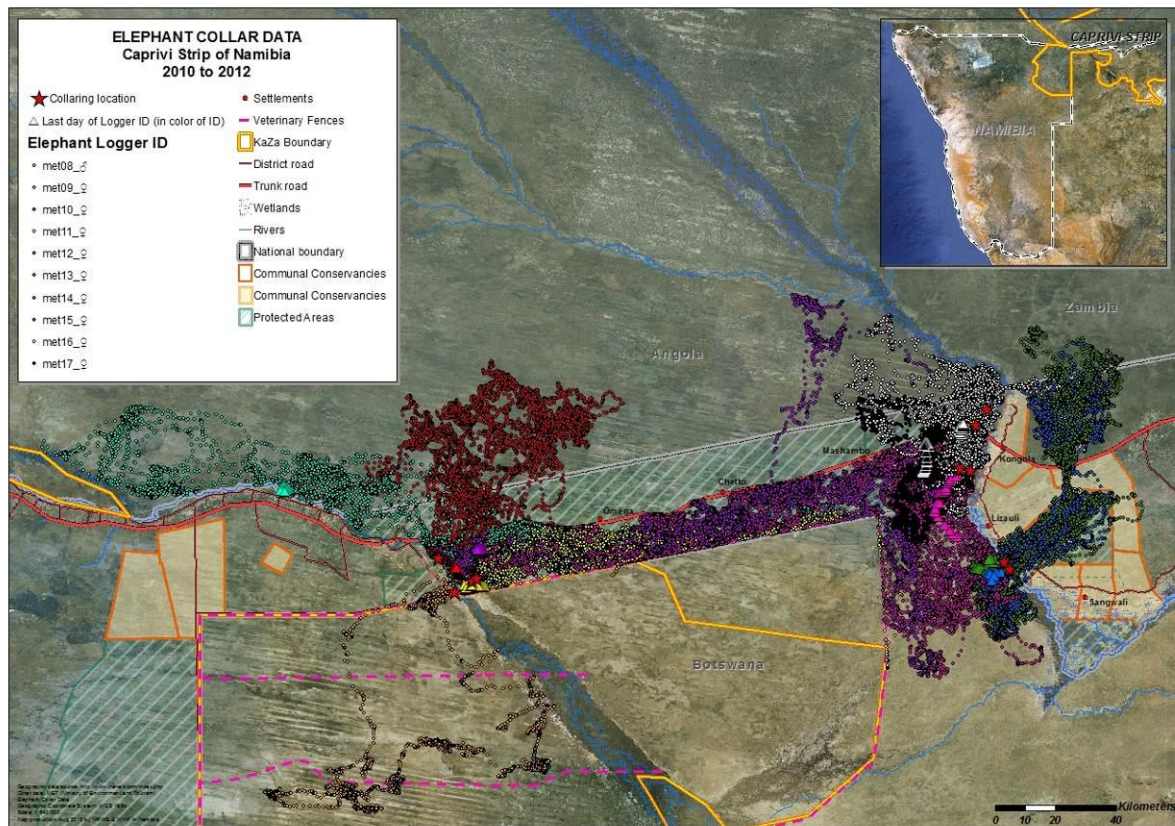
Showing the gradually increasing trend in important wildlife species in Zambezi Region (IRDNC 2014).

WILDLIFE MOVEMENTS

Many species of wild animals occurring in Zambezi Region (such as wildebeest, zebra, elephant, lion) move widely within the region and across the international borders into neighbouring countries. Conservation field work in the area, and especially satellite tracking of individuals, has given information on the extent of these movements, and helps to show where barriers to movements exist (Stuart-Hill 2012).

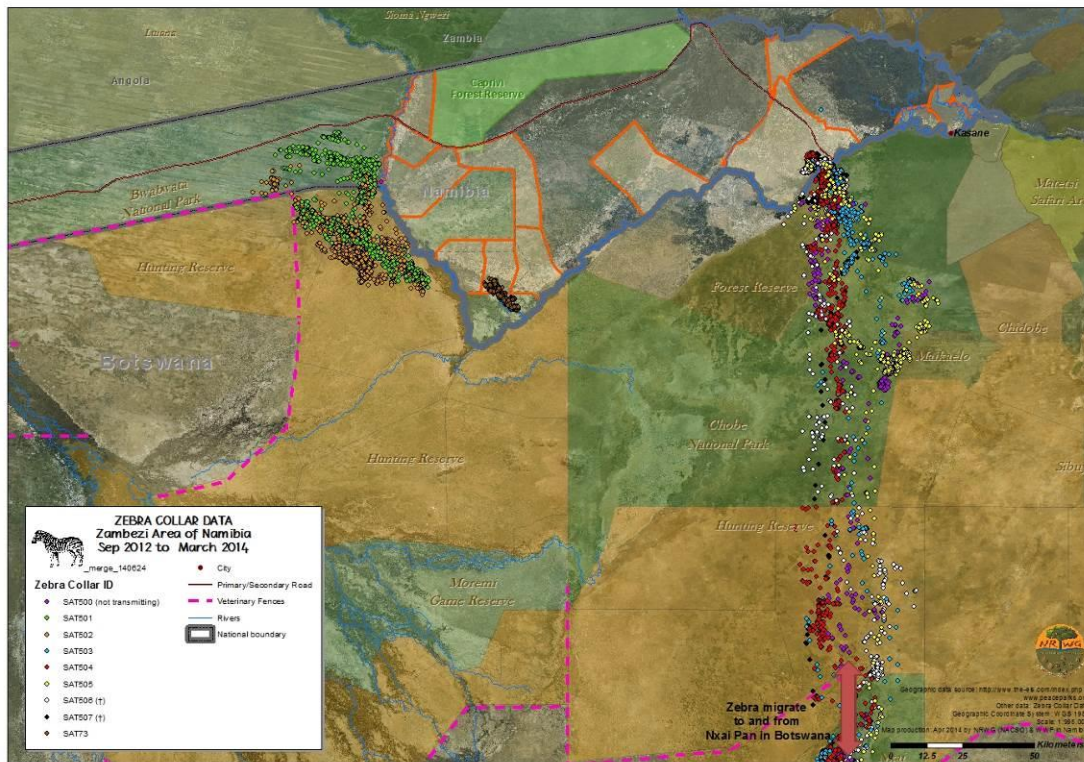
Some examples of movements are shown in Figure 18, Figure 19 and Figure 20 below.

FIGURE 18 ELEPHANT COLLAR DATA.



Note: Elephant collar data from the East Kavango and Zambezi Regions. Dots of different colours represent 10 individuals. Note the movements of the green individual, from Botswana west of the Kwando River, into Mudumu NP, following a narrow corridor into the State Forest, and moving northwards into Zambia. (Source Stuart-Hill 2012)

FIGURE 19 ZEBRA COLLAR DATA.



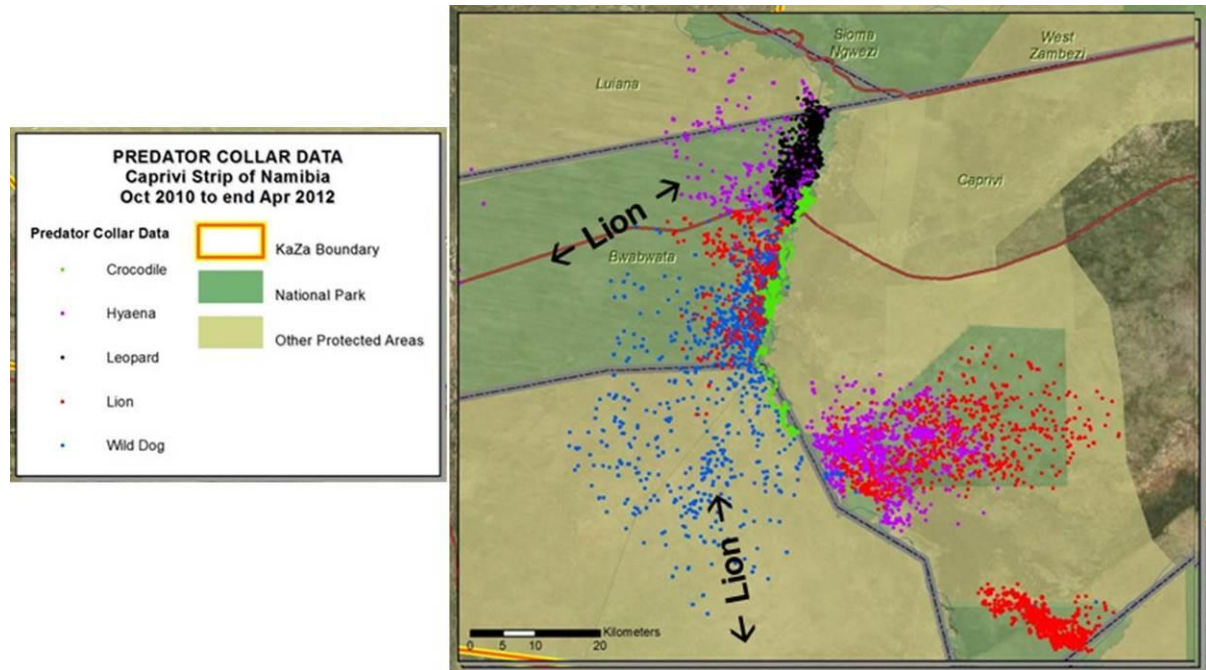
Note: Individuals on the western side of the Region show movements between Bwabwata NP and Botswana. Satellite tracking has also revealed an important route for this species, from Nxai Pan in northern Botswana to the Chobe River and into eastern Zambezi Region, covering over 200 km.

Predators are obviously drawn to these large numbers of herbivores and there are significant numbers of lion, spotted hyena (threatened), African wild dog (Endangered) and leopard (Hanssen, 2011). For instance, it has been estimated that there are about 15-25 spotted hyena in Bwabwata NP, and about 15 in the Mudumu North Complex. These are often accused of killing livestock, but detailed research has shown that such cases are often unfounded. Where it has been proven, it can be shown that cattle were left unattended close to or within protected areas (Hanssen, 2011). The research report suggests that hyenas could contribute more to tourism, by activities such as nocturnal guiding to bait sites for hyena viewing, than they presently do through the small hunting quota. Similarly, lions do come into conflict with people by predation on livestock but this can be reduced by measures such as kraaling at night and shepherds tending the cattle by day, and by keeping cattle away from key lion areas e.g. the National Parks (Hanssen 2014). Lions are especially valuable for tourism in the region.

The number of crocodiles in the rivers has shown a slight decrease to about 150 animals (Chase 2009). MET’s Crocodile Management Plan (MET 2013) notes the threats against this species – habitat loss and persecution due to deaths of livestock and humans – but also recognizes their value for sport hunting and ecotourism. Hunting could target problem

individuals and thus achieve dual benefits of removing certain individuals which have become problem animals and generating income for conservancies. Crocodile ranching is also noted as being potentially lucrative. MTI through the Namibia Development Corporation (NDC) is currently establishing a crocodile ranch near Kongola (New Era 2014).

FIGURE 20 PREDATOR COLLAR DATA.



Note: Predators are largely confined to the National Parks, as shown in this WWF map above. Although lion points (red) are mostly in Parks there are other records of their movements as indicated. The individual African wild dogs (blue) clearly moved widely between Namibia and Botswana.

BIRD LIFE

The wetlands of the Kavango and Zambezi Regions hold the richest diversity of birds anywhere in Namibia. The most important features of this system are the swampy areas and floodplains, which are an important breeding habitat for wetland birds. The Zambezi wetlands support a number of breeding resident species, and make an important stop-over area for migrant passerines, raptors and waders. The Zambezi wetlands support a number of threatened species, including the following:

- slaty egret
- wattled crane
- rufous-bellied heron
- African skimmer
- lesser jacana
- white-crowned lapwing

- long-toed lapwing
- black-winged Pratincole
- rosy-throated longclaw
- Montagu's harrier.

The 'Eastern Caprivi wetlands' are identified as an 'Important Bird Area' (Simmons et al., 2001). This designation does not hold any legal status but improves the recognition of the area as important bird habitat. It is based on the presence of globally threatened species, the presence of many habitat-restricted species, and the concentration of water birds that are supported in the area.

Lake Liambezi is an important habitat for wetland birds, with islands in the lake being used for breeding by Openbill Storks and White Pelicans (Endangered).

3.3.6 CARRYING CAPACITY AND AGRO-ECOLOGICAL ZONES

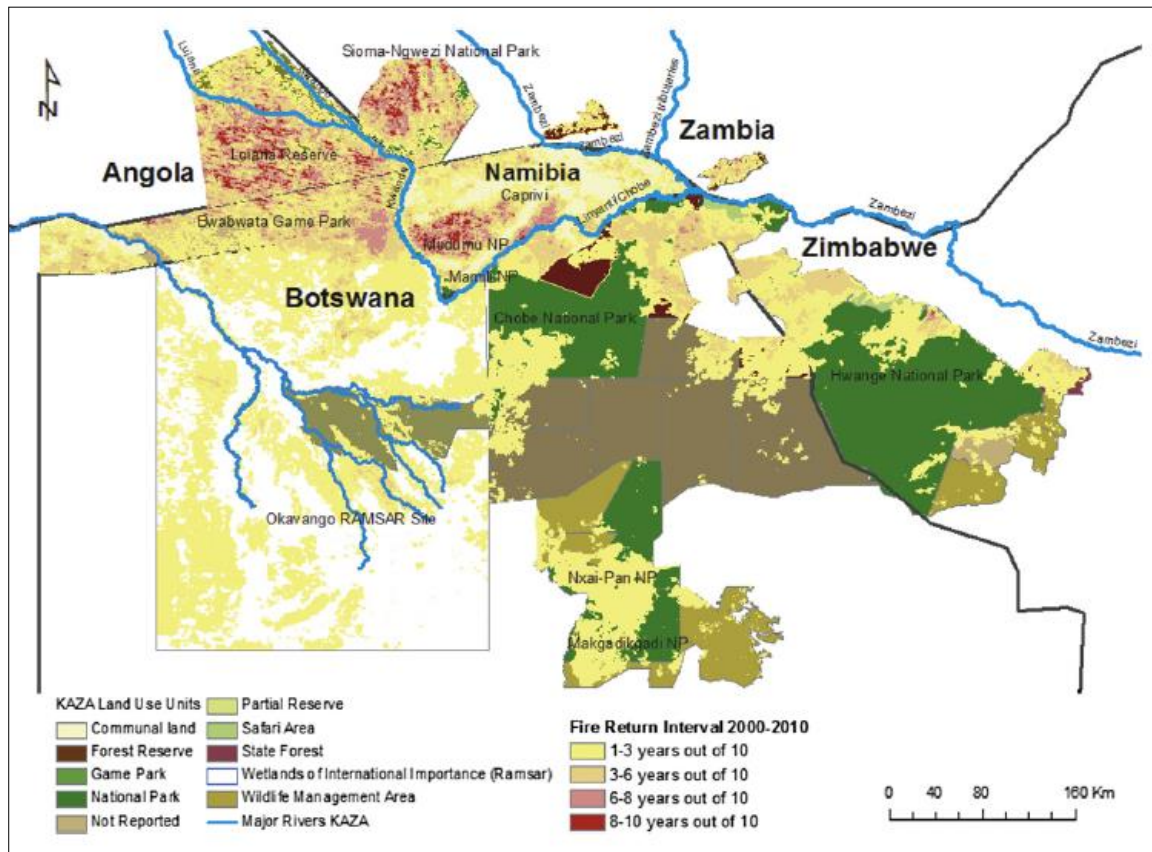
The whole of the region is classified as one uniform agro-ecological zone: the Kalahari sands plateau, which is suitable for short-maturing crops and large stock grazing.

3.3.7 FIRE

The great majority of fires in the Zambezi are started by people. People burn to stimulate grass growth for livestock and wildlife, and to clear land for cultivation. Such fires often get out of control, and there are few barriers to stop them. Columns of smoke rising from wide veld fires are a common sight in the region throughout the dry season. The extent of these fires, and the fact that large areas burn almost every year, has significant negative impacts on the environment.

While fire is a necessary and important part of the ecological functioning of savannas, it obviously also creates damage. Fires cause wildlife and livestock deaths, and can destroy houses and buildings. From August to October the weather is hot, dry and windy, and the dry grass and leaves make ready fuel. Therefore, late-season fires are usually hotter and more difficult to control, and they do more damage than fires in the early part of the season. In addition, areas burnt frequently (once every year or second year) suffer the most harm.

FIGURE 21: MAP SHOWING THE FIRE RETURN INTERVAL (FRI) IN PARTS OF KAZA.



Note: The FRI scores represent the number of years an area has burned in the period from 2000 to 2010.

In areas that burn frequently, young trees are killed, leading to little or no replacement of old ones. Large trees are eventually killed as successive fires do increasing damage to the trunk. While fires can destroy both younger and older trees, it is also true that frequent fires are responsible for bush encroachment, as removal of the grassy layer allows young invading trees to get established and grow into thickets. Frequent fires reduce soil fertility by the loss of nitrogen and sulphur to the atmosphere, and by exposing the soil to direct sun and wind. On a global scale, burning contributes to the build-up of carbon dioxide and dust in the atmosphere, which adds to pollution and accelerates climate change.

The map (Figure 21) shows the extent of recurrent fires in KAZA. More than half of the Zambezi Region burns 3-6 times every 10 years, while a core area roughly in the centre burns 6-10 times every 10 years. These high rates of burning destroy many valuable resources.

3.3.8 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally sensitive areas are identified on the basis of four main criteria (Barnard 1998, Ecosystem Services report SAIEA in prep.):

- the presence and abundance of Red Data species and other threatened plants and animals they host,
- the presence and abundance of species endemic to Namibia. Namibian endemics are species which occur nowhere else in the world; the responsibility for their survival and conservation lies entirely in Namibia’s hands.
- the presence of ‘keystone’ species which are critical to the ecological functioning of the natural environment (e.g. hippo which help to keep channels open, thereby helping downstream flows),
- areas which provide critical ecosystem services, which are important in sustaining human livelihoods (e.g. floodplains, important as nursery areas for breeding fish)

The region hosts only a few endemic species, although it is likely that more will be identified and named as scientific research continues. It is more the diversity and abundance of tropical species, which are only found in Namibia in this area, for which the region has special significance. All the wetland habitats fulfil one or more of the four criteria above. Additionally, strips of riverine forest lining the main rivers, of which very little is left due to ongoing tree-cutting, also fulfil one or more of the criteria. These areas are listed in Table 9

TABLE 9: ENVIRONMENTALLY SENSITIVE AREAS IN ZAMBEZI REGION

Name of area	Justification	Vulnerability to a particular activity
Zambezi River and floodplains, including belt of riparian forest lining the river banks	<ul style="list-style-type: none"> • Habitat of hippo (keystone species for aquatic ecosystems); • Fisheries make an enormous and critical contribution to livelihoods; • Various patches of riverine forest along the river as it passes Katima Mulilo are still well preserved. These host tropical tree species, with forest-living species of birds and bats, which do not occur in Namibia outside of Zambezi Region. They are valuable for local recreation purposes and for nature-based tourism. • Rocky areas of the river, such as at Wenela, Maningimanzi and Impalila, host fish species that are specific to this habitat. 	Overfishing Tree-cutting along river banks
Kwando River, floodplain and riverine woodlands	<ul style="list-style-type: none"> • Habitat of hippo (significant population in Nkasa Lupala wetlands) 	Tree-cutting along river banks

Name of area	Justification	Vulnerability to a particular activity
Linyanti River and floodplain	<ul style="list-style-type: none"> • Namibia’s only stronghold of puku (Endangered) • Supports Namibia’s largest herds of buffalo • Breeding area for Wattled Cranes (Critically Endangered) • Areas of permanent swamp critical for wetland birds, many of them Red Data species • 	Overfishing in Lake Liambezi
Chobe River and floodplain	<ul style="list-style-type: none"> • Zambezi R fish use the floodplain, often occur in larger numbers here than in the main Zambezi River. 	Overfishing
Ephemeral pans in Bukalo area	<ul style="list-style-type: none"> • Home of Caprivi killifish (extremely range-restricted endemic fish) 	Road developments

3.4 SOCIO-ECONOMIC PROFILE

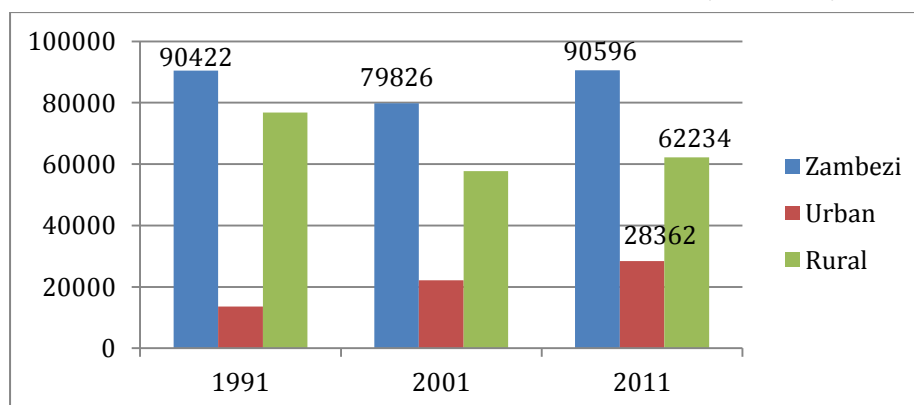
The socio-economic profile is composed of different elements that make up the social wellbeing, demography and economic status of people. Statistics provided within this profile will provide a snapshot of the current socio-economic status of the Zambezi Region. Land ownership and the role of the traditional authorities is described in Section 3.2.

3.4.1 POPULATION STATISTICS

Population Size, Structure and Composition

The population of the Zambezi Region has grown from 79,826 in 2001 to 90,596 in 2011. This is an annual growth rate of 1.3% which is slightly lower than the national average of 1.4% (NSA, 2014). The region has seen some fluctuations in its population numbers in the past two decades as shown in Figure 22. There are most likely attributed to a combination of regional boundary change, political conflict / uprising, return to stability (people moving back), and out-migration towards perceived better employment opportunities elsewhere in the country.

FIGURE 22: POPULATION VARIATIONS IN THE ZAMBEZI REGION (1991-2011)



Source: (NSA, 2014)

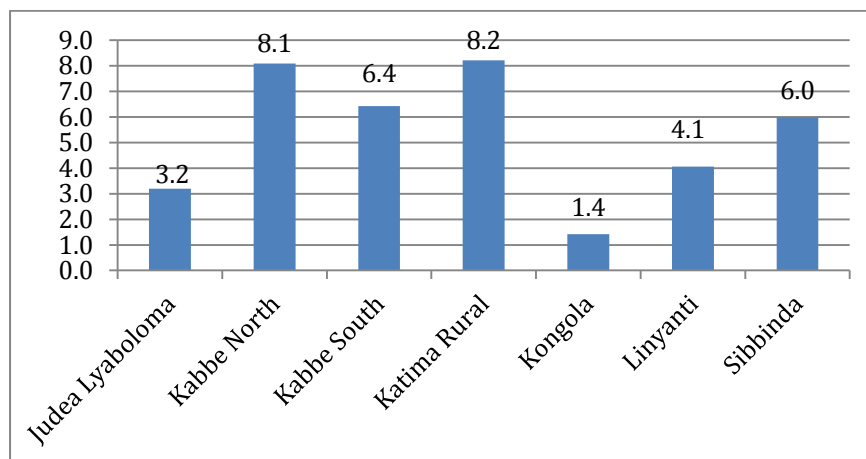
In 2011, there were a significant number of non-Namibians (10%) living in the Zambezi Region. The majority originate from Zambia (70%) while 15% were Angolans (NSA, 2014). The people from the Zambezi Region are descendants of Zambian kingdoms (Harring & Odendaal, 2012) and therefore their traditional linkages to Zambia are much stronger than to the other neighbouring countries.

The population density of the region was 6.1 persons per km² in 2011, which is much higher than the national average of 2.6 persons per km², indicating possible land use pressures (NSA, 2014). Katima Mulilo Urban Constituency had the highest density amongst the constituencies with 631 persons per km². Katima Mulilo is the only major urban area and its population has increased from 22,134 people in 2001 to 28,362 in 2011; the majority of the

population (69%) still live in the rural areas. Rural to urban migration is happening across the country as people move to seek job opportunities and improved infrastructure and services.

The constituencies with the next highest population densities were Katima Mulilo Rural and Kabbe North, both with 8 persons/km², and this is largely due to their proximity to Katima Mulilo and Zambia where trade takes place (Figure 23).

FIGURE 23: POPULATION DENSITY OF RURAL CONSTITUENCIES



Note: Kongola and Judea Lyaboloma Constituencies had the lowest population densities (1.4 and 3.2 persons per km² respectively) as much of the land comprises of National Parks and the State Forest where only a limited number of people are permitted to live.

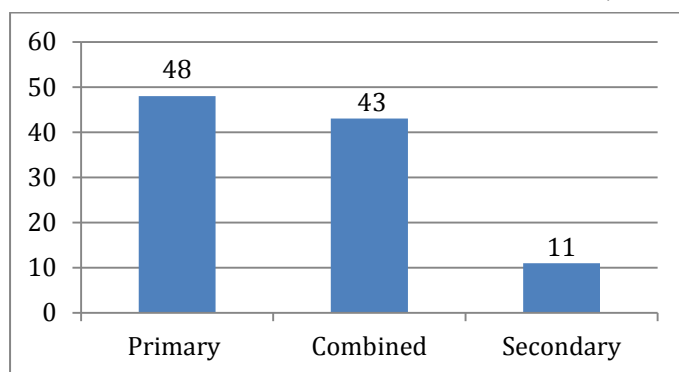
The majority of the population (55%) of the Zambezi Region is in the economically active age group of 15–59 years and the majority of them (61%) live in the urban area. The rural areas have more young children and people over 60 years (NSA, 2014). This is consistent with the urbanisation trend that usually sees the younger people moving to the urban areas and the older people staying or returning to the rural areas to continue with farming activities. (NSA, 2014).

3.4.2 EDUCATION AND LITERACY

School facilities and results

The latest available education statistics are for 2012. These show there were 102 schools in the Zambezi Region (Figure 24).

FIGURE 24: NUMBER OF SCHOOLS IN ZAMBEZI REGION, BY TYPE

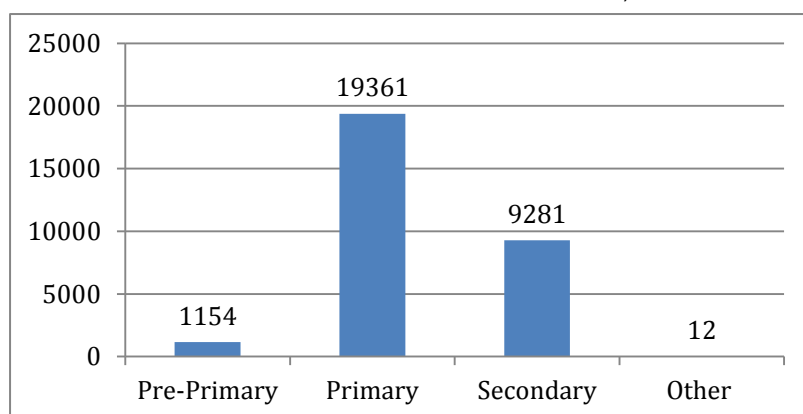


Source: (EMIS, 2013)

These schools had just over a thousand classrooms of which 63 (6%) were traditional structures. Only 71% of all schools had toilets for learners and 77% schools had their own water supply while the rest have to get water from nearby communities; the levels of these basic services are below the national average. Communication for schools are not desirable with only 58% of schools having access to electricity and only 61% have a telephone connection (EMIS, 2013).

In 2012, nearly 1,400 teachers taught 29,808 learners. Of these, 65% were receiving primary education, in Grades 1-7 (Figure 25). There were 250 more teachers than in 2010 which improved the average learner teacher ratio to 21.4 from 24.6 within two years. Grade 10 results for the region in 2012 were close to the national average and 52% of the 1,674 learners were able to enter Grade 11 (EMIS, 2013).

FIGURE 25: NUMBER OF LEARNERS IN ZAMBEZI REGION, BY SCHOOL PHASE



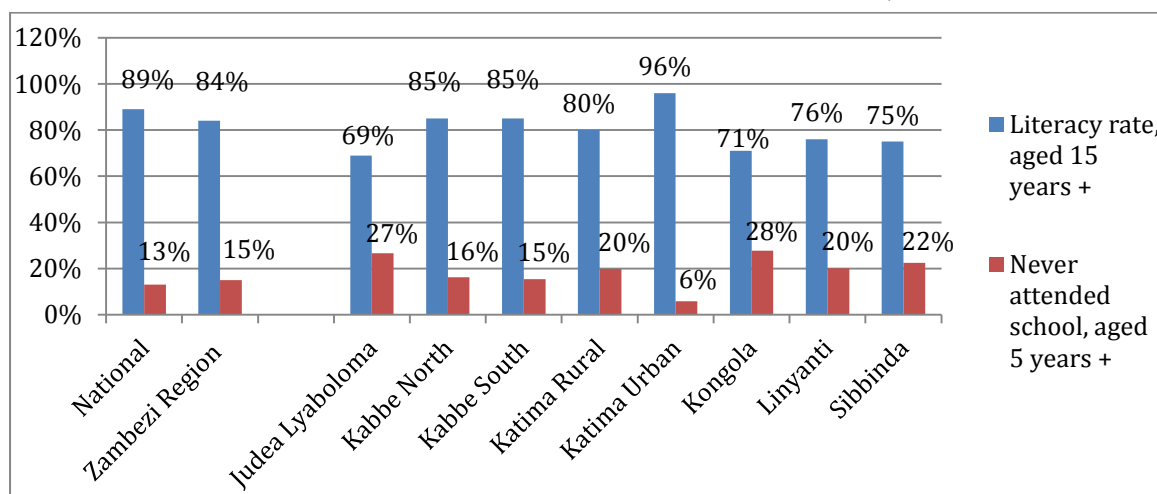
Source: (EMIS, 2013)

Literacy and school attendance

The regional literacy rate of people over 15 years old has increased from 78% to 84% from 2001 to 2011. Literacy is closely linked to school attendance so younger generations are more literate than older ones and urban populations are more likely to have attended school than people in rural areas. Judea Lyaboloma and Kongola Constituencies had the

lowest school attendance and the lowest literacy rates whereas in Katima Urban Constituency, literacy was well above the national average at 96% (Figure 26).

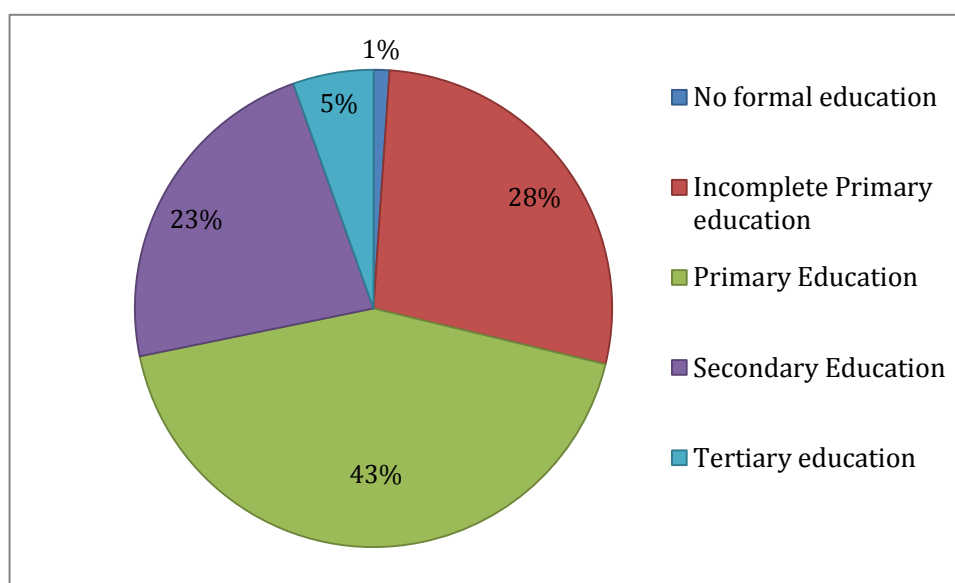
FIGURE 26: LITERACY RATES AND NEVER ATTENDING SCHOOL BY CONSTITUENCY, 2011



Sources: (NSA, 2013)

By 2011 across the region, about 43% of the population had completed their primary education while 23% completed secondary school education and 5.5% completed some form of tertiary education (Figure 27) (NSA, 2014).

FIGURE 27: HIGHEST LEVEL OF EDUCATION ATTAINMENT, 15 YEAR OLDS+ IN ZAMBEZI REGION



Source: (NSA, 2014)

3.4.3 HEALTH

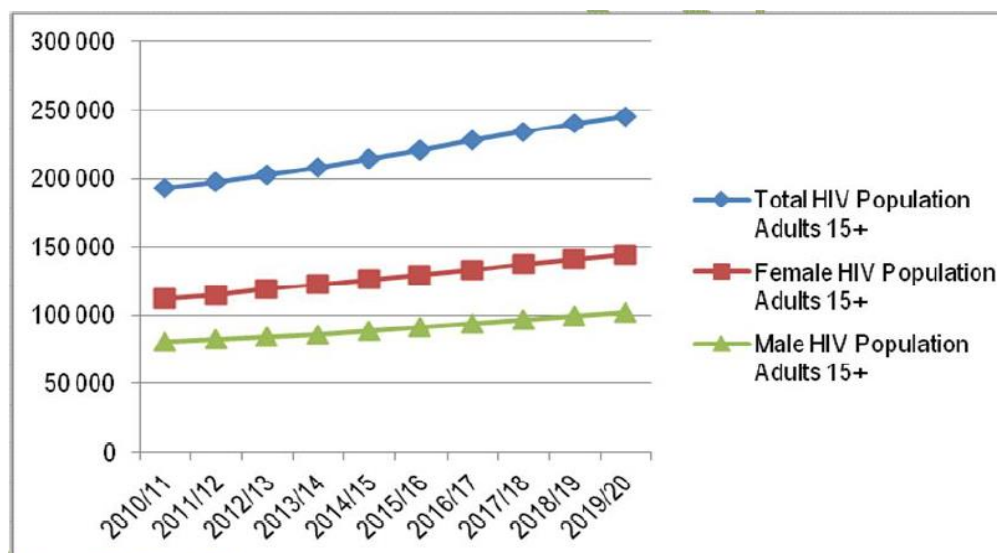
The region is served by one district hospital in Katima Mulilo, three health centres in Sangwali, Sibbinda and Bukalo and 23 clinics. In 2001, 82% of the population was within 10km of a health facility. The top killer diseases in the region, of people 5 years and older, were gastroenteritis, acute respiratory infections, AIDS, malaria and tuberculosis (El Obeid & Mendelsohn, 2001).

HIV

The Zambezi Region has always experienced higher rates of HIV than anywhere else in the country. This is largely due to cross border movements of people between its three neighbouring countries of Botswana, Zambia and Zimbabwe.

Namibia is severely affected by the HIV/AIDS epidemic and AIDS is the leading cause of death in the country (CDC, 2013). Namibia’s epidemic is described as generalised and mature, where HIV is mainly transmitted through heterosexual and mother to child transmission. Nationally, approximately 208,000 of people aged 15 and above were estimated to be living with HIV in 2013 and this is projected to increase to over 227,000 by 2016/17, and to over 245,000 by 2019/20 (Figure 28) (Spectrum, 2013) .

FIGURE 28: ESTIMATED HIV POPULATION AGED 15+, 2010/11 - 2019/20



Source: Spectrum Policy Modelling System, Version 4.69_500 (2013); Namibia Model 2013 (Spectrum, 2013)

Figure 29 and Figure 30 show that the prevalence of HIV among pregnant women attending antenatal clinics in Katima Mulilo is more than double the national average for both young and mature women. Despite HIV rates among the younger age group being relatively stable, Figure 30 shows that HIV prevalence appears to be increasing among older women,

which is due to increased survival of HIV infected women, but could also be due to new infections.

FIGURE 29. COMPARISON OF HIV PREVALENCE AMONG YOUNG WOMEN IN KATIMA MULILO AND THE NATIONAL AVERAGE

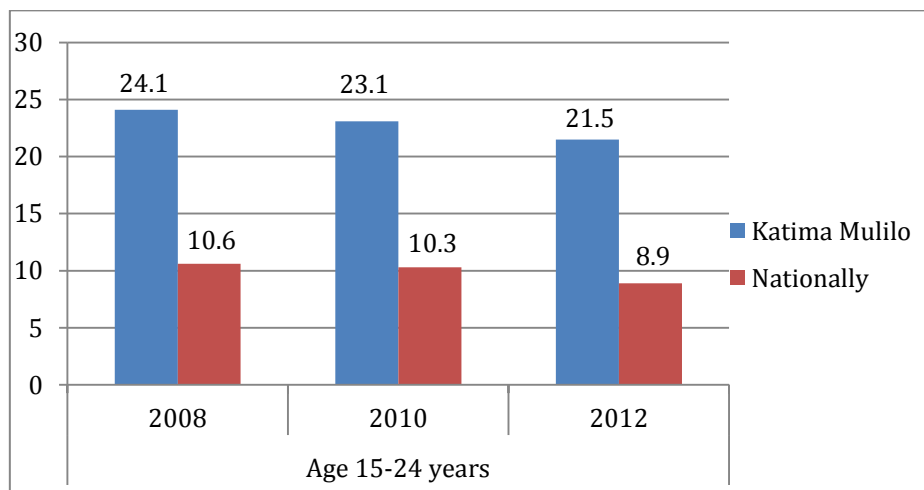
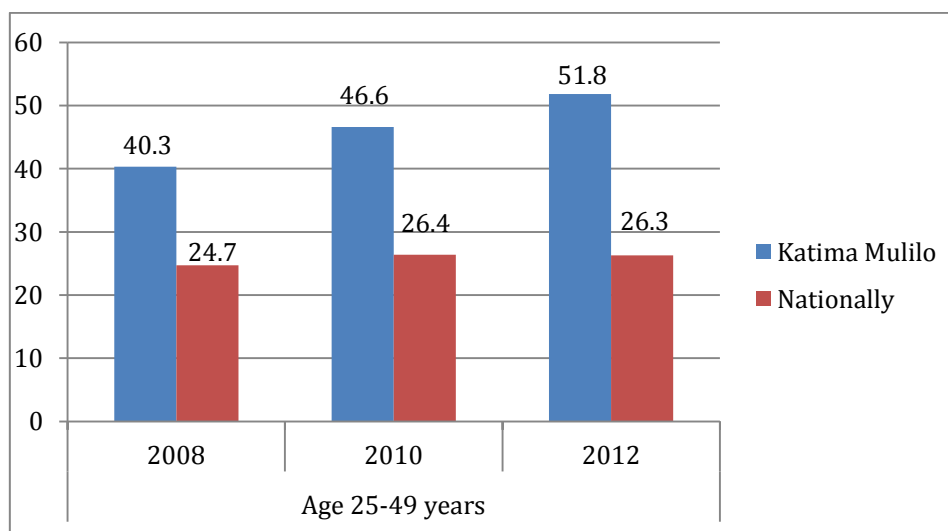


FIGURE 30. COMPARISON OF HIV PREVALENCE RATES AMONG OLDER WOMEN IN KATIMA MULILO AND THE NATIONAL AVERAGE



Source: (MOHSS, 2012)

The continued increase in the number of people living with HIV is expected because of the reduced AIDS mortality as coverage and access to improved antiretroviral therapy (ART) continues. Key factors maintaining the high levels of HIV in Namibia are high levels of multiple and concurrent partnerships, low and inconsistent condom-use, inter-generational sex, and transactional sex (MOHSS, 2014). HIV prevention knowledge, changing sexual behaviour and knowing one’s status are key to lowering the HIV levels.

Worryingly in the Zambezi Region, knowledge of HIV prevention methods (using condoms and limiting sexual intercourse to one uninfected partner) has increased among women to

90% but has decreased among men from 93% to 83% between the 2012 and 2006/07 Demographic and Health Surveys (MOHSS, 2008).

Among 15-49 year olds who had two or more partners in the last 12 months, 73% of Zambezi women reported using a condom during the last sexual intercourse compared to only 43% of Zambezi men and 71% of rural men nationally. These regional figures are the same as for the 2006/07 (MOHSS, 2008). These high regional figures partly explain the continuing high HIV rates, especially among the youth where new infections are most common.

Over three quarters of women (79%) have been tested for HIV and received their results; half of these were tested in the last 12 months. This is considerably higher than men, where only 60% have ever been tested in the region. However, this is a great improvement since 2006/07 as more than double the numbers of both men and women know their HIV status which allows them to take action to protect their sexual partners, to seek treatment, and to plan for the future.

Family Planning, Antenatal Care and Delivery

Half of the 204 married women in Zambezi Region who took part in the 2013 Demographic and Health Survey were not using any contraception. The number of women using injectable methods has increased from 32% to 41% while the number of women using male condoms as contraception has dropped from 7% to only 3%. The 2013 figures are significantly different from the national average where 11% of married rural women use male condoms as contraception (which also protect against HIV) (MOHSS, 2014).

Almost all women surveyed (97%) attended antenatal care from a skilled provider before their last live birth and 83% were injected to protect against neonatal tetanus – the highest coverage in the country. The number of women who delivered their baby in a health facility in the last 12 months has risen to over 85%, compared to 78% in 2006/07. The 2006-07 survey found that nearly 93% of Zambezi women aged 15-49 years had serious problems in accessing health care, citing distance and getting money for transport as the main constraints (MOHSS, 2008). In 2006/07, the Zambezi Region had the highest perinatal mortality rate in the country (58 deaths per 1,000 live births during the last two months of pregnancy and first seven days after birth) (MOHSS, 2008). No figures are available yet for 2013.

Childhood illnesses

Fever, diarrhoea and acute respiratory infections (ARI) are all potential killers of young children. In 2006/07 the region had the highest rates in the country for ARI (11%), fever (38%) and the third highest for diarrhoea. By 2013, the region's health statistics had improved across all three of these indicators, compared to other regions. However, in the

two weeks prior to the 2013 survey, more children under five years had symptoms of fever (140 out of 149 sampled) than diarrhoea 90/149 than ARI 34/149 (MOHSS, 2012).

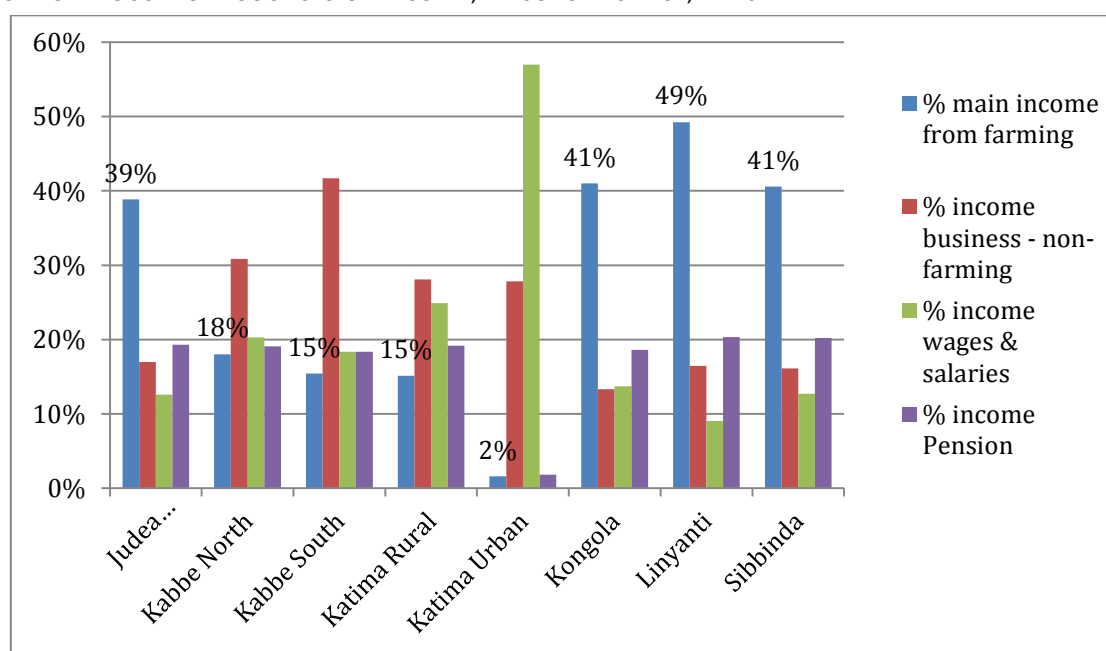
In 2013, the percentage of children under five years in the Zambezi Region who were classified as malnourished is below the national average, but is still too high. Nearly one in five children (19%) were stunted – short for their age – which shows they have not received enough nutrition over a prolonged period; 5% are severely stunted. Ten percent of children under five years in the region are suffering from acute and chronic under-nutrition. However, these statistics have all improved since 2006/07 when 26% were stunted, 9% severely so, and 14% were undernourished (MOHSS, 2008).

A new recorded health issue in the 2013 survey, which negatively affects children as well as women, is that domestic violence was reported by 28% of women aged 15 – 49 in Zambezi Region, compared to 32% nationally (MOHSS, 2014).

3.4.4 ECONOMY AND LIVELIHOODS

Even though the majority of the Zambezi population live in the rural areas (69%), the main source of household income across the region are from wages and salaries (30%), 25% from non-farming business activities, and 21% from farming activities. This varies quite significantly between constituencies as shown in *Figure 31*, which gives the percentage of households which obtain their main income from farming. Households in Linyanti are the most reliant on farming, but farming also contributes significantly to households in Sibbinda, Kongola and Judea Lyaboloma.

FIGURE 31. HOUSEHOLD SOURCES OF INCOME, BY CONSTITUENCY, IN 2011

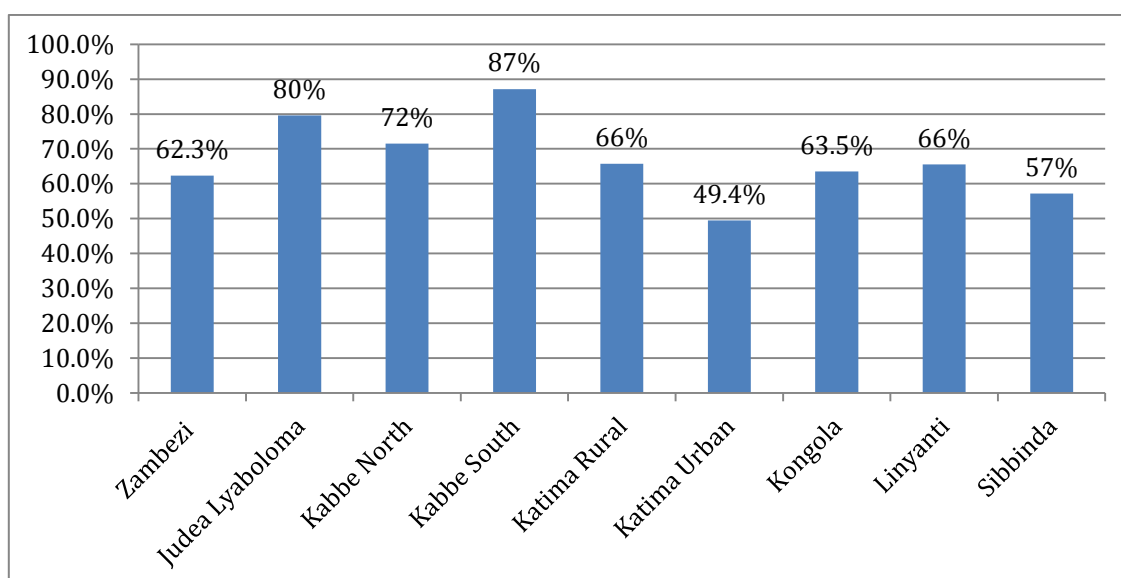


Source: (NSA, 2014)

In Katima Mulilo Urban Constituency, wages and salaries are the main source of income to 57% of households while income from business makes up 28%. In its neighbouring constituencies of Kabbe North and South and Katima Mulilo Rural, income from non-farming business is the most common main source of household income for 31%, 42% and 28% of households respectively.

The economically inactive population comprises students, homemakers and income recipients, while the economically active population is divided into the unemployed and employed population. *Figure 32* shows that approximately 62% of the economically active people aged over 15 years are in some form of employment and the census includes subsistence farming in this category.

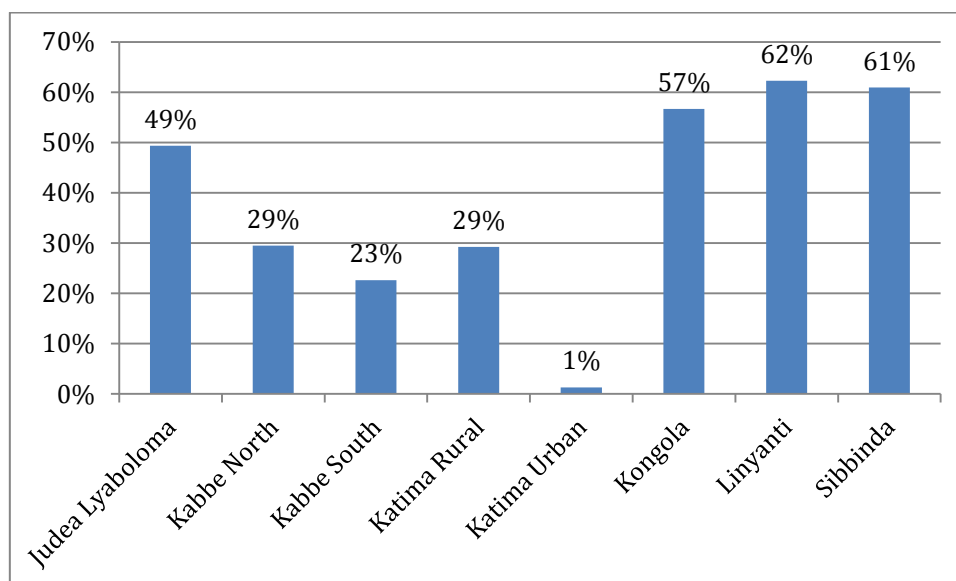
FIGURE 32: PERCENTAGE OF THE ECONOMICALLY ACTIVE POPULATION WHO ARE EMPLOYED



Source: (NSA, 2014)

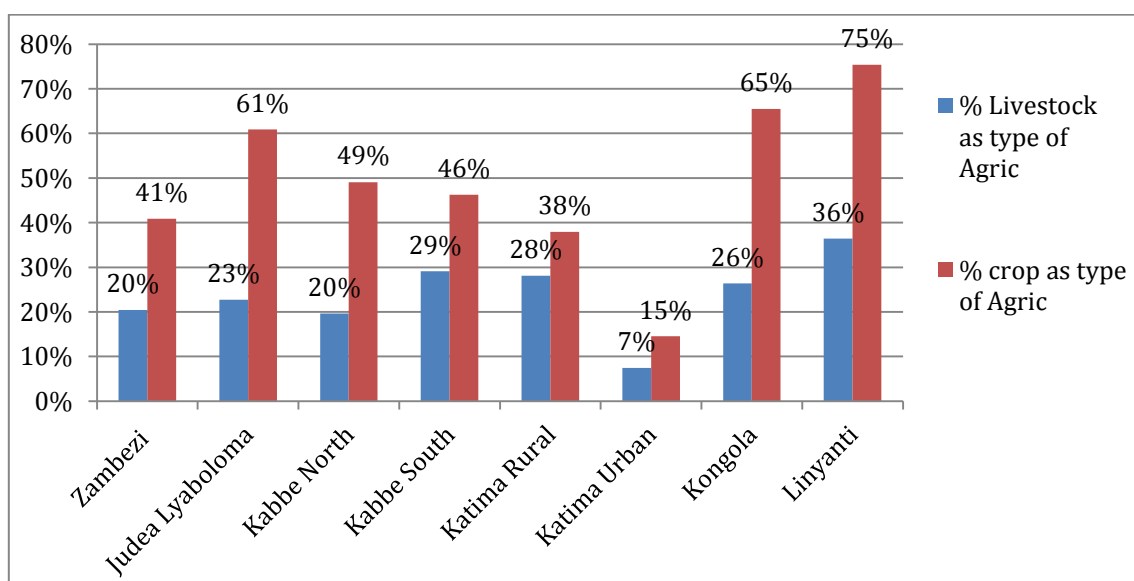
The importance of subsistence farming varies by constituency as shown in *Figure 33*

FIGURE 33: SUBSISTENCE FARMING AS MAIN JOB OF THE EMPLOYED POPULATION AGED 15 YEARS+



Overall crop farming was the dominant agriculture activity within all the constituencies in the region with livestock farming being the second largest agricultural activity in the region (Figure 34).

FIGURE 34: PERCENTAGE OF ALL HOUSEHOLDS WHICH ENGAGE IN CROP AND LIVESTOCK FARMING



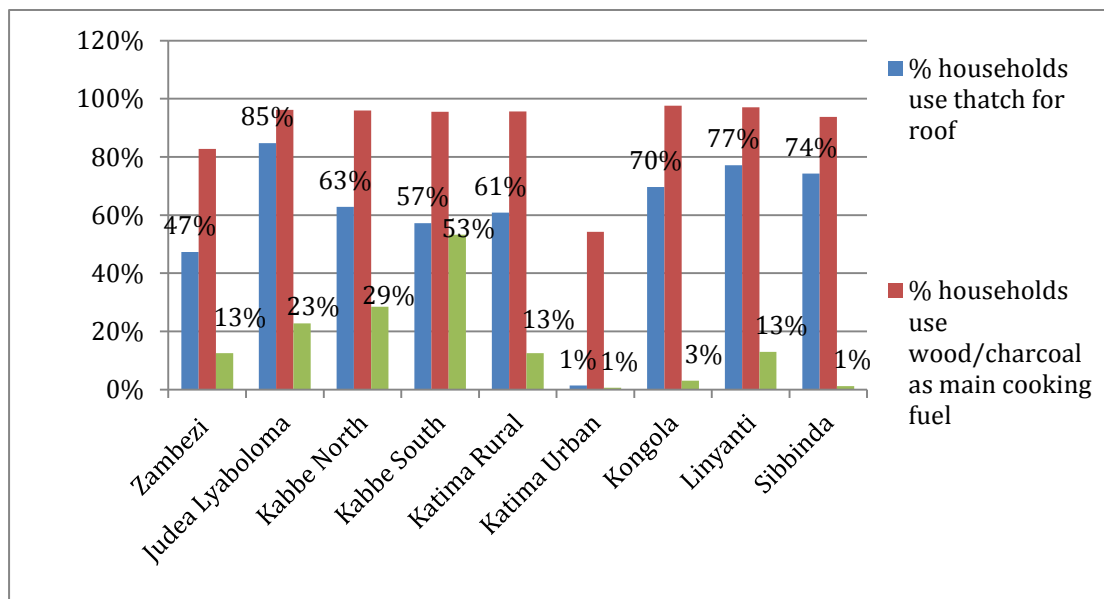
Source: (NSA, 2014b)

Many communities are fortunate to have additional livelihood activities coming from the life sustaining river and floodplain systems which surround the region to the west, south and east. For the communities living in proximity to water, fishing and home based industries such as collection of reeds from the rivers are important, while inland communities focus mainly on dry-crop and livestock farming for their livelihoods. Combined, communities in the region have the following livelihood activities, depending on locality:

- fishing
- river – field crops
- dry-land crops
- livestock farming
- horticulture
- home based industries (wild fruit, collection of wood, reeds, poles etc.)
- wildlife/ tourism.

Figure 35 shows that between 94-98% of households in the rural constituencies depend on wood or charcoal as their main source of fuel for cooking. Compared with Katima Mulilo Urban Constituency, only 54% use wood products and 41% cook with mains electricity. There is more variation among rural constituencies in the use of thatching grass for the roof of the main house. Households in the west of the region are more likely to use thatching grass than households in the east. More than half the households in Kabbe South are reliant on river water as their main source of water for cooking and drinking and, to a lesser extent it is important for many households in Kabbe North and Judea Lyaboloma.

FIGURE 35: PERCENTAGE OF HOUSEHOLDS USING SOME NATURAL RESOURCES



Source: (NSA, 2014b)

3.5 CLIMATE CHANGE PREDICTIONS

It is expected that extreme weather events such as flooding will become more common. With such conditions, it will become more difficult to decide when to plant. The onset of the rainy season will become more variable with prolonged dry spells. This will also affect agricultural activities, making it difficult to decide on when to prepare fields. Increased flooding will not only have an impact on agriculture production but will also have impacts on settlements, infrastructure provision and health. Increased flooding in the Zambezi Region will lead to more agriculture land being lost for longer periods, growing periods will be shorter and yields will therefore be lower. On the positive side, increased floods will lead to increased fertility of the floodplains as sediments and organic matter are carried by the floods.

3.5.1 FUTURE CLIMATE SCENARIOS

The various climate change studies done in southern Africa and on the Okavango – Zambezi River systems do not allow for predictions of future conditions with a high degree of confidence (Wolski 2013). Nevertheless there is certainty from a number of global circulation models that Namibia can expect higher temperatures and increased evapo-transpiration country-wide (Turpie et al. 2010, Davis 2011).

Uncertainty about future rainfall in the Zambezi Region and in the Angola and Zambia catchment area forces one to expect and plan for the worst. Some predictions claim (NACSO, 2010) that there will be increased aridification, with a shift from grassy savanna to more arid shrubland, a reduction in primary productivity and carrying capacity, and more frequent and intense floods. For farm-based livelihoods, this means reduced crop production and higher incidence of crop failure, and higher irrigation water demand.

Namibia has always known high rainfall variability, and the overall prediction is that this pattern is likely to increase. Extreme events such as droughts and floods are likely to become more frequent and intense (Turpie et al. 2010). The lesson from these predictions is that livelihood options should be diversified as widely as possible, and should be flexible and able to adjust when necessary. While the mainstay of Zambezi livelihoods is centred on crop and livestock agriculture, this can be complemented with wildlife, indigenous natural products and tourism options that are less prone to shocks from drought and floods. Similarly, alternative urban employment options need to be created.

3.6 ARCHAEOLOGICALLY AND CULTURALLY IMPORTANT AREAS

The Zambezi Region has a relatively short archaeological sequence representing the introduction of agricultural resettlements to the area within the past two thousand years. Research coverage to identify archaeological sites in the region has been poor. Some studies have been done during environmental impact assessments (EIAs) for developments such as power lines. In some areas, remains from burials are found, but not recognised as formal graveyards. This is since funerals in the rural areas are often not done formally. Such sites could be disturbed or destroyed during future construction projects (Kinahan, 2004).

An archaeological survey was done for the 400 kV power line running from Zambia, through the Zambezi Region (Kinahan, 2004). The assessment identified two sites which have significance to the archaeological record. On the west bank of the Kwando River at Kongola, the dune cover overlies a calcareous tufa-like deposit with a dense hump of root casts from what appear to be reeds and sedges. The upper surface of the tufa-like deposit represents the former water level of the adjacent wetland.

The second site is of recent alluvial deposits north of Kasheshe, near Katima Mulilo. They indicate shifts in the course of the middle Zambezi River in the Quaternary Period. A few artefacts including sub-fossil bones and freshwater molluscan shells were found.

Historically, the Zambezi Region has a few monuments of Namibia's colonial past. A building at Luhonono (former Schuckmansburg) still stands, that served as an ammunition storage during the German period (Otto et al., 2014). Schuckmansburg served as the administrative centre for the region at that time. From more recently, there is a monument to the Singalamwe massacre, where people were tortured and killed for supporting the freedom struggle. Today there is a graveyard in Masida village for them (Figure 36).

FIGURE 36: MASIDA GRAVE FOR SINGALAMWE MASSACRE (GONDWANA HERITAGE, 2014)



4. PRESENT LAND USES AND SECTOR TRENDS WITHIN THE ZAMBEZI REGION

Namibia is classified as an upper middle income country... this relatively high income status however masks extreme inequalities in income distribution, standard of living and quality of life. In terms of the Human Development Index (HDI) 2012, Namibia is ranked 128th (HDI of 0.608) out of 186 countries. The incidence of poor individuals is estimated at 28.7% of the population, with a poverty gap of 8.8% of the poverty line, while about 15% of the population is estimated to be living in severe poverty' (NPC, 2012).

The incidence of poor and severely poor individuals is currently estimated at 28.7% and 15.3% respectively (NSA, 2012). The Zambezi Region has a 50% poverty rate and a poverty incidence rate above the national rate of 28.7%, with more than half of the Zambezi population being under poverty (NSA, 2012) with poverty being higher among pensioners, subsistence farmers and those with household business income.

'Over the last ten years, the Namibian economy grew by an average rate of 5%, while recording an inflation rate of below 10%. The economy is characterised by heavy reliance on natural resource extraction for export market, a large non-tradable sector (government services) and heavy independence on imports, mainly from South Africa, to meet the domestic demand for goods and services' (NPC, 2012).

The Namibian economy had a growth rate of 4.4% in 2013 with the secondary and tertiary industries having growth rates of 8.7% and 6.4% respectively.

The primary industries of Namibia consists of mining, fisheries and agriculture. These industries dominate the export trade of Namibia, but has been declining over the years. In contrast, the secondary industries of manufacturing, electricity and water and construction have been steadily increasing. Primary industries recorded a decline of 9.3% during 2013 with the agriculture sector showing the greatest decline because of drought in 2013. The mining sector also had a decline in 2013 mainly due to a decline in uranium production (NSA, 2013).

According to the Annual Economic Development Report of 2012 for Namibia the tertiary industry (wholesale and retail sector) continues to be the largest contributor to the Namibian GDP, accounting for about 56.9% of the GDP, 'however the primary industry,

especially the agricultural sector, remains an important source of livelihood supporting more than half of the population’ (NPC, 2012).

In the 2014-2017 development budget allocation, the largest share of the budget will be allocated towards infrastructural development and the economic sector; agriculture, forestry, fisheries and marine resources, land reform and resettlement, tourism, environment, sustainable resource management, mining, energy, trade and industry. According to the budget allocation, the Zambezi Region will be allocated 6% in 2014-2015; 6% in 2015-2016 and 5% in the 2016-2017 financial years from the overall national budget for development projects.

Table 10 provides an overview of the main projects that will receive budgetary allocations until 2017 and may influence land use.

TABLE 10: SUMMARY OVERVIEW OF MAJOR BUDGETED DEVELOPMENT PROJECTS THAT MAY POTENTIALLY HAVE A LAND USE IMPACT

Project	Support/ Where
Community learning centre for adult learners	Kongola
Community learning development centre	Ngoma
Support for servicing, town planning, surveying of settlements	Chinchimani, Sibbinda, Sangwali, Lusese, Ngoma
Reintroduction of games species through the wildlife breeding loan scheme	Conservancies
Crocodile farm – breeding, leather tanning and tourist facilities	Kongola
De-bushing	Communal areas
Increase livestock productivity: Small stock distribution and development of small stock sector	Communal areas
Support for Green Schemes, expansion	Sikondo; Katima Farm/ Lusese
Increased rice production and support	Kalimbeza
Railway development	Cape Fria to Katima Mulilo (revision of feasibility study)
Road upgrading to bitumen standard	<ul style="list-style-type: none"> MR125 – Liselo – Linyanti – Singalamwe – Kongola road (210km)
Construction of gravel road	<ul style="list-style-type: none"> MR 125 – Lizauli – Sachona (15km) to provide access to Choi; Luzauli and Linyanti schools and clinics. Masokotwane- Machita (32km) Isize – Sifuhu – Malindi – Schuckmannburg (50km) Ngoma (Izimwe) – Nakobolelwa

Project	Support/ Where
Construction of border post	• Kamenga

Source: (NPC, 2014)

Livelihoods in the Zambezi Region is mainly mixed subsistence farming (livestock and dry-crop farming) supplemented by either fishing, harvesting of natural products, sale of crafts, reeds, thatch, medicines, fruits, nuts and employment at lodges or benefits from conservancies. Currently, livestock, cropping and fishing are the most important contributors to the livelihoods for households within the region. Secondary to the subsistence farming, is the growing tourism and conservation sector with its spin-off benefits, such as crafts, guides, cultural tourism, niche tourism.

4.1 AGRICULTURE SECTOR WITHIN THE ZAMBEZI REGION

The value of the meat industry in Namibia in 2010 was estimated to be over N\$2,052,195,329 (Schutz, 2010) with the largest contributor to the industry being the small stock sector. The contribution to the meat industry from the areas north of the veterinary fence are considerably low (approx. off-take rate at 25%) due to the restrictions placed on export because of foot and mouth disease.

With 69% of the Zambezi Regions' population living in the rural areas, the main source of income and livelihood support is from subsistence farming. Approximately 26.3% of the rural population depend on livestock farming and 52.9% depend on crop cultivation (NSA, 2012). The long history of subsistence farming for both livestock and crop cultivation is also further enforced by the strict regulations for export of meat from the region due to the existence of foot and mouth disease. There have been recent investigations and studies to find means to improve the livestock sector and to stimulate the commercialisation of the sector in the region. These will be further discussed in later sections.

There are two quarantine camps at Katima and Kopano. The quarantine camps have been established to improve the marketing of cattle. Since the Zambezi Region is communal land the Ministry of Agriculture, Water and Forestry provides certain services to the communal farmers such as agriculture development, extension services, veterinary services and agriculture planning. These services are further supported by various NGO's operating within the region.

In the Zambezi Region, crop cultivation is dryland cropping that is dependent on the rainfall for water. Typically, households plant between one and four hectares of mostly mahangu, sorghum and maize.

4.1.1 OPEN ACCESS LIVESTOCK/CATTLE FARMING

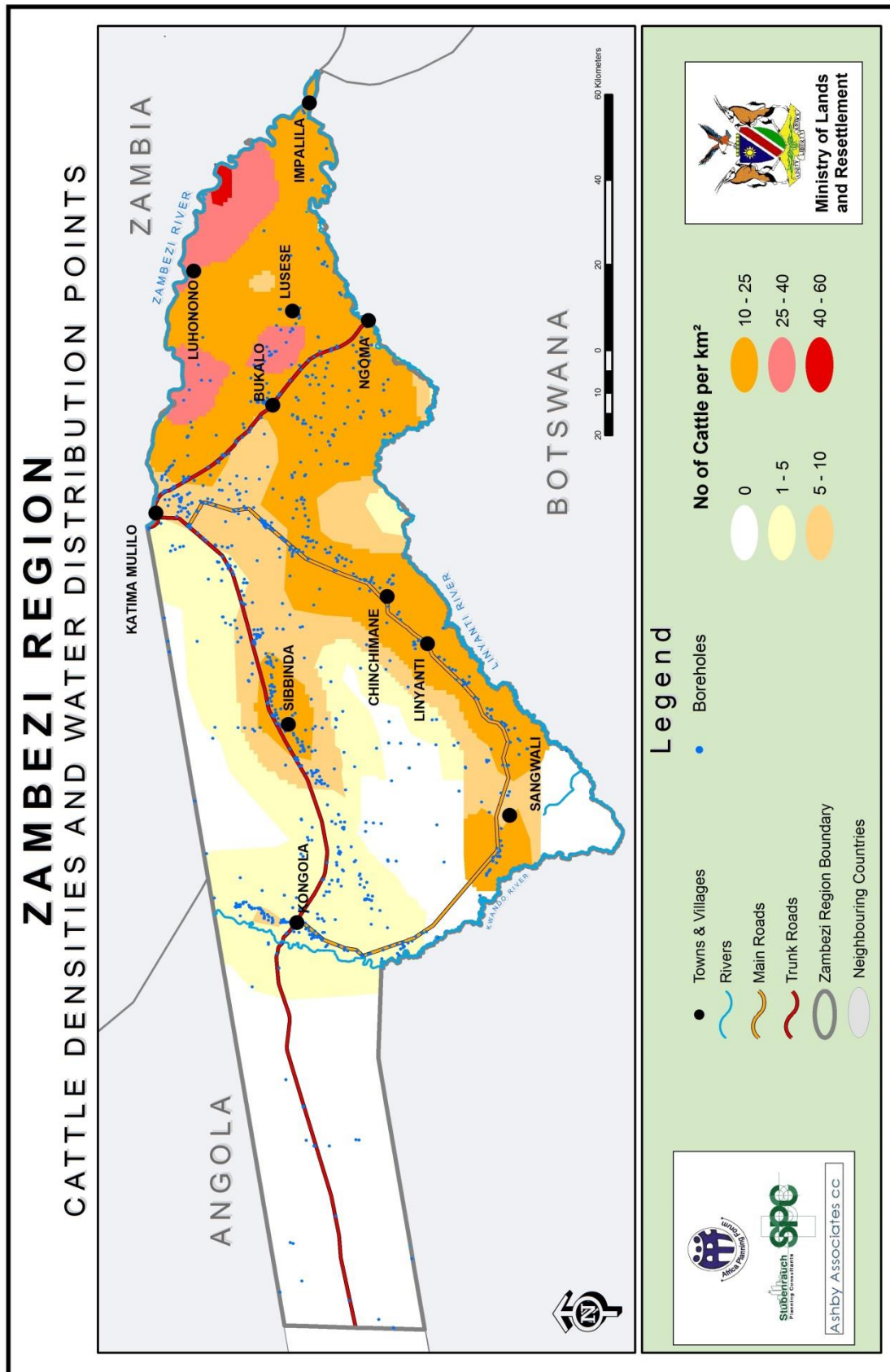
There are no commercial livestock farms within the Zambezi Region and consequently livestock farming takes place on open access communal land with the main stock being cattle. Although grazing land is open access communal land, a system of rights and access rules apply according to the traditional authority of the area.

Livestock farming in the Zambezi Region is dominated by cattle farming, although according to Mendelsohn (2006) it is often believed that every farmer in a communal area has livestock, but more than half of all households most likely do not have any cattle. In the Zambezi Region 42% have no cattle; 43% have between 1 – 30 heads of cattle and 15% owns more than 30 head of cattle (Mendelsohn, 2006). Cattle distribution is mostly in areas where there is water available, which is closer to the river systems and water points (Figure 37).

During the wet season cattle graze in the forest areas which have good grass and where water is available. During the drier months, cattle are moved into the floodplains where water has receded and where grass quality is better and access to water is easier. Typically, communal households are clustered in small villages surrounded by cattle grazing areas and dryland cropping.

It is estimated by MAWF veterinary services that in 2012 the Zambezi Region had approximately 136,221 head of cattle and approximately 10,000 small stock (mostly goats). Cattle farming is traditionally favoured by households in the Zambezi Region as there are a number of advantages for communities to own cattle. Owning cattle is not only advantageous for utilising cattle for draught power, milk, meat, cash income, but also important for social status. Unfortunately the grazing capacity of the region is relatively low (9ha/Lls unit), which means the land availability for livestock farming, (excluding conservation, state forest and national parks) is approximately 6,212 km². This means that approximately 69,000 cattle can be grazing in this area. Far less than the estimated 136,221 cattle.

FIGURE 37: CATTLE DENSITIES AND WATER DISTRIBUTION POINTS



It is estimated that cattle off-take from the region is 25% with half of these for the local informal market and the other half for formal markets. Live animal sales are limited to the region itself, with 25% from livestock traders and the rest directly from the farmers. There is one formal abattoir in Katima Mulilo operated by Meatco. The average abattoir throughput is between 7,000 to 8,000 cattle per annum with about 80% of production of poor quality C grade (Barnes J. I., 2013). The Katima Abattoir had a production rate of 28,087 cattle between 2009 and 2014 (Meat Board of Namibia, 2014).

Table 11 provides more detail on the number of livestock slaughtered at the Katima Abattoir between 2009 – 2014

TABLE 11: LIVESTOCK SLAUGHTERED AT KATIMA ABATTOIR BETWEEN 2009 - 2014

	2009	2010	2011	2012	2013	2014
January	-	1,207	643	-	-	-
February	-	1,163	1,063	-	632	-
March	-	973	1,044	-	866	247
April	-	754	1,179	-	903	750
May	-	653	747	211	1,108	813
June	-	242	1,041	-	833	881
July	-	318	1,138	-	590	
August	-	1,019	625	388	-	
September	522	948	-	758	-	
October	1,002	312	-	54	-	
November	951	-	-	247	-	
December	679	334	-	249	-	
TOTAL	3,154	7,923	7,480	1,907	4,932	2,691

Source: Meat Board of Namibia, 2014

The Zambezi Region is classified as a foot and mouth disease area (FMD). This classification has an impact on the export of livestock from this region as this controls and regulates the trade of livestock. On previous occasions Meatco were allowed to export industrial grade deboned beef from the region to markets in South Africa. However, this market was closed in 2007 due to a FMD outbreak. On average, the abattoir has been operating less than 50% of the time, mainly due to FMD outbreaks. There has been some export of partially processed products (deboned, frozen cuts and offal) to the DRC, Angola and Zimbabwe, and in 2010 some 170 tons were sold (Barnes J. I., 2013).

There are two quarantine camps in the Zambezi Region. The Katima Quarantine Farm is approximately 2,965 hectares in size and situated 10km west of Katima Mulilo. Kopano Quarantine Farm is about 40km west of Katima Mulilo with a size of 8,184 hectares.

Only three of the six vegetation types found within the Zambezi Region have the highest grazing potential: the floodplains, Mopane woodlands and Kalahari woodlands. (Mulonda, 2011). Cattle prefer two types of perennial grasses, *Antephora pubescens* and *Schmidtia pappophoroides* and these grasses can make up about 70% of their diet. According to Mulonda (2011) the floodplains have an abundance of annual grass species which indicates poor rangelands while the Kalahari woodlands prove to be in better conditions leading to the assumption that the Kalahari woodlands will be the preferred grazing area. In general the Zambezi Region has a grazing capacity of 9 hectares per livestock unit (Mulonda, 2011).

As part of the ecosystems services undertaken by SAIEA for the Zambezi Region a study on the monetary value of the different ecosystems within the Zambezi Region was undertaken.. As summary, this study found that communal livestock has economic direct use value of approximately N\$27 million annually (Barnes, Suich, & Tarr, 2015).

4.1.2 CROP CULTIVATION

52.9% of the rural population in the Zambezi Region relies on dryland crop farming for their subsistence livelihood. Cultivation practices are usually low input-low output with farmers investing very little in their fields and very few fields being fertilised and irrigated. Most fields are planted using seeds collected from previous years. Crops are usually harvested between April and July, generally four to five months after planting.

Crop production in the region is based around three types of land: forest zone, bushed valleys and the floodplains (Purvis, 2002). The main crops grown under dryland cultivation are mahangu (pearl millet), sorghum and maize. The maize is usually grown within the floodplains while sorghum and millet are grown on the higher drier land. As the flood recedes, people move onto the floodplain and cultivate the river-fields that have fertile soil.

Most households plant between one and four hectares of crop each year. Yields are quite low, mainly because of the poor soil and the low inputs to crop production. In 2003 only about 1,107 of the 12,556 households used fertilisers (CBS, 2003), and only a small number of households utilised mechanical means for ploughing the fields. Yields are not only low, they are also highly variable. From year to year yields vary between 70 and 455kg/ha for mahangu and sorghum and between 30 and 700kg/ha for maize (Mendelsohn & Roberts, 1997). Of all activities, clearing the land for cultivation has perhaps the greatest and most visible impact on the environment. New fields are cleared when existing fields are considered no longer as fertile as they should be, and when householders have enough resources to increase the area (Mendelsohn & Roberts, 1997).

Mahangu has been declared a controlled crop by the Namibian Agronomic Board (NAB) under the Agronomic Industry Act. This means that from 1 July every year no permits are granted for the import or export of mahangu until the total harvest has been sold. This guarantees a free market within the boundaries of Namibia and during this time mahangu is

marketed and sold in line with a production cost related floor price (NAB, 2014). It is estimated that for the 2012-2013 period approximately 213,635 hectares were planted in Namibia for mahangu with an estimated production of 33,038 tons.

It was estimated in March 2014 by the Namibia Early Warning and Food Information Unit (NEWFIU) that 79% of the total cropping area in the Region was planted with farmers being optimistic that the harvest for 2014 will be higher than that of 2013. It was further estimated that the harvest for maize will increase by about 77%, mahangu by 43% and sorghum by 22% from the previous season (NEWFIU, 2014). No regional data was available by the time of preparation of this report.

As part of the ecosystems services undertaken by SAIEA for the Zambezi Region a study on the monetary value of the different ecosystems within the Zambezi Region was undertaken.. As summary, this study found that communal crop farming has an economic direct use value of approximately N\$153 million annually (Barnes, Suich, & Tarr, 2015).

4.1.3 PROGRAMME FOR COMMUNAL LAND DEVELOPMENT (PCLD)

The Programme for Communal Land Development (PCLD) is a project that will be implemented through the KfW Development Bank, GIZ and MLR. The objective of the programme is to enhance sustainable land management practises, and to improve the productivity and market-orientation of communal farmers. This project is aimed at providing infrastructure investments and advisory farming services within selected communal areas.

The area for the PCLD is approximately 102,000 hectares in extent, since being reduced from the initial 148,000 hectares for the small scale commercial farm (SSCF) units. The project will aim at providing agriculture support to communal farmers by providing necessary infrastructure, advice and training. This project is still in its infancy stage and, at the time of writing this report, no clear outcome or course of action had been established.

4.1.4 IRRIGATION AND HORTICULTURE WITHIN THE REGION

Surprisingly, the large scale commercial irrigation sector within the Zambezi Region seems to be very much undeveloped.

Currently, the only operational large-scale irrigation project is the Kalimbeza Rice Project that is approximately 229 hectares in extent, of which only 30 hectares is currently under production. In 2013, the annual floods caused the loss of 15 hectares of rice production. The project currently grows three different rice varieties, two of which is a shorter rice variety. The shorter rice variety needs to be harvested before the annual floods. It was expected that 50 tonnes of rice would have been harvested for 2014. No additional information was available on the production of this project.

Table 12 provides an overview of the projects identified by stakeholders that are either in the planning or feasibility stage. It is therefore not guaranteed that these projects will proceed (see also Figure 39 showing the localities of these projects as identified by stakeholders)

FIGURE 38: COMMUNAL LAND DEVELOPMENT PROGRAMME AREA

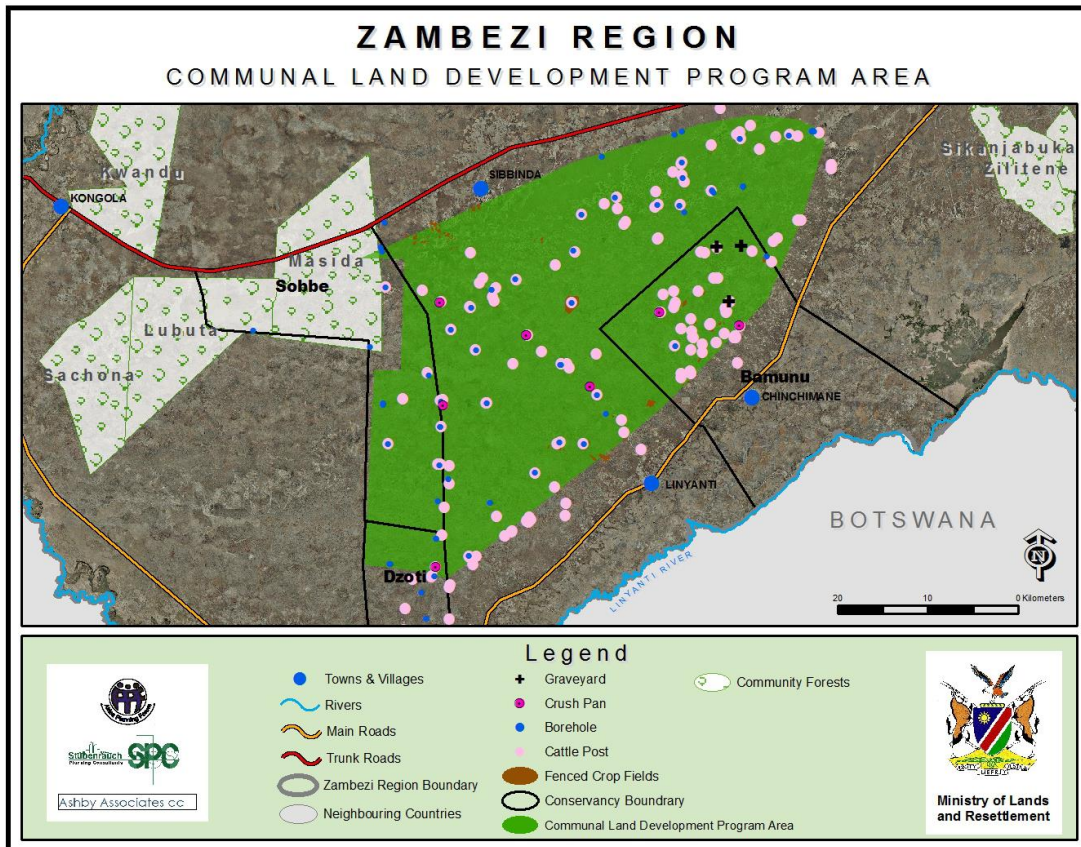


FIGURE 39: IDENTIFIED AGRICULTURE PROJECTS IN THE REGION BY STAKEHOLDERS

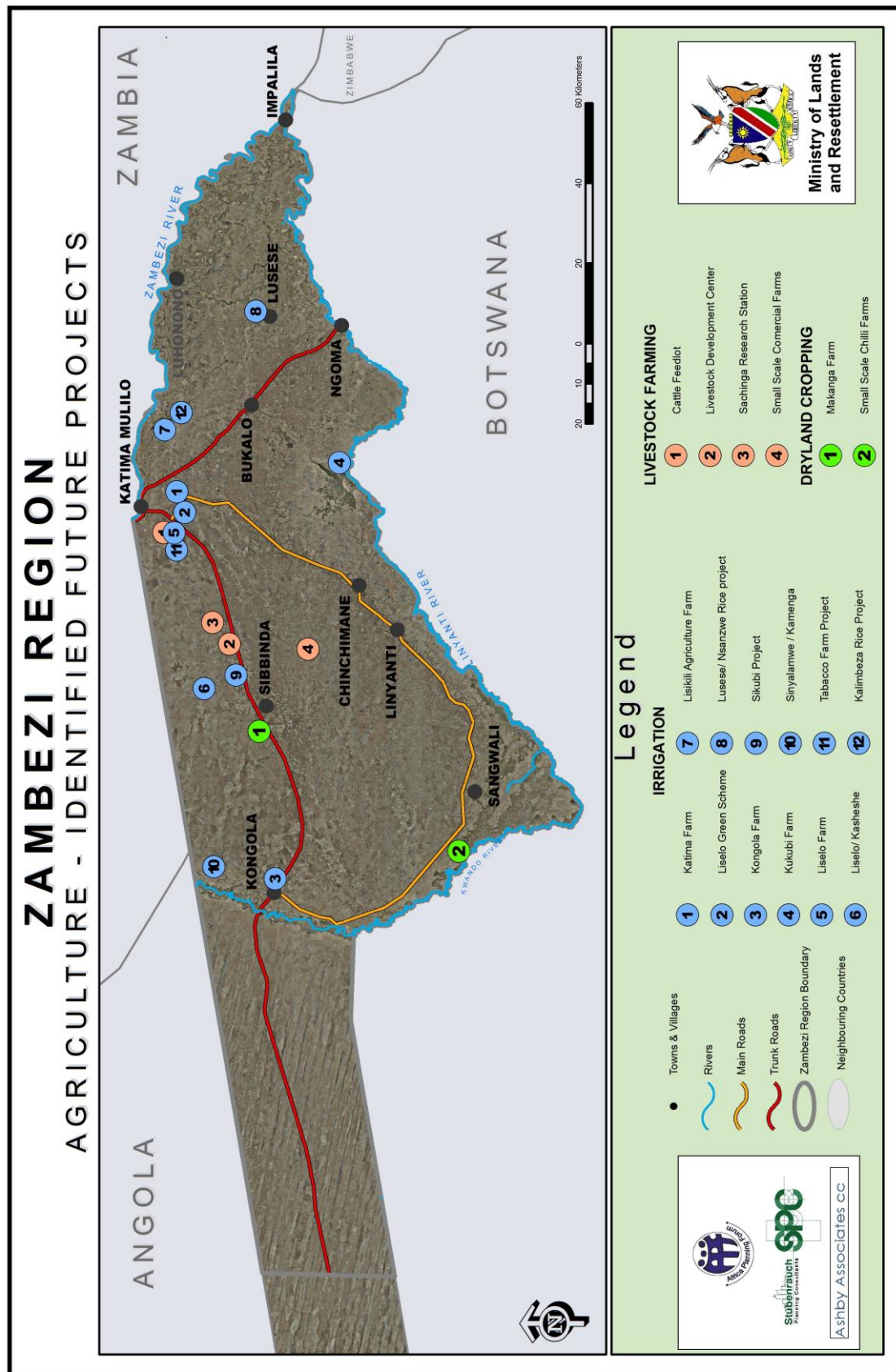


TABLE 12: LIST OF POTENTIAL IRRIGATION PROJECTS IN THE ZAMBEZI REGION IDENTIFIED BY STAKEHOLDERS

Name	Locality	Size	Products
Wenela Farm Green Scheme	On Wenela farm close to Katima Mulilo	250 ha	Maize, wheat, vegetables
Katima/ Liselo Green Scheme	Liselo	2,000 ha	Various crops
Mayako Green Scheme	Not available	Approx. 1,000 ha	Not available
Kongola	Kongola	Approx. 1,000 ha	Not available
Singalamwe		Approx. 5,000 ha	Not available
Oriental Tobacco Farm	West of Katima, in State Forest	Approx. 10,000 ha	Tobacco
Namibia Agricultural Renewable	In central Sibbinda Constituency	Approx. 30,000 ha	Lucerne

Subsistence small-scale horticulture seems to be more successful in the region. Horticulture is mostly small-scale household level, but there are about 19 small formal horticulture farmers in the region¹. As part of the Emerging Commercial Farms Support Programme (ECFSP), a number of these horticulture farmers receive support through a mentorship programme. Table 13 provides an overview of the horticulture producers for 2014, as provided by the ECFSP.

TABLE 13: ZAMBEZI HORTICULTURE PRODUCERS (2014)

Project Name	Size of Cultivation	Comments
Tusano Mbomande and Tusa Kazyii	8,710m ² ; 5,000m ² ; 3,500m ² ; 5,600m ²	Four small producers with low input and low output. Only one producer using production blocks and planning.
Nambwe	4,000m ²	Currently in planning process.
Kopano	4,000m ²	Have good to medium output and utilising partially production planning.
Kopano	4,000m ²	Have good to medium output and utilising partially production planning.
Kopano	4,000m ²	Have good to medium output and utilising partially production planning.
Ishibu Garden	5,000m ²	Stopped in 2013, but currently in re-planning phase. Horticulture only part-time.
Ngondo	4,500m ²	In planning still. Not in production yet.

¹ Personal communication Patrick Hilger 21 August 2014

Project Name	Size of Cultivation	Comments
Namalubi Tusa Project	0.9 ha	Each member has 1,500m. The project was supported by the Red Cross. Only supported by one small water pump. Need to be re-organised in 4 groups with one pump each.
Mpacha	2,500m ²	Had good production in 2013, but not in 2014. The garden needs restructuring.
Sachinga	0.5 ha	This is a new project but there are problems with the water supply.
Shaile	6,000m ²	Access to field is difficult even during times of low flood.
Kanono/Isizumu	2,000m ²	Water supply limited. There is no borehole. Soil is good.
Batubaja	0.4 ha	Poor production, poor management, part-time producer.
Silongo	1 ha	Excellent full time producer. Production increased and have all-year production.
Mungweze	2,000m ²	Project has a water problem.
Eden farm	6,000m ²	Good to excellent full time producer but access to farm is difficult during the flood time.
Lisikili/Saili	15,603m ²	New mentees, mainly cabbages Partially flood prone 1ha only all year flood free.
Idove	0.8 ha	Excellent full time producer but water issues. Well only provides 25m ³ / day and needs 50m ³ / day.
Masene	1,600m	Small part time producer

Source: (Hilger, 2014)

From the information received by the ECFSP it seems that most of the farmers have the same challenges with water. If water for the garden is obtained from a borehole, it might not deliver sufficient water, or farms situated in flood areas risk annual damage to the gardens. It also appears that small schemes suffer as a result of inadequate management and lack of sustained market linkages, often related to project donor cycles (C. Murphy, personal communication, December 2014). It is quite ironic that a region with so much water actually produces so little commercial crops.

4.1.5 INDIGENOUS PRODUCTS

The sale of indigenous natural products (INP) in the Zambezi Region is mostly from Devil's Claw. It was estimated by the Millennium Challenge Account (MCA) report on indigenous products (MCA, 2011) that approximately 80% of non-income families in the western Zambezi Region rely on plant resources for both income generation and dietary needs.

According to Karen Nott from the Integrated Rural Development and Nature Conservation (IRDNC), (personal communication, 27 January 2015), there were nine Producer and Processor Organisations (PPOs) involved in the harvesting in 2014 in the Zambezi Region. A total of 110,985kg was harvested and an approximate amount of N\$3,2 million received for the sale of the Devil’s Claw. Table 13 provides an overview of the PPOs, that includes the number of workers that harvested and the monetary value of the Devil’s Claw for the 2014 season (Nott, 2014) .

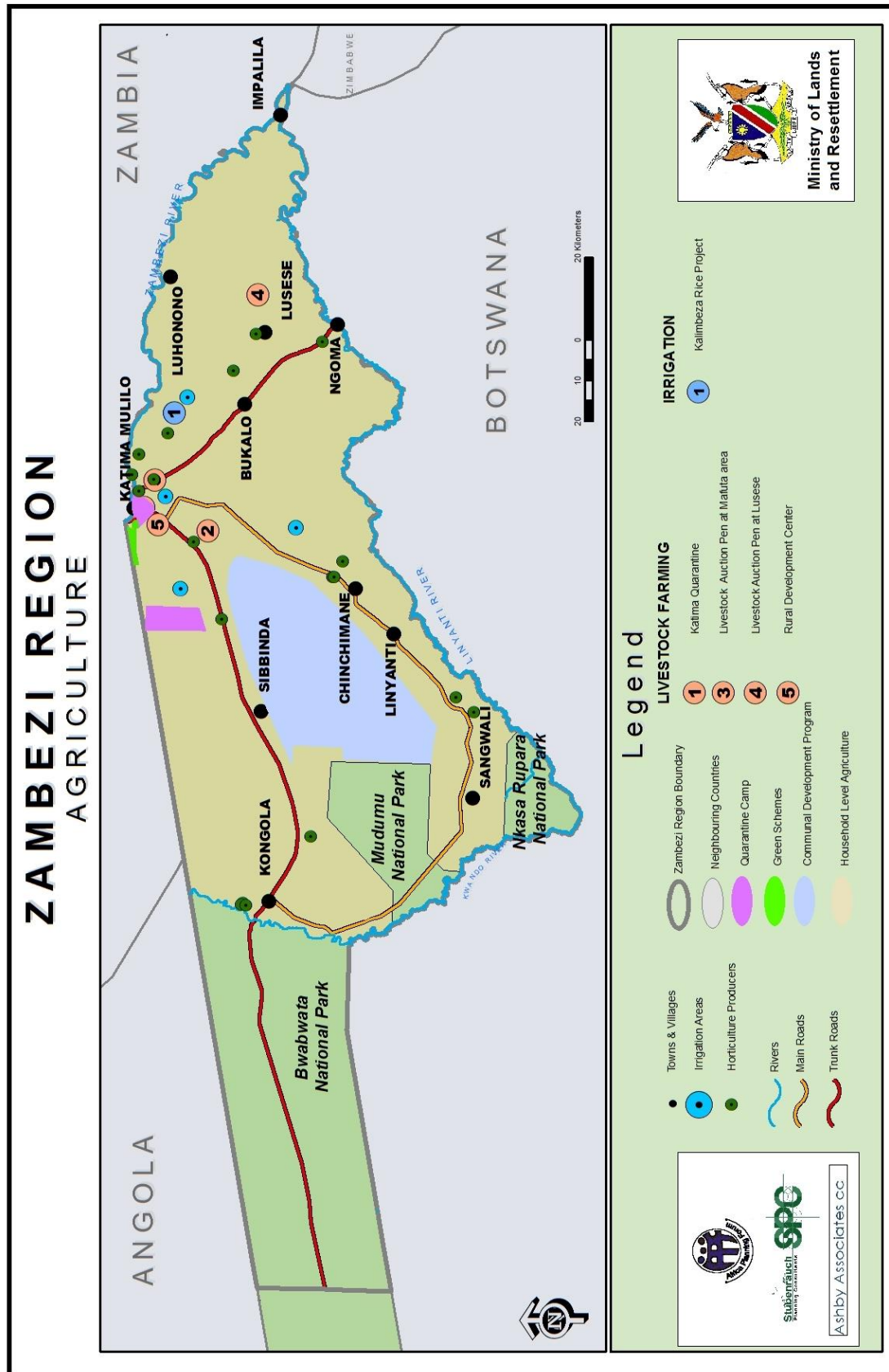
TABLE 14: LIST OF DEVIL'S CLAW PPOs AND BUYING AGREEMENTS IN 2013

PPO Name	Number of Harvesters	KG Harvested	Monetary Value of Harvest (Total)
Kyaramacan	352	20,372	N\$611,160.00
Kwando	92	10,020.10	N\$290,583
Mayuni	37	4,706.70	N\$136,494
Sobbe/Masida	182	35,664.20	N\$1,034,262
Balyerwa	109	11,472,20	N\$332,694
Wuparo	121	7,615.20	N\$220,841.00
Dzoti	40	2,999.60	N\$86,988.4
Lubuta	123	9,137.30	N\$264,982.00
Sachona	162	8,998.30	N\$260,951.00
Total	1,218	110,985.60	N\$3,238,954.00

Source: (Nott, 2014)

The Department of Forestry is promoting honey production through supporting small-scale beekeeping in the region. According to Murphy, the demand is high, but the supply is limited. Some of the challenges that create a low bee carrying capacity are due to the felling of large trees, a parasitic wasp that prey on bees, the need for supplementary winter feed and the smoke from bush fires (C. Murphy, personal communication, December 2014).

FIGURE 40: EXISTING AGRICULTURE PROJECTS IN THE REGION



4.2 TOURISM AND CONSERVATION SECTOR

The Zambezi Region is a popular tourist destination especially for wildlife viewing and fishing activities. However, the tourism sector is still very much undeveloped, but there is much potential.

A unique selling point for the region is the ever-growing conservation efforts, the vast amount of wildlife and beautiful sceneries along the river. Compared to the other regions in Namibia, the Zambezi Region has an excellent comparative advantage for tourism. Proximity to popular tourist destinations such as Victoria Falls and the Okavango Delta and a number of neighbouring national parks, puts the region in an excellent strategic position.

Not only is the Zambezi Region in the epicentre of one of the largest transfrontier conservation areas (KAZA), but there are also communal conservancies and three national parks. Thus, further enforcing the region's comparative advantage over the rest of the regions in Namibia. The regional borders formed by the Kwandu/Linyanti/Chobe and Zambezi Rivers further lends synergies to the tourism industry related to the ecosystems, wildlife and birdlife from these rivers.

Tourists to the Zambezi Region mainly visit the region for the following reasons:

- wildlife and the scenic areas found next to the rivers;
- as part of a tour package on their way to other known tourism destinations such as the Chobe National Park, the Okavango Delta and the Victoria Falls.

4.2.1 TOURISM IN THE ZAMBEZI REGION

There are 24 tourist establishments in the region, offering approximately 504 beds². The establishments range from hotels of established chains (e.g. Protea Hotel in Katima Mulilo) to much smaller camping outfits (e.g. Muvenje River Camp), to various community camp sites that offer fairly basic facilities.

Tourism enterprises in the Zambezi Region are either:

- private enterprises
- joint venture enterprises between communities and private investors, or
- community enterprises.

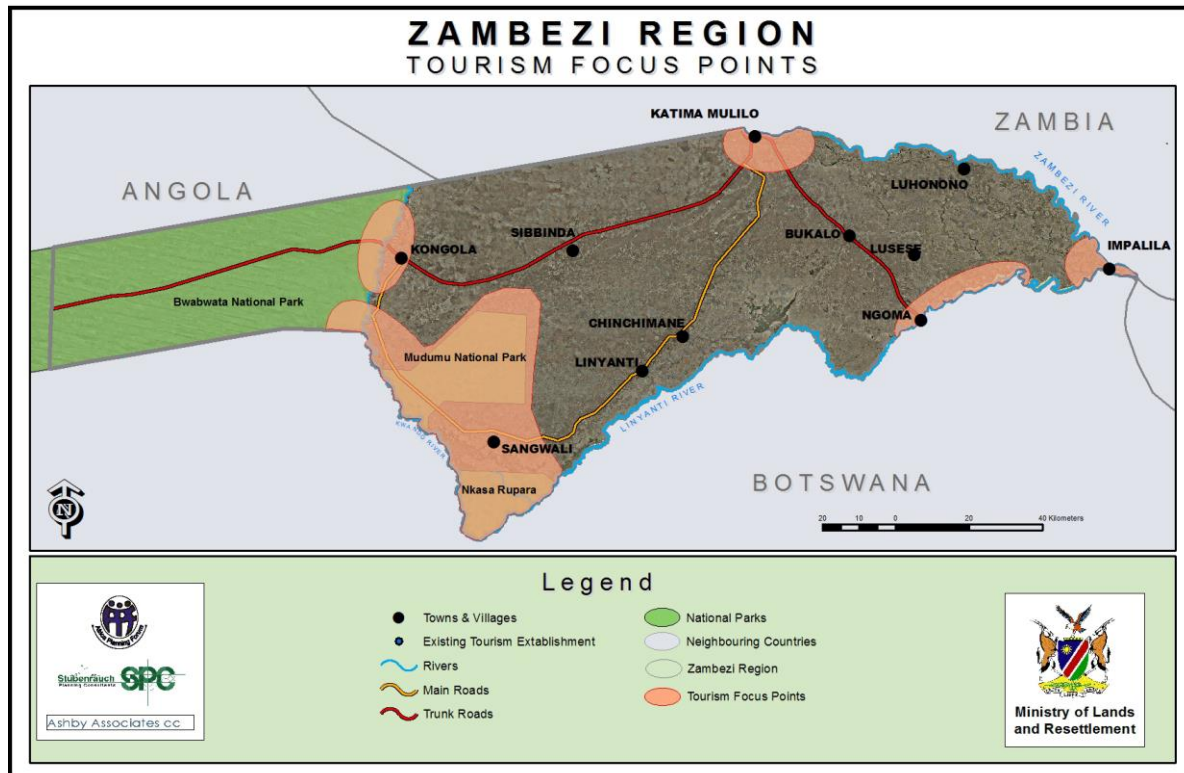
Tourism facilities are concentrated in roughly six areas within the Zambezi Region:

- surroundings of Kongola,

² Internet search and telephone directory search (August 2014)

- Kongola South towards the Nkasa Rupara National Park, next to the Kwando/Linyanti River
- next to the Zambezi River especially areas in the vicinity of the Chobe National Park
- Impalila island and surrounding areas
- Katima Mulilo and surrounding areas (on Zambezi River)

FIGURE 41: TOURISM FOCUS POINTS IN THE ZAMBEZI REGION



4.2.2 CONSERVATION IN THE ZAMBEZI REGION

Tourism in the Zambezi Region is focused around areas of conservation. There are 15 registered communal conservancies, three national parks and seven registered Community Forests. The Zambezi Region is well situated in the middle of a number of neighbouring conservation efforts. Care therefore needs to be taken when allocating land activities within the region to avoid any conflicting land uses.

COMMUNAL CONSERVANCIES

There are currently 15 registered conservancies and six emerging conservancies in the Zambezi Region. Table 15 provides an overview of these conservancies.

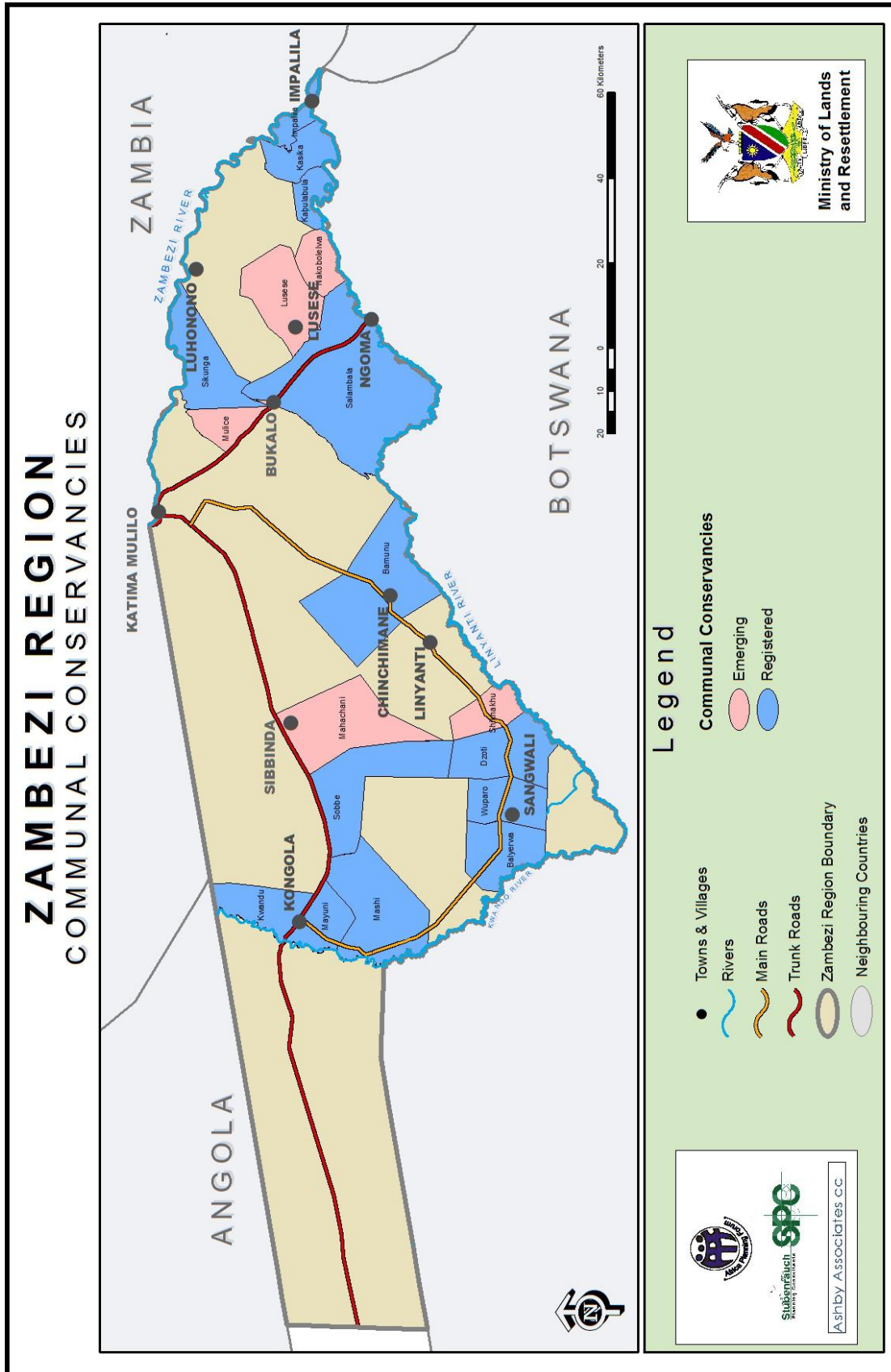
TABLE 15: LIST OF REGISTERED AND EMERGING COMMUNAL CONSERVANCIES

Name	Status	Size km ²
Salambala	Registered June 1998	930 km ²
Wuparo	Registered December 1999	148 km ²
Kwandu	Registered December 1999	190 km ²
Mayuni	Registered December 1999	151 km ²
Mashi	Registered March 20013	297 km ²
Kasika	Registered December 2005	147 km ²
Impalila	Registered December 2005	73 km ²
Balyerwa	Registered October 2006	223 km ²
Sobbe	Registered October 2006	404 km ²
Dzoti	Registered October 2009	287 km ²
Sikunga	Registered July 2009	287 km ²
Bamunu	Registered March 2011	556 km ²
Kabulabula	Registered November 2011	89 km ²
Lusese	Registered August 2014	283 km ²
Nakabolelwa	Registered August 2014	122 km ²
Mahachani	Emerging	397 km ²
Shikaku	Emerging	Not available
Mulice	Emerging	269 km ²
Ikaba	Emerging	Not available

Each of the registered conservancies has a conservancy management plan with a zonation plan for each conservancy. Within each of the management and zonation plans of a conservancy, provision is made for specific zones where cropping, livestock farming, human settlement, hunting and conservation may take place. Therefore, a communal conservancy does not exclude cropping, livestock farming or settlements as people often incorrectly believe.

As part of the ecosystems services undertaken by SAIEA for the Zambezi Region a study on the monetary value of the different ecosystems within the Zambezi Region was undertaken. As summary, this study found that game has an economic direct use value of approximately N\$27.48 (Barnes, Suich, & Tarr, 2015) while tourism and recreation has a value of N\$226.05 million within the Zambezi Region .

FIGURE 42: CONSERVANCIES WITHIN THE ZAMBEZI REGION

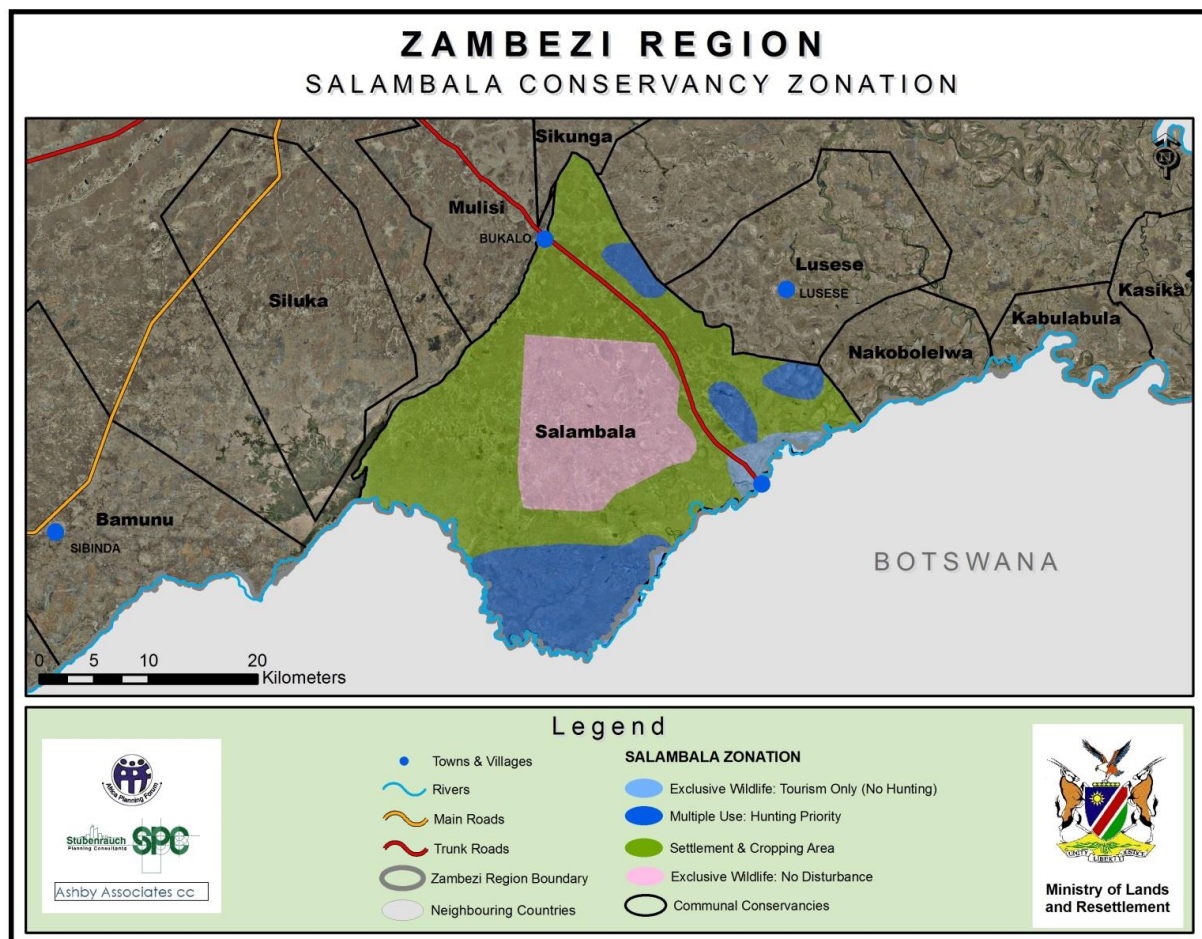


SALAMBALA CONSERVANCY

Salambala Conservancy was registered in 1998 and comprises an area of 930km². It has a population of approximately 8,000 people. The zonation plan for Salambala identified four different zonations:

- Exclusive Wildlife: tourism only, situated mainly along the river;
- Multiple Use: hunting priority, along the river and a few inland areas;
- Settlement and Cropping Area: makes up the largest of the areas;
- Exclusive Wildlife: no disturbance area which is in the centre of the conservancy.

FIGURE 43: ZONATION PLAN FOR SALAMBALA CONSERVANCY

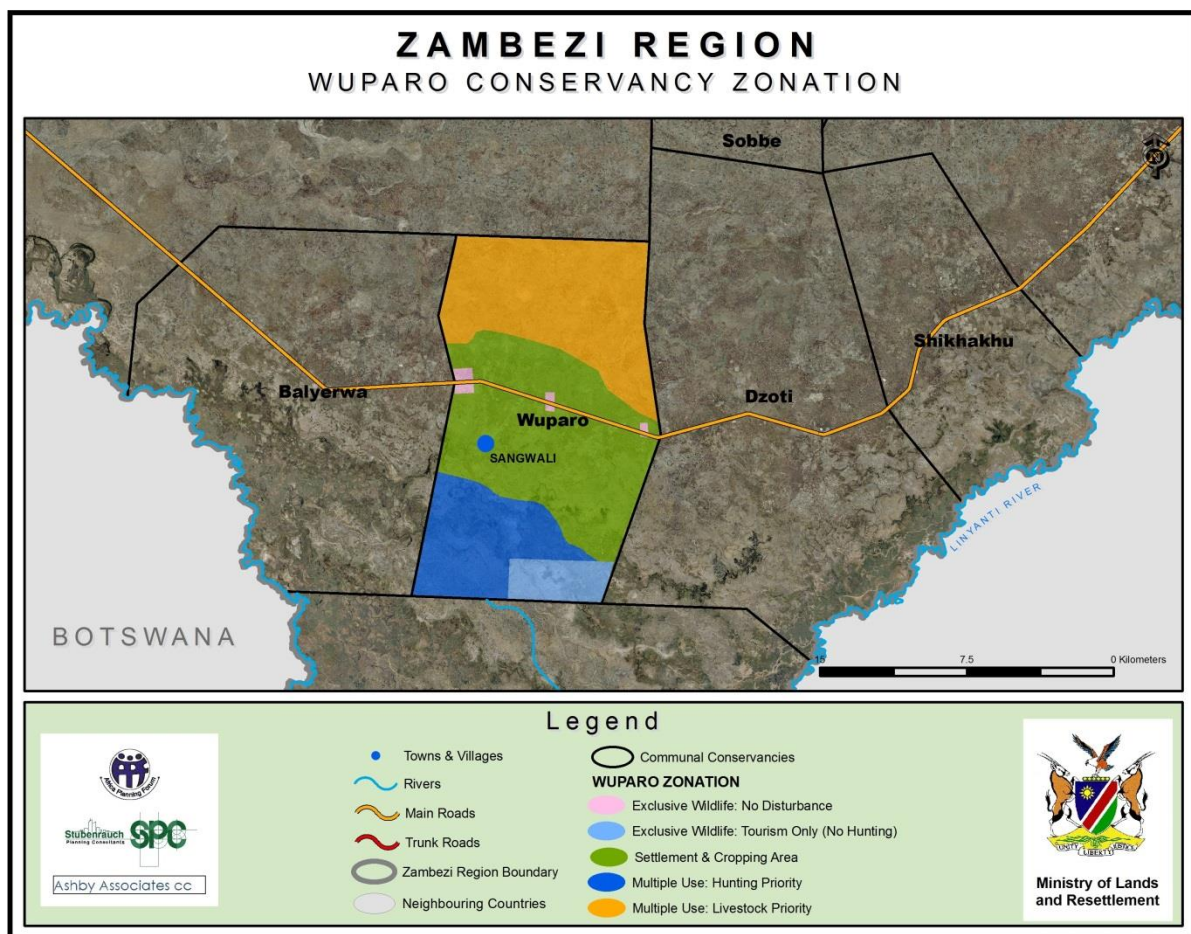


WUPARO CONSERVANCY

Wuparo Conservancy is situated in the south-western part of the region and was registered in 2003. The conservancy spans an area of 148km² and is situated just north of the Nkasa Rupara National Park. This conservancy has the following land use zones:

- Exclusive Wildlife: no disturbance, these are wildlife corridors through which wildlife tend to migrate;
- Exclusive Wildlife: tourism only, situated in the south-eastern corner of the conservancy adjacent to the national park;
- Settlement and Cropping Area: in the centre of the conservancy and making up the largest part of the conservancy;
- Multiple Use Area: hunting priority, situated in the south-western corner of the conservancy next to the Nkasa Rupara National Park;
- Multiple Use Area: livestock priority, situated in the northern part of the conservancy and the second biggest part of the conservancy.

FIGURE 44: ZONATION PLAN FOR WUPARO CONSERVANCY



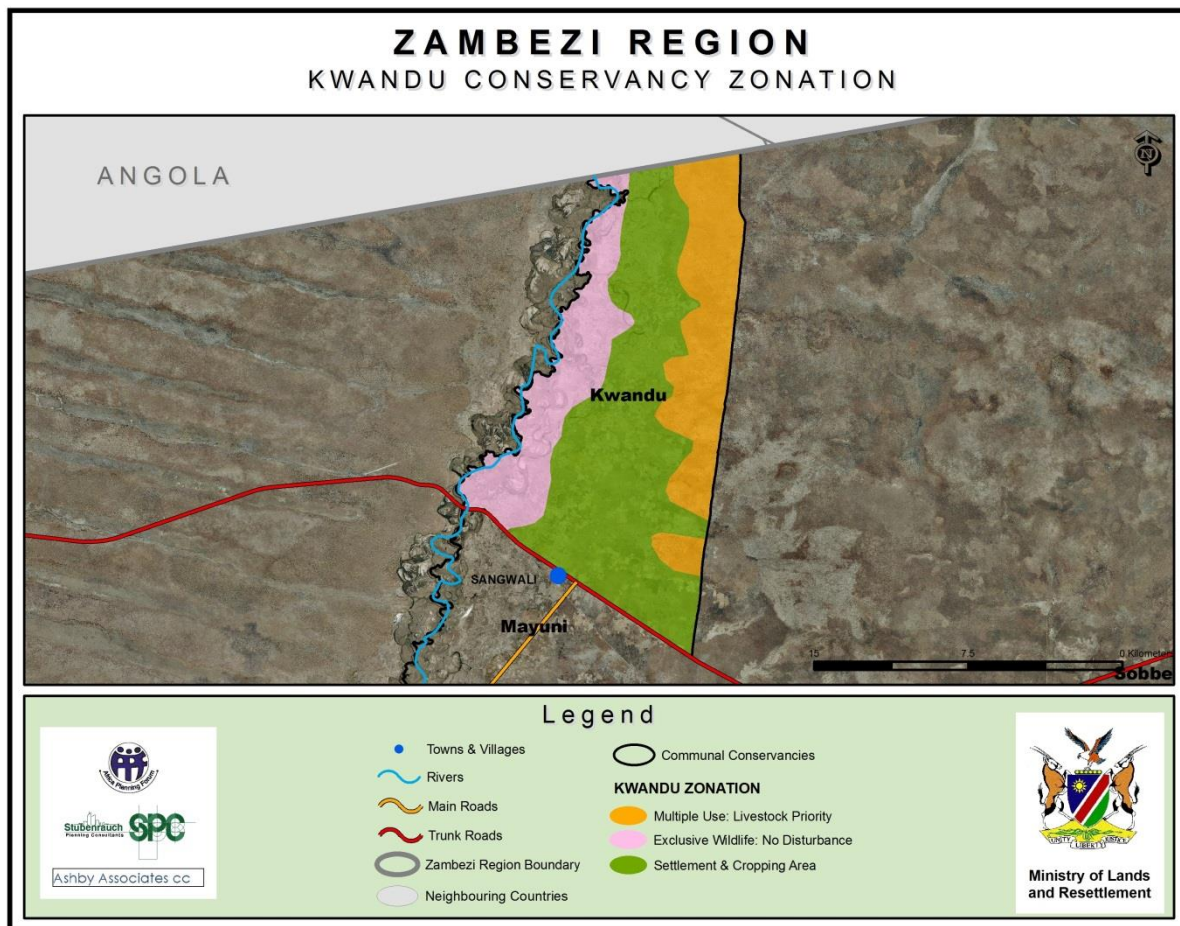
KWANDU CONSERVANCY

The Kwandu Conservancy is within the Kongola Constituency, just east of the Kwando River and west of the State Forest. The conservancy was registered in 1999 and comprises an area of 190km² in which approximately 4,300 people reside. The Kwandu Conservancy has the following land use zones:

- Multiple Use: livestock priority, situated directly adjacent the State Forest;
- Settlement and Cropping Area: in the centre of the conservancy and making up the largest part of the conservancy
- Exclusive Wildlife: no disturbance, situated adjacent to the Kwandu River

The Kwandu Conservancy together with Mayuni; Mashi and Sobbe Conservancy forms part of the Mudumu North Complex.

FIGURE 45: ZONATION PLAN FOR KWANDU CONSERVANCY

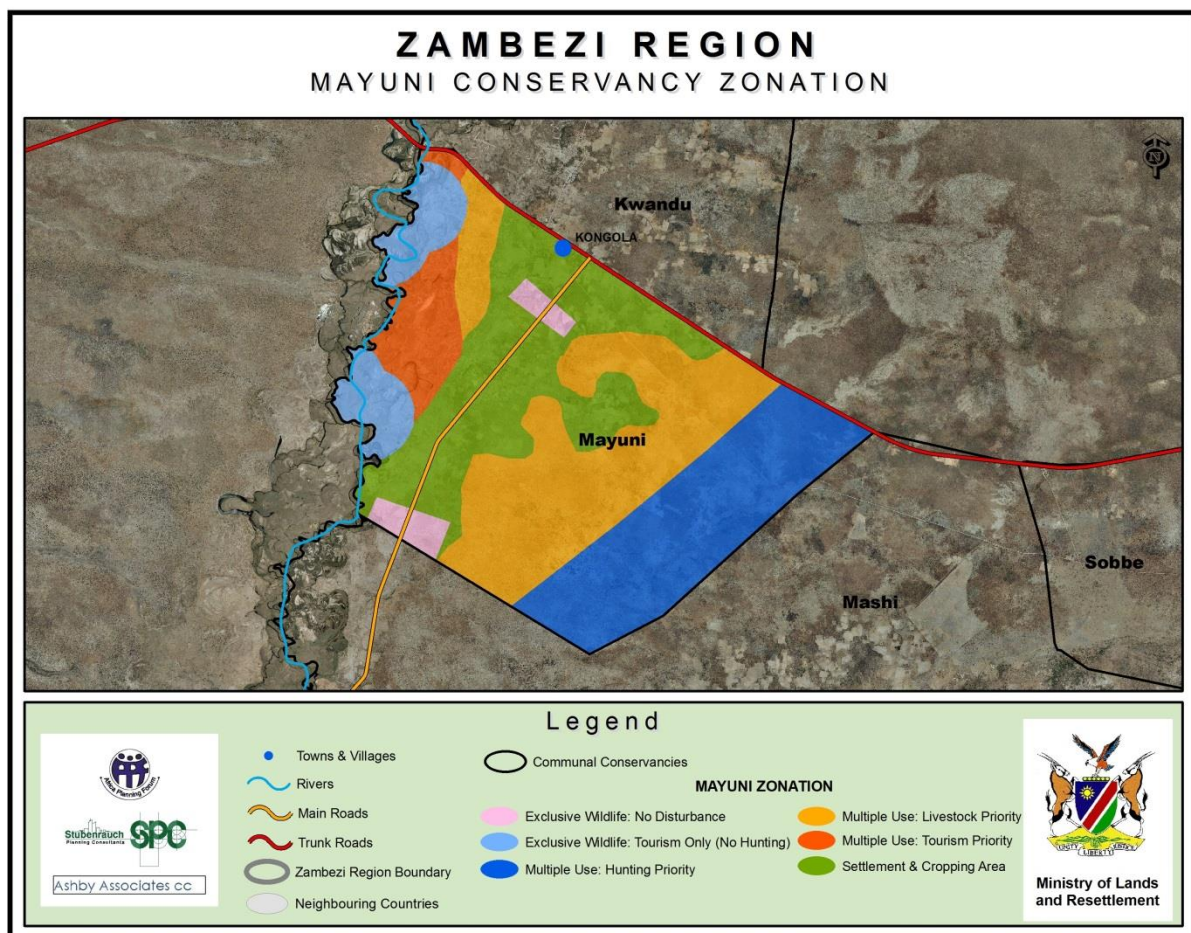


MAYUNI CONSERVANCY

The Mayuni Conservancy is just south of the Kwandu Conservancy and forms part of the Mudumu North Complex. The conservancy was registered in 1999 and comprises an area of 151km². Approximately 2,400 people reside in the conservancy. The conservancy has the following land use zones:

- Exclusive Wildlife: no disturbance, these are wildlife corridors;
- Exclusive Wildlife: tourism only, situated next to the Kwandu River;
- Multiple Use: hunting priority, situated within the eastern part of the conservancy;
- Multiple Use: livestock priority, the largest section of the conservancy;
- Multiple Use: tourism priority, situated next to the Kwandu River at certain areas;
- Settlements and Cropping: in the centre of the conservancy and the second largest area.

FIGURE 46: ZONATION PLAN FOR MAYUNI CONSERVANCY

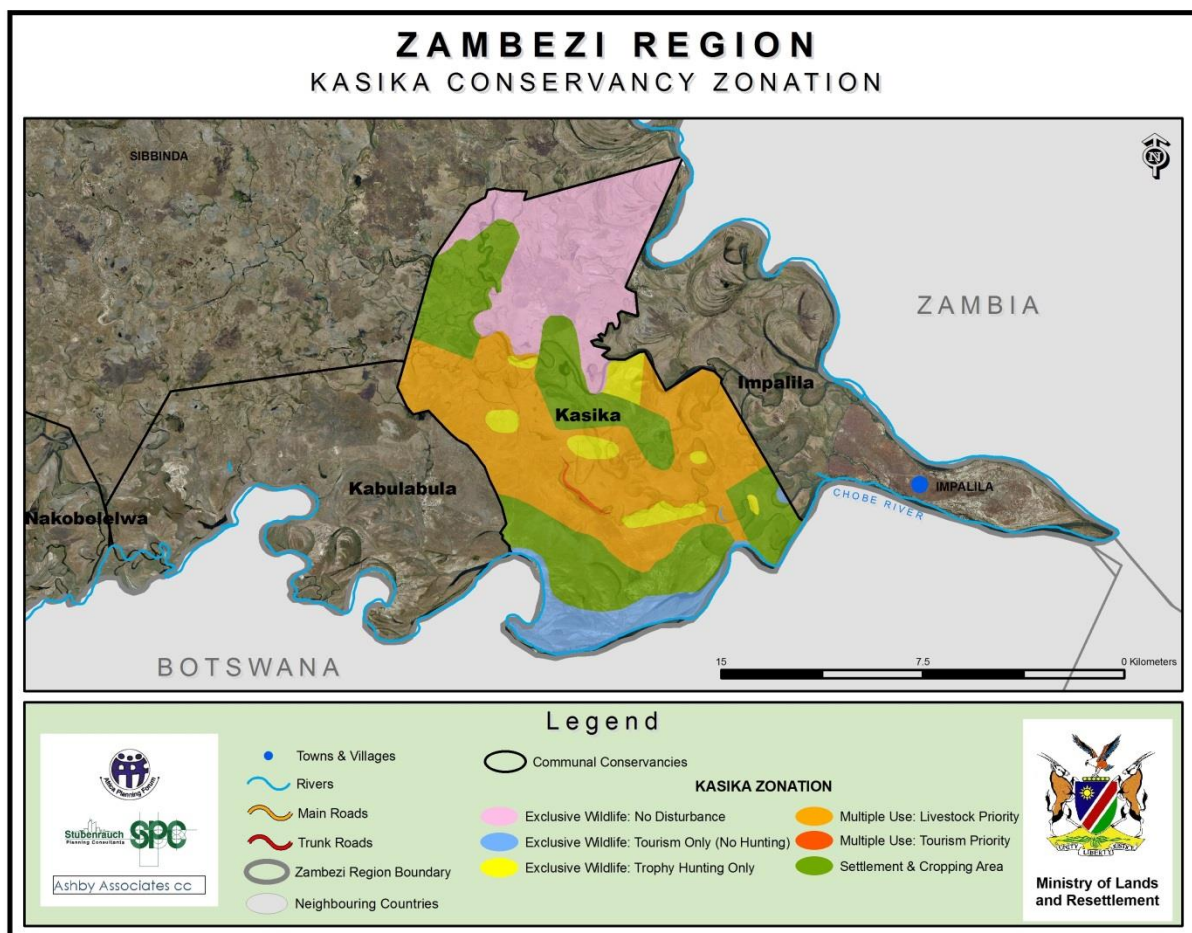


KASIKA CONSERVANCY

Kasika Conservancy was registered in 2005 and comprises an area of 147km² and is situated within the eastern floodplains of the region. The conservancy has the following main land use zones:

- Exclusive Wildlife: no disturbance;
- Exclusive Wildlife: tourism only, next to the Linyanti River;
- Exclusive Wildlife: trophy hunting only, scattered throughout the conservancy;
- Multiple Use: livestock priority, in the centre of the conservancy;
- Multiple Use: tourism priority
- Settlements and Cropping: scattered throughout the conservancy.

FIGURE 47: ZONATION PLAN FOR KASIKA CONSERVANCY

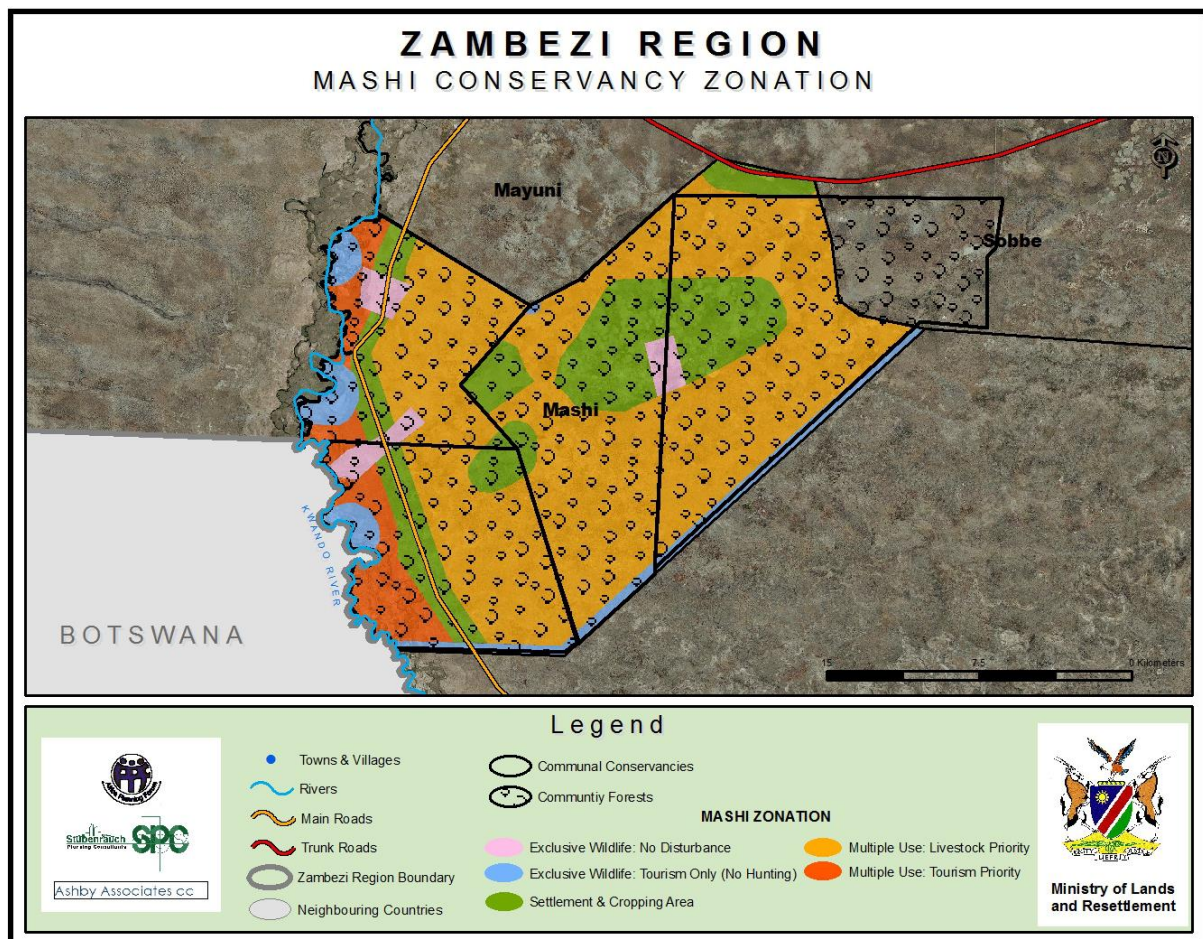


MASHI CONSERVANCY

Mashi conservancy was registered in 2003 and comprises an area of 297km² with approximately 3,900 people. Mashi Conservancy forms part of the Mudumu North Complex. The conservancy has the following land uses:

- Exclusive Wildlife: no disturbance, wildlife corridors;
- Exclusive Wildlife: tourism only, next to the Kwandu River at selected areas;
- Settlements and Cropping: next to the river and in the centre;
- Multiple Use: livestock priority, the majority of the conservancy;
- Multiple Use: tourism priority; next to the river.

FIGURE 48: ZONATION PLAN FOR MASHI CONSERVANCY

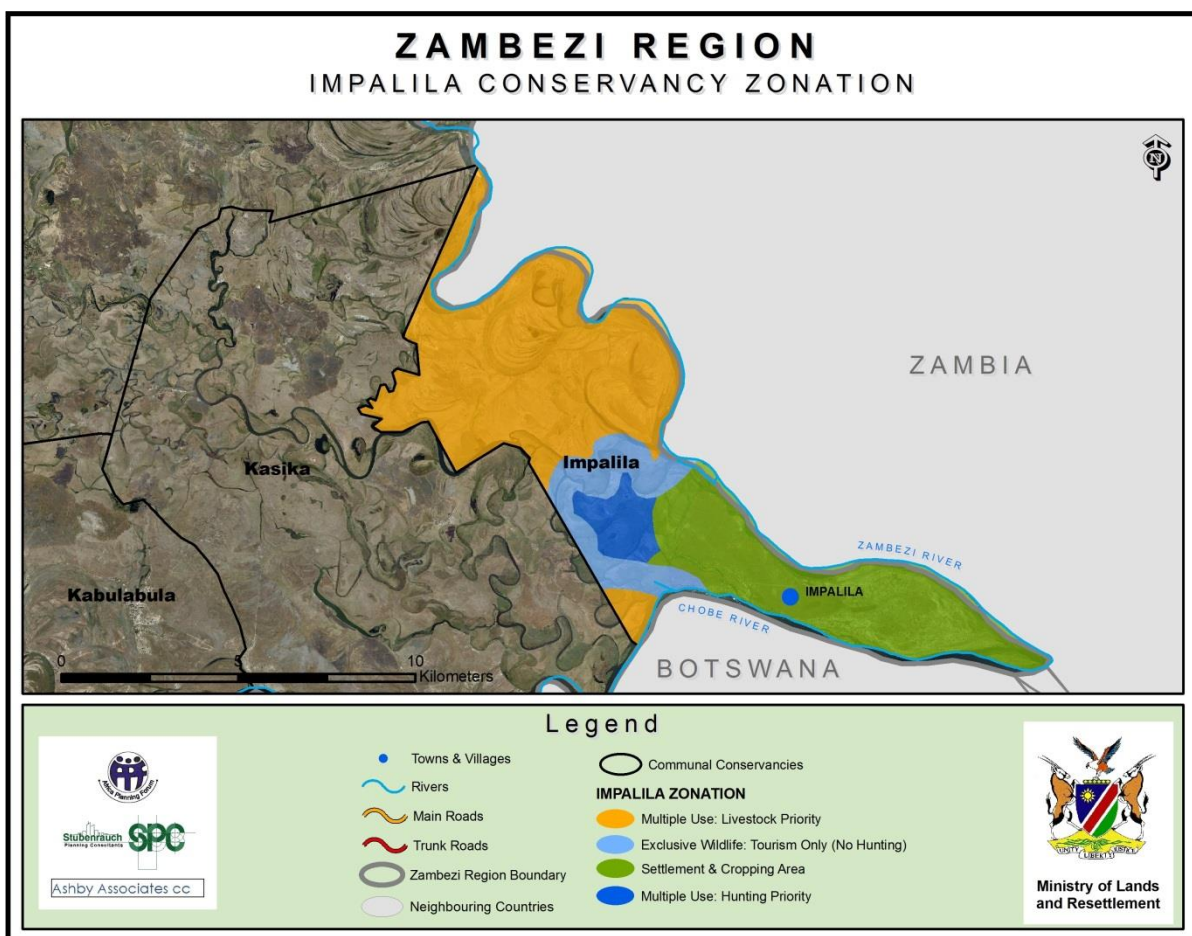


IMPALILA CONSERVANCY

Impalila Conservancy is situated within the eastern floodplains of the region and comprises an area of 73km². The conservancy has about 2,000 people and the following land use zones:

- Multiple use: livestock priority, next to the river and inland;
- Exclusive Wildlife: tourism only;
- Settlement and Cropping: in the southern part of the conservancy;
- Multiple Use: hunting, in the centre of the conservancy.

FIGURE 49: ZONATION PLAN FOR IMPALILA CONSERVANCY

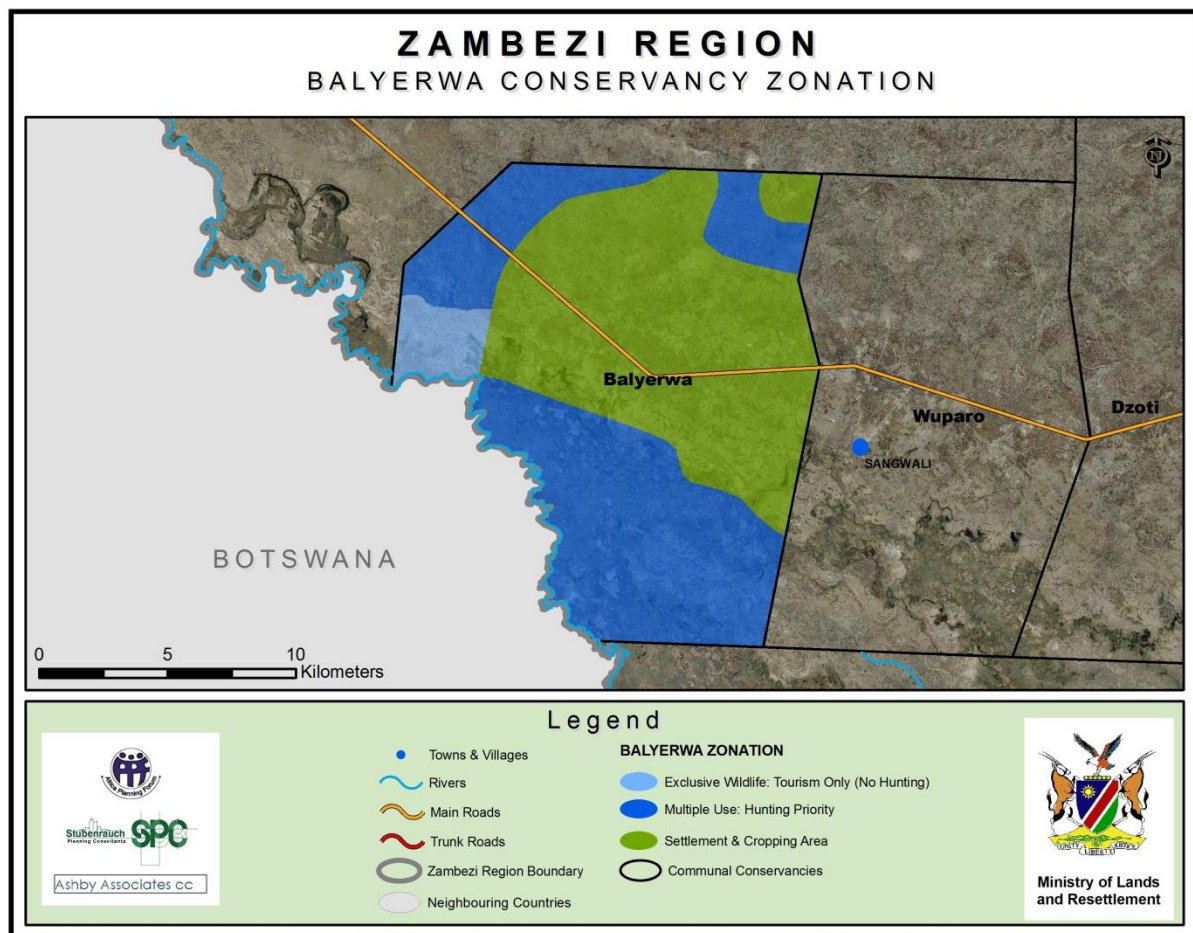


BALYERWA CONSERVANCY

Balyerwa conservancy was registered in 1999 and comprises an area of 223km² and has a population of about 1,500 people. Balyerwa conservancy is situated south of Mudumu National Park and north of Nkasa Rupara National park. The conservancy has the following land use zones:

- Exclusive Wildlife: tourism only, situated next to the river at selected areas;
- Multiple Use: hunting, scattered throughout the conservancy;
- Settlement and Cropping: the largest of the zones, within the centre of the conservancy.

FIGURE 50: ZONATION PLAN FOR BALYERWA CONSERVANCY

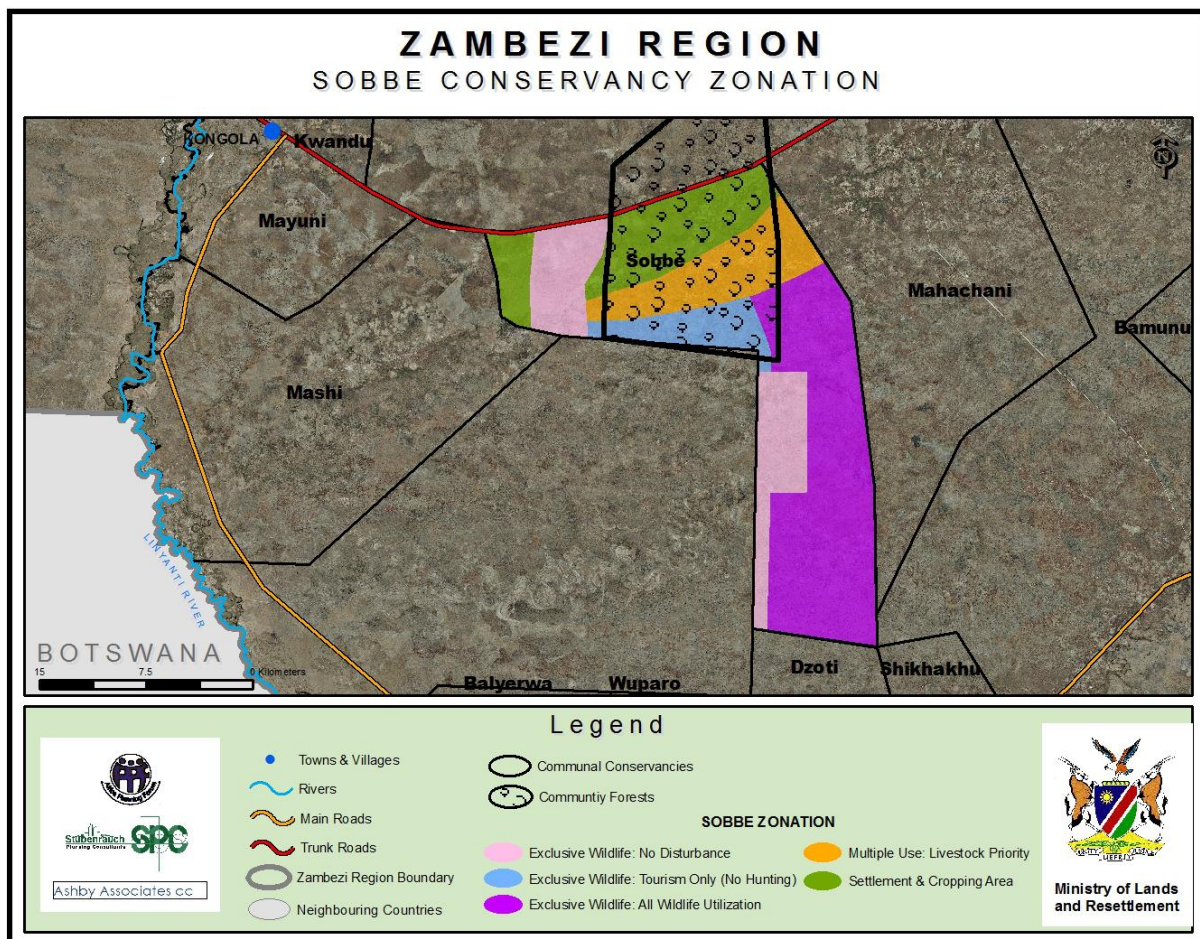


SOBBE CONSERVANCY

Sobbe Conservancy was registered in 2006 and comprises an area of 404km². Sobbe Conservancy is located east of Mudumu National Park and forms part of the Mudumu North Complex. Sobbe Conservancy has the following land use zones:

- Exclusive Wildlife: no disturbance;
- Exclusive Wildlife: tourism only, next to Mudumu National Park;
- Exclusive Wildlife: all wildlife utilisation, the largest part of the conservancy;
- Multiple Use: livestock priority;
- Settlement and Cropping.

FIGURE 51: ZONATION PLAN FOR SOBBE CONSERVANCY

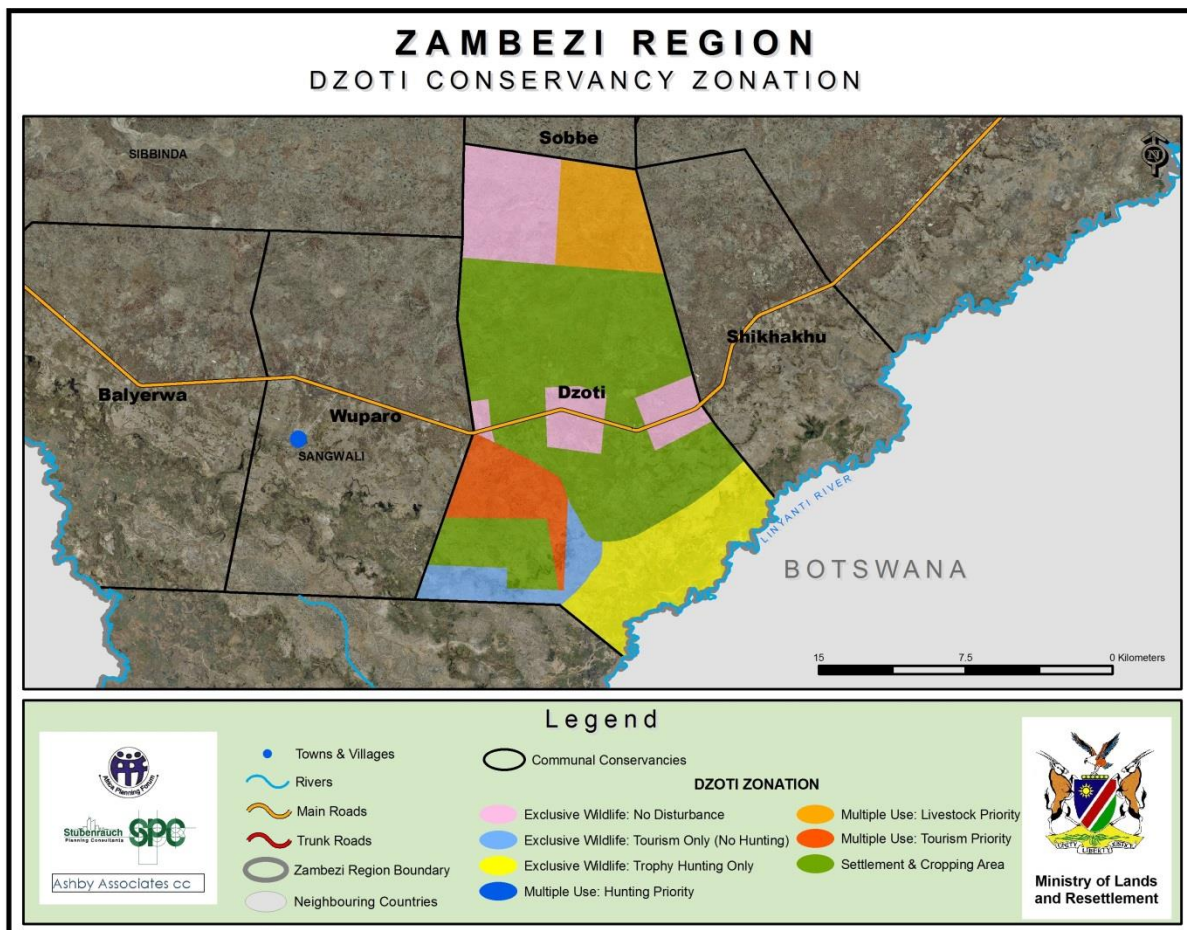


DZOTI CONSERVANCY

Dzoti Conservancy was registered in 2009 and spans an area of 287km². Dzoti is situated north-east of Nkasa Rupara National Park and north of the Linyanti River. Dzoti Conservancy has the following land use zones:

- Exclusive Wildlife: no disturbance;
- Exclusive Wildlife: tourism only;
- Exclusive Wildlife: trophy hunting;
- Multiple Use: livestock priority;
- Multiple Use: tourism priority;
- Settlement and Cropping: in the centre of the conservancy and the largest zone.

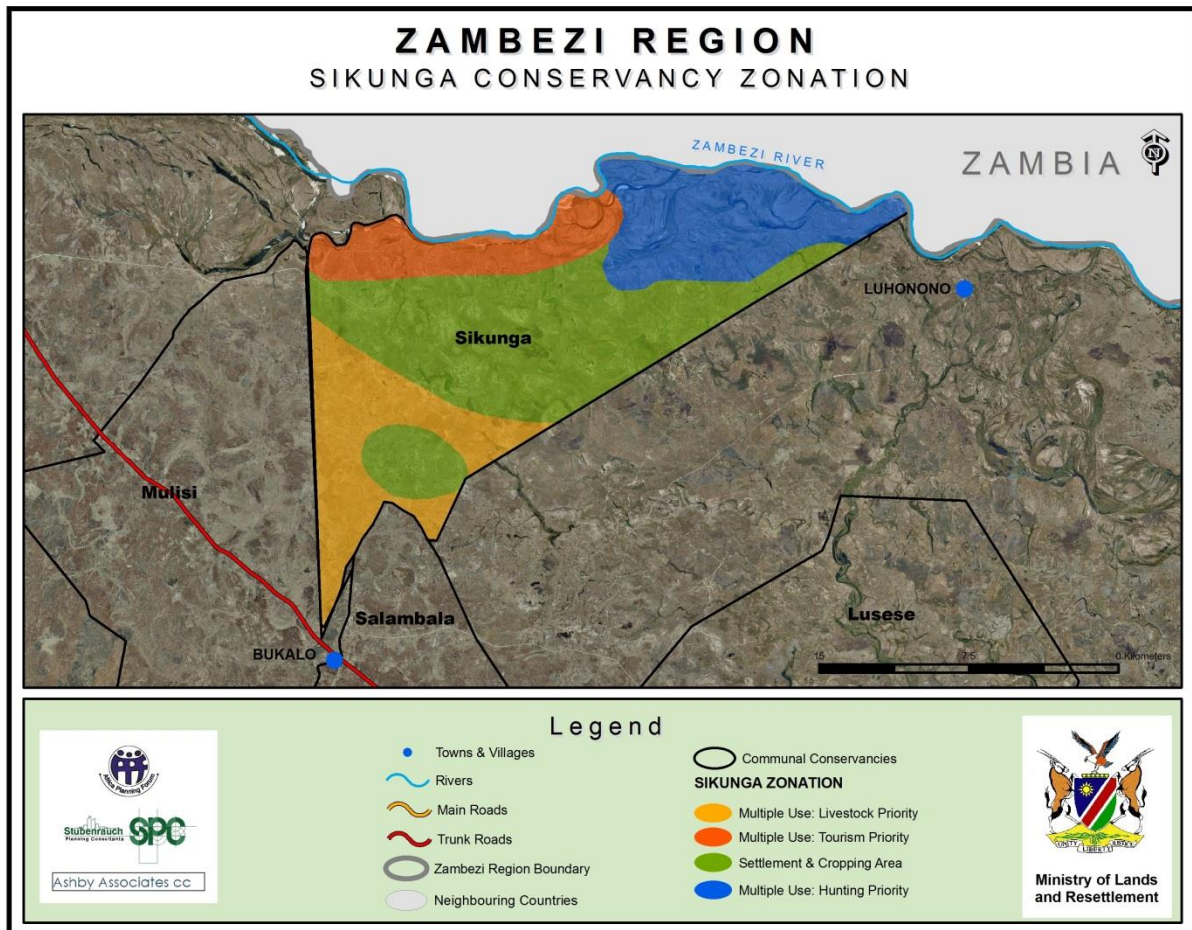
FIGURE 52: ZONATION PLAN FOR DZOTI CONSERVANCY



SIKUNGA CONSERVANCY

Sikunga Conservancy is situated within the Kabbe North Constituency and was registered in 2009 and spans an area of 287km². The conservancy has about 2,000 people living in the conservancy. There is no formal zonation plan for the conservancy but the focus of the conservancy is to encourage tourism in areas such as bird-watching and sport fishing.

FIGURE 53: ZONATION PLAN FOR SIKUNGA CONSERVANCY

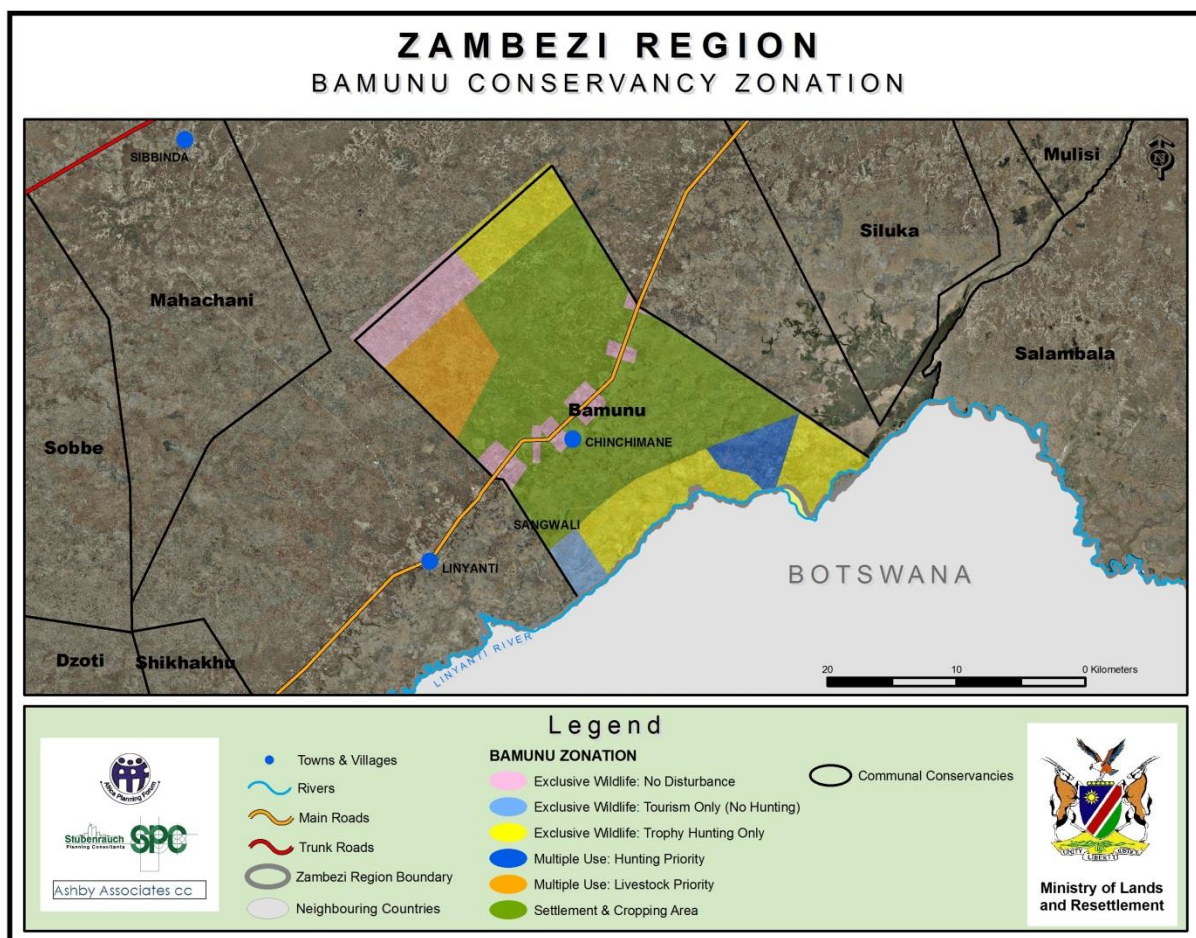


BAMUNU CONSERVANCY

Bamunu Conservancy was registered in 2011 and comprises an area of 556km². It is situated within the Linyanti and Sibbinda Constituencies. Bamunu conservancy has the following land use zones:

- Exclusive Wildlife: no disturbance;
- Exclusive Wildlife: tourism only;
- Exclusive Wildlife: trophy hunting only;
- Multiple Use: hunting and livestock priority;
- Settlement and Cropping: the largest zone of the conservancy.

FIGURE 54: ZONATION PLAN FOR BAMUNU CONSERVANCY



Zonation plans for Kabulubula, Lusese and Nakobolelwa were not available at the time of compilation of this report.

COMMUNITY FORESTS

The Forestry Act No. 12 of 2001 makes provision for the protection of the environment and for the establishment of state forest reserves and community forests (CF). A CF is an area within communal lands ‘for which local communities have obtained the rights to manage forests, woodlands and other types of natural vegetation.’ CF management is guided by the principles of sustainable management. Meaning, it should not deplete but maintain and improve the resource base and involves the sharing of benefits among all local residents (Mbapaha, 2013). CF is one of the core programmes of the Directorate of Forestry under Ministry of Agriculture, Water and Forestry (MAWF) and the programme aims at, ‘establishment of community forests and the transfer of forest resource management rights to local communities’ (MAWF, 2013). Despite popular belief, livestock farming is permitted within a gazetted Communal Forest.

There are currently seven registered community forests and 12 emerging CFs within the Zambezi Region. Table 16 below provides an overview of the gazetted and emerging community forests.

TABLE 16: LIST OF GAZETTED AND EMERGING COMMUNITY FORESTS

Name	Status	Size km ²
Kwandu	Community Forest	212 km ²
Lubuta	Community Forest	171 km ²
Masida	Community Forest	179 km ²
Sikanjabuka	Community Forest	42 km ²
Bukalo	Community Forest	53 km ²
Zilitene	Community Forest	82 km ²
Sachona	Community Forest	120 km ²
Sikunga	Community Forest and CC	287 km ²
Ngonga	Emerging	Not available
Lizauli	Emerging	Not available
Mayuni	Emerging	Not available
Ngoma	Emerging	Not available
Sachinga	Status not clear	Not available
Dzoti (old Malengalenga)	Emerging	Not available
Shikhakhu (old Mbara)	Emerging	Not available
Izimwe	Emerging	Not available
Imukusi (Katima area)	Emerging	Not available
Muyako	Emerging	Not available

Name	Status	Size km ²
Salambala Core Area	Emerging	Not available

As part of the ecosystems services undertaken by SAIEA for the Zambezi Region a study on the monetary value of the different ecosystems within the Zambezi Region was undertaken. As summary, this study found that the economic value of products such as thatching grass, building poles, timber and craft production within the region are valued at N\$16.74 million (Barnes, Suich, & Tarr, 2015).

KAZA TFCA AND NEIGHBOURING CONSERVATION EFFORTS

Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) is a conservation area spanning the five countries of Angola, Botswana, Namibia, Zambia and Zimbabwe. It is centred around some of the worlds most renowned conservation areas such as the Victoria Falls and the Kavango Delta. The KAZA TFCA includes 36 national parks, game reserves, community conservancies and game management areas

The goal of the KAZA TFCA is to, ‘sustainably manage the Kavango Zambezi ecosystem, its heritage and cultural resources based on best conservation and tourism models for the socio-economic wellbeing of the communities and other stakeholders in and around the eco-region through harmonisation of policies, strategies and practices.’ (KAZA TFCA, 2013). The KAZA TFCA initiative has a clear focus on conservation as the primary form of land use and tourism as a by-product of conservation. According to the Memorandum of Agreement between the countries, each country is to draw up an Integrated Development Plan (IDP). Zimbabwe and Zambia have drawn up IDPs with Botswana and Namibia in the process of compiling their IDPs.

FIGURE 55: COMMUNITY FORESTS IN THE ZAMBEZI REGION

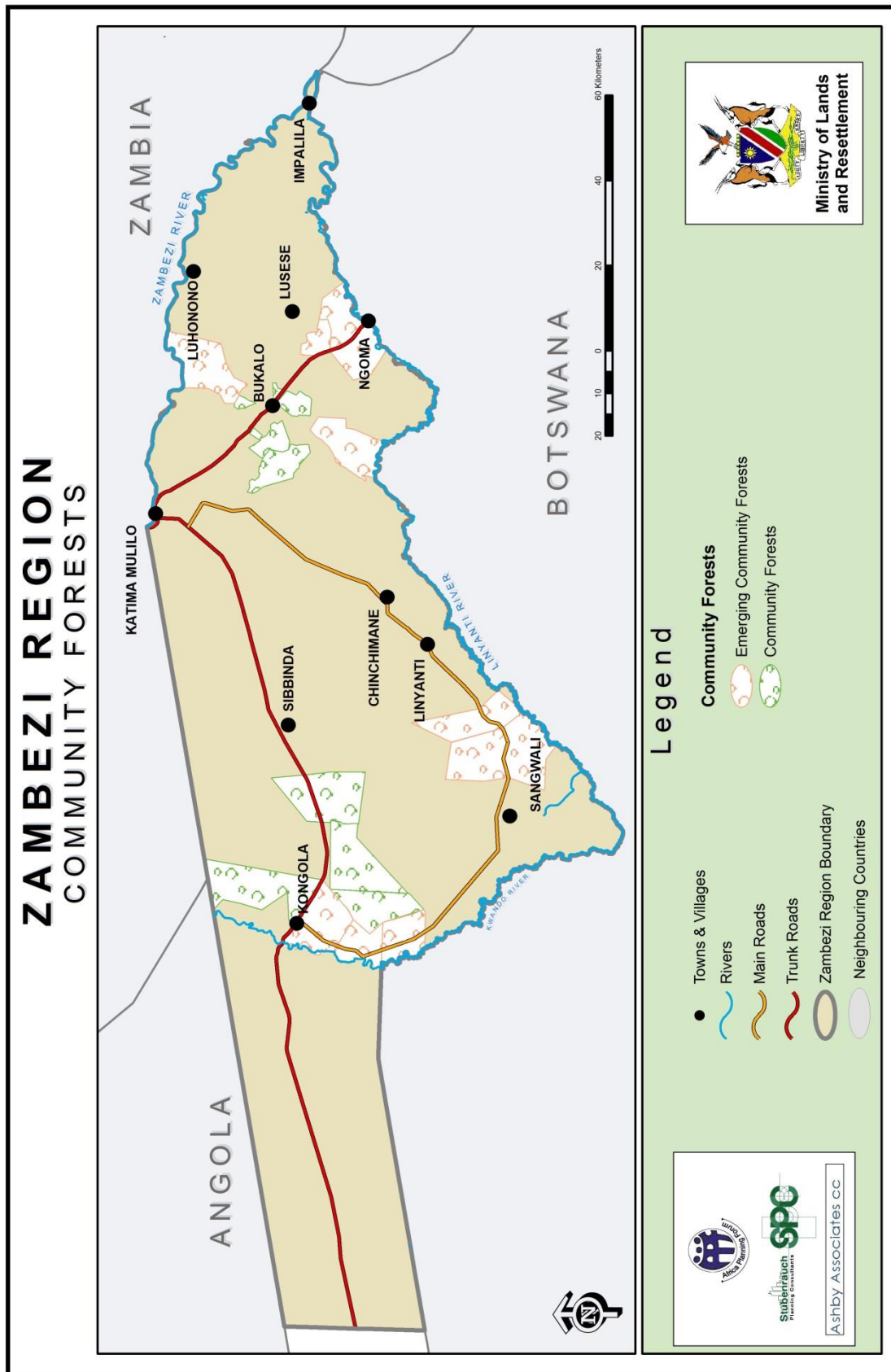
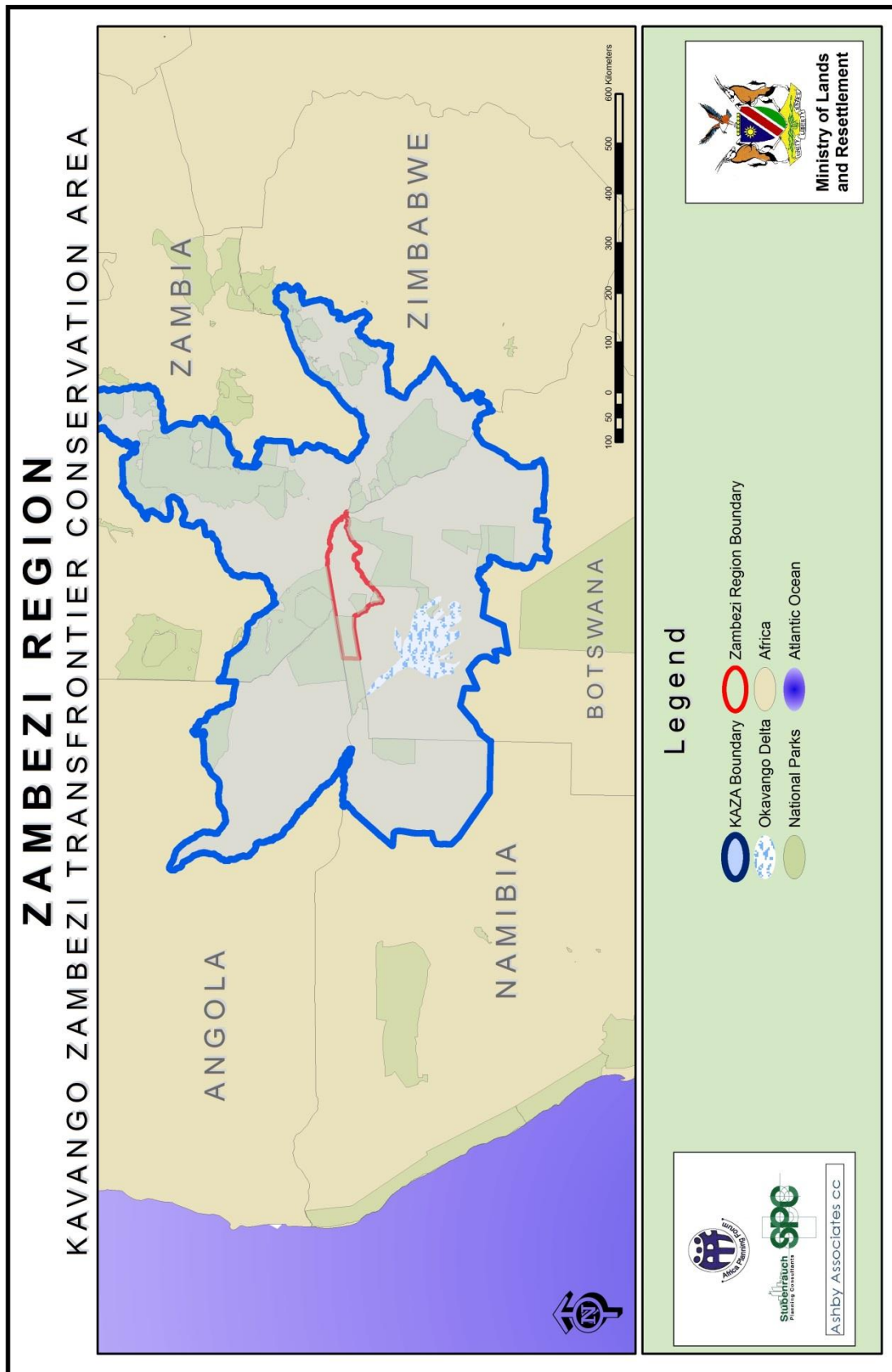


FIGURE 56: KAZA TFCA AND NEIGHBOURING CONSERVATION EFFORTS



NATIONAL PARKS

The Zambezi Region has three national parks, situated within the western part of the region.

The Mudumu and Nkasa Rupara National Parks were proclaimed in 1990. Prior to its proclamation the area was settled and used by the Mafwe and Mayeyi people. However, in 1945, following a tsetse fly infestation, local residents moved away from low lying areas and much of the park area was designated as traditional hunting grounds. In 1987, an agreement was signed between the Mafwe Traditional Authority and the Department of Agriculture and Nature Conservation to officially proclaim Mudumu as a State protected area (MET, 2013).

Mudumu National Park covers an area of 737 km² and is situated along the Kwando River, bordered by Botswana to the west, Mashi Conservancy to the north, Sobbe Conservancy to the east, Balyerwa, Wuparo and Dzoti Conservancy to the south. 'The park is centred on the Mudumu Molapo fossil river course, a seasonally dry, open channel that drains the primarily Mopane woodlands of the hinterland to the east. Without any fences, Mudumu forms a crucial transboundary link for wildlife migration and seasonal dispersal between Angola, Botswana and Zambia and for seasonal migrations to and from the rivers. One of Mudumu's main purposes is to serve as a core wildlife area.' (MET, 2013).

Nkasa Rupara National Park (Mamili) covers an area of 337km² and is the largest formally protected wetland area in Namibia. The park is located southwards of the Mudumu National Park and is bordered to the south, west and east by the Kwando and Linyanti Rivers – which also constitutes the border with Botswana – and north by the Balyerwa, Wuparo and Dzoti Conservancies (MET, 2013).

Bwabwata National Park covers an area of 6,274km² and falls within the Kavango East Region as well as within the Zambezi Region, with the boundary of the two regions being roughly in the middle of the park. The park consists of three core areas designated for special protection and controlled tourism; the Kwando, Buffalo, and Mahango. In addition to this, a large multiple use area (MUA) zoned for community-based tourism, trophy hunting, human settlement and development by the resident community. The Trans-Caprivi Highway traverses the park from east to west. A number of small settlements can be found inside the MUA of the park where there is a population of approximately 5,500. Of these, about 80% are of the San ethnic group, the Khwe (MET, 2013). The area between the Kavango and Kwando rivers was first proclaimed as a nature park in 1963 mainly for military strategic reasons. In 1964, the Odendaal Commission recommended to create a homeland for the Khwe in the 'Zambezi Strip'. In 1968, the park was elevated to a game park and until 1990 the entire area was treated as a military zone by the South African Defence Force (SADF). It was only in 1990, with independence and the disbanding of the SADF in Namibia, that the conservation staff could undertake work in the park. In 1998, a recommendation from a

socio-ecological survey recommended that the Mahango and the Caprivi Game Park should be merged into the Bwabwata National Park and that the boundaries be extended eastwards to the middle of the Kwando River (MET, 2013).

The three national parks in the Zambezi Region have its own management principles and land use zonations as shown in Figure 58-60. The management plans for these parks provide detailed zoning regulations for each of the main management zones.

FIGURE 57: NATIONAL PARKS WITHIN THE ZAMBEZI REGION

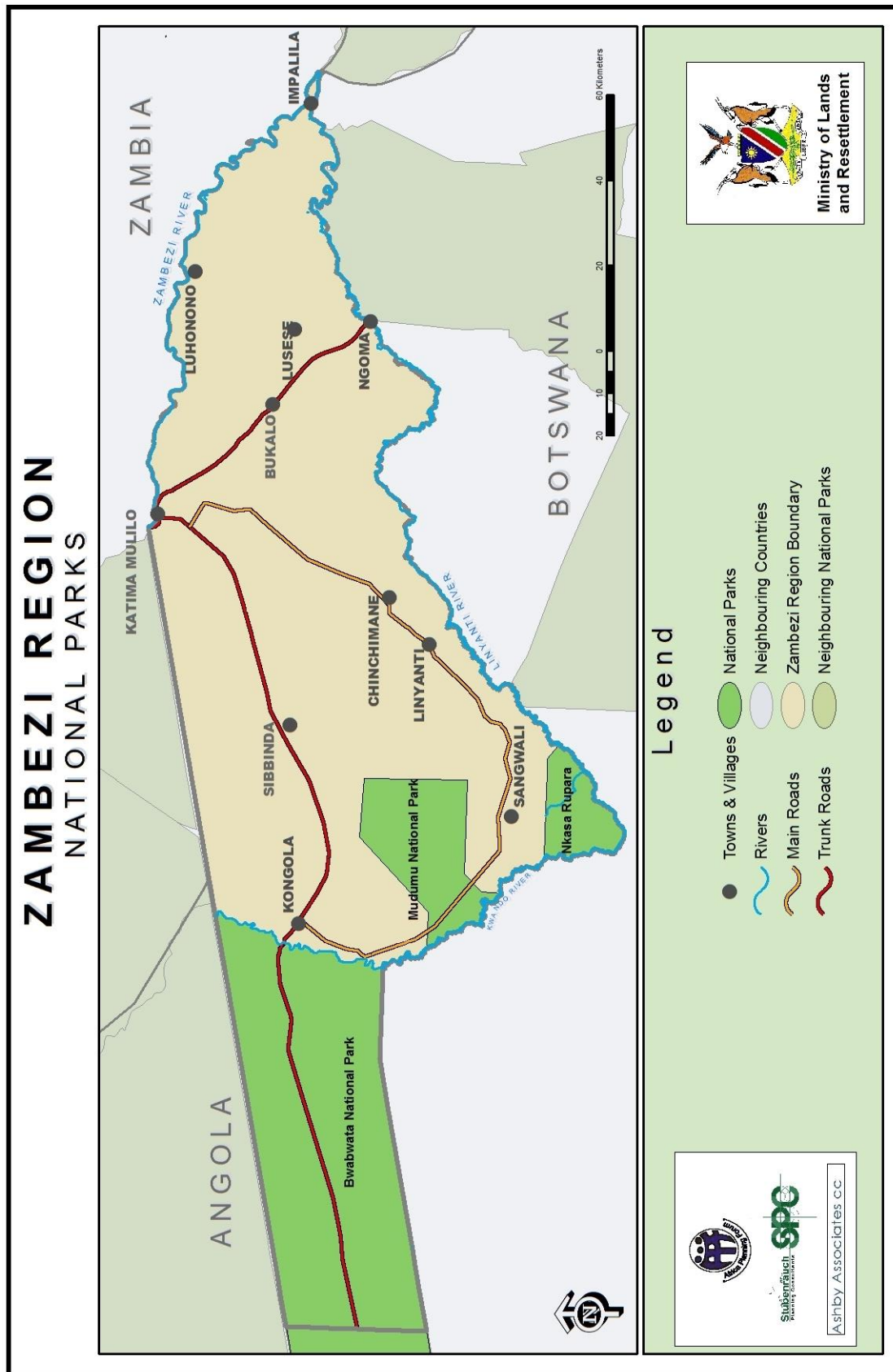


FIGURE 58: ZONATION PLAN FOR BWABWATA NATIONAL PARK

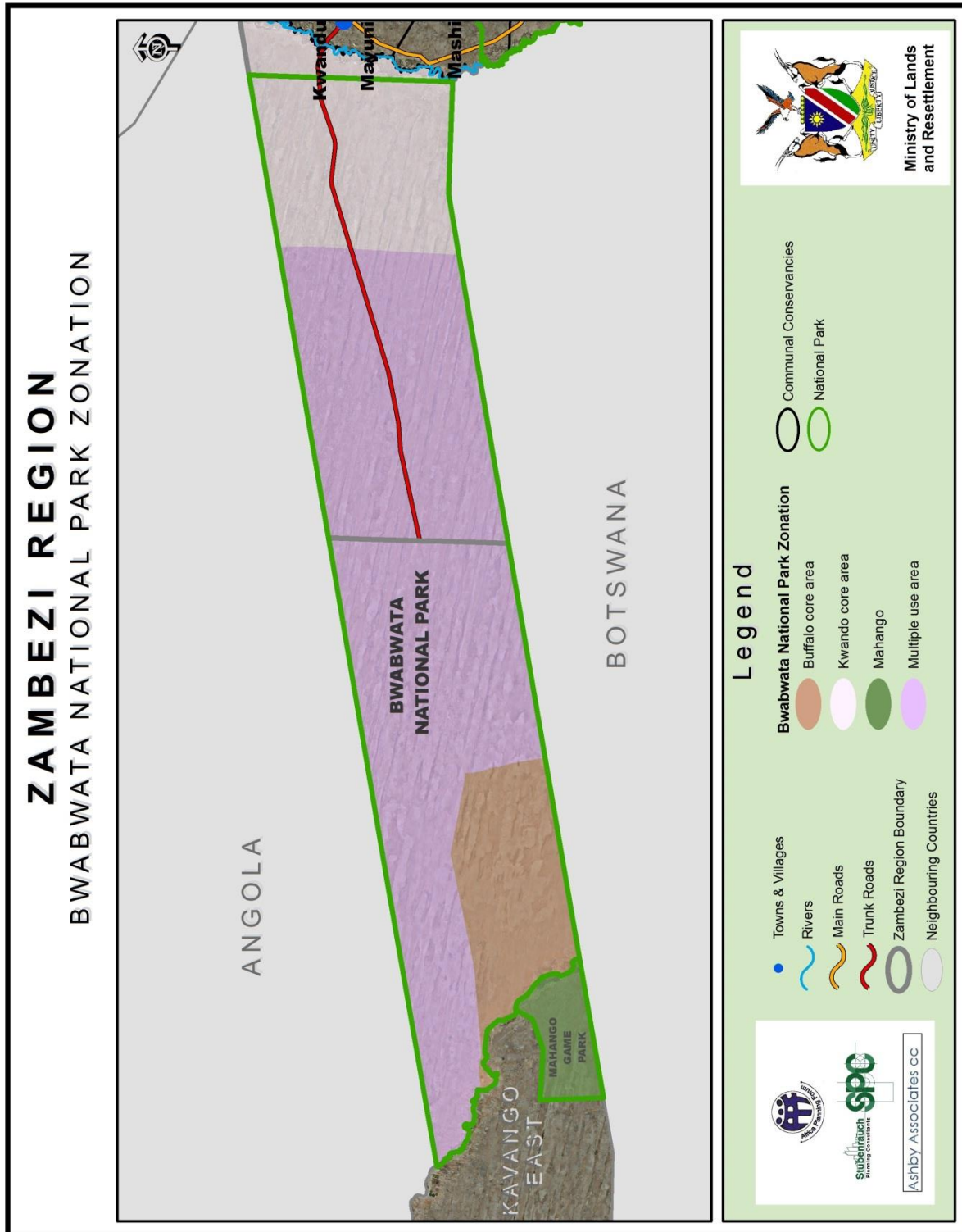


FIGURE 59: ZONATION PLAN FOR MUDUMU NATIONAL PARK

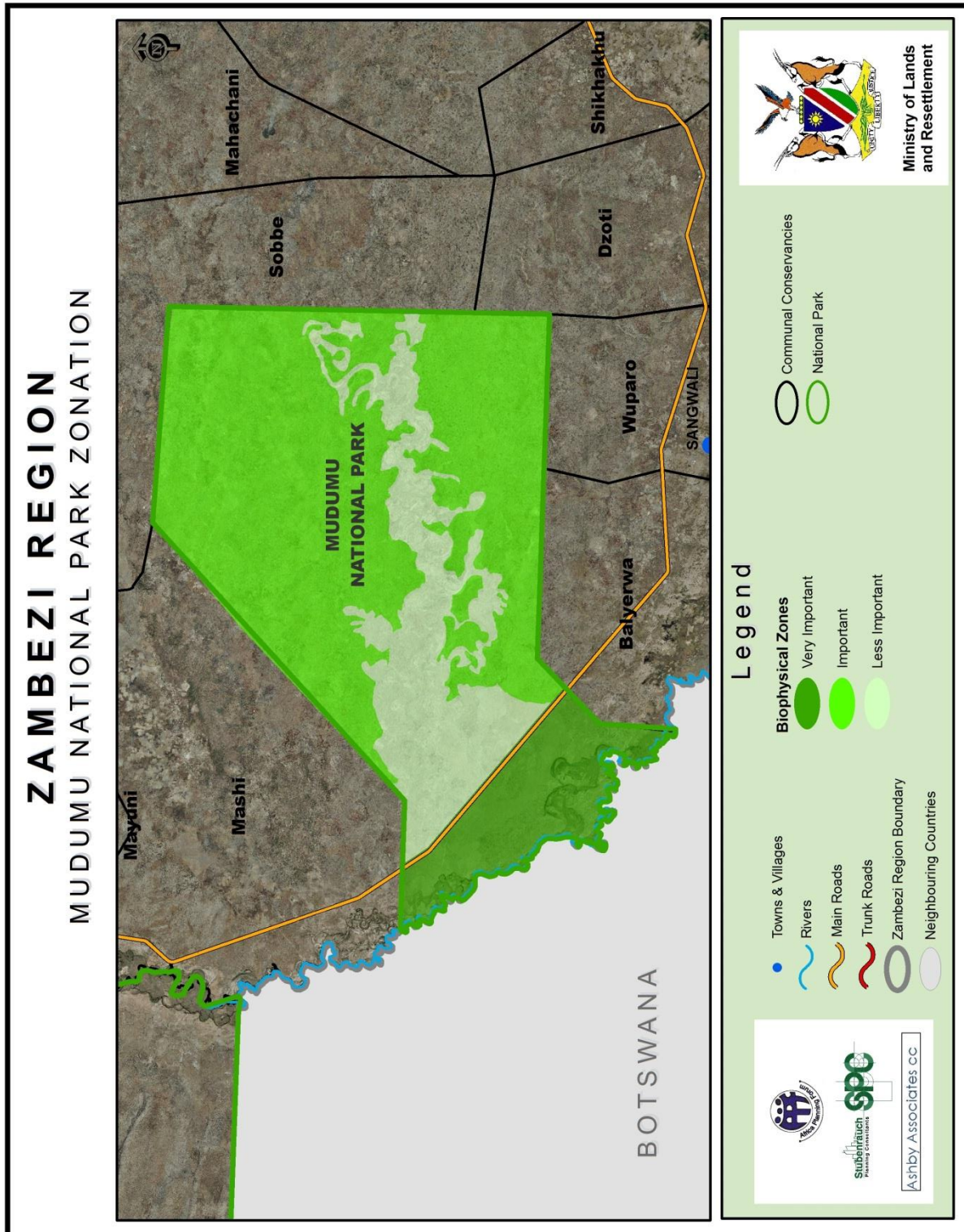
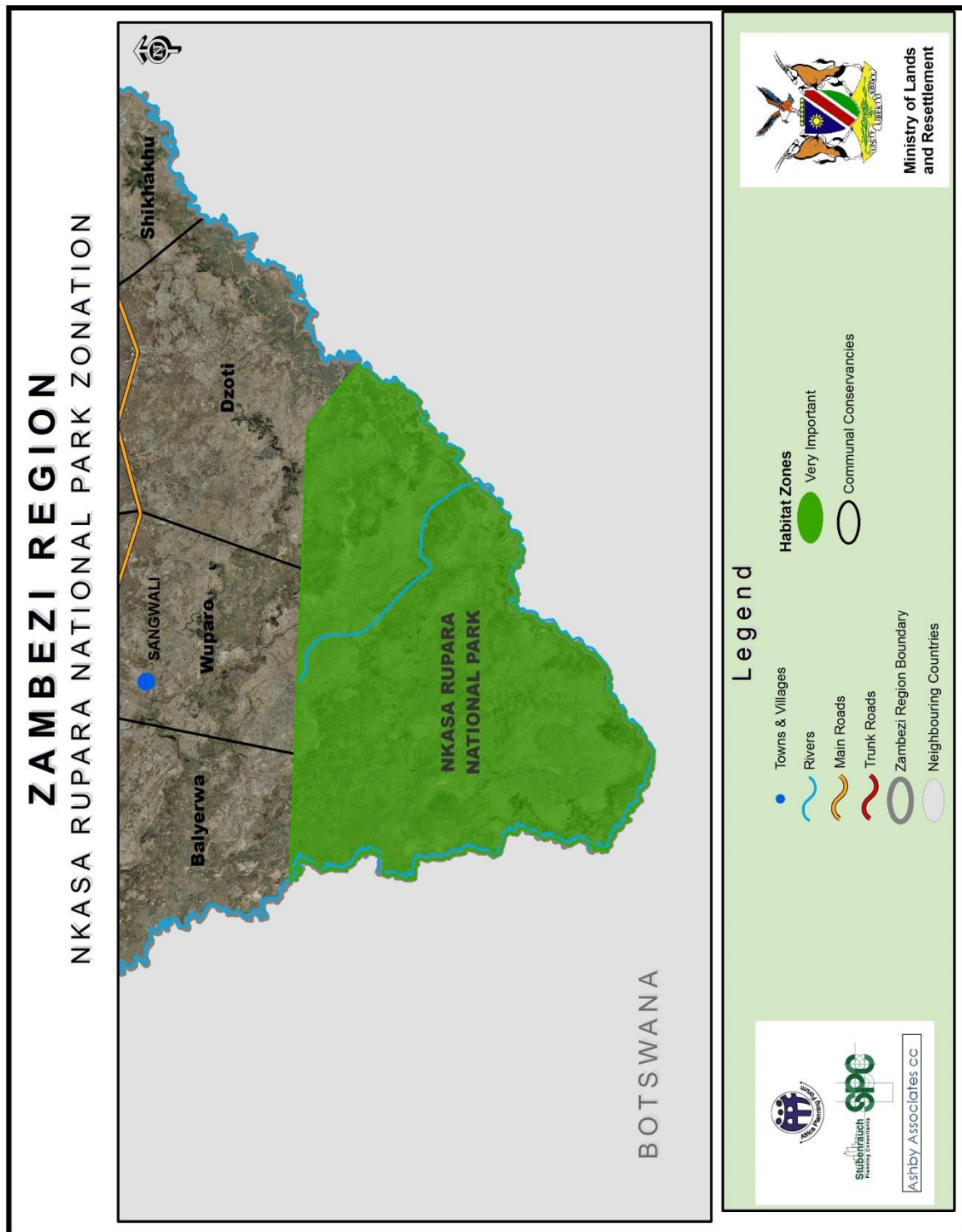


FIGURE 60: ZONATION PLAN FOR NKASA RUPARA NATIONAL PARK

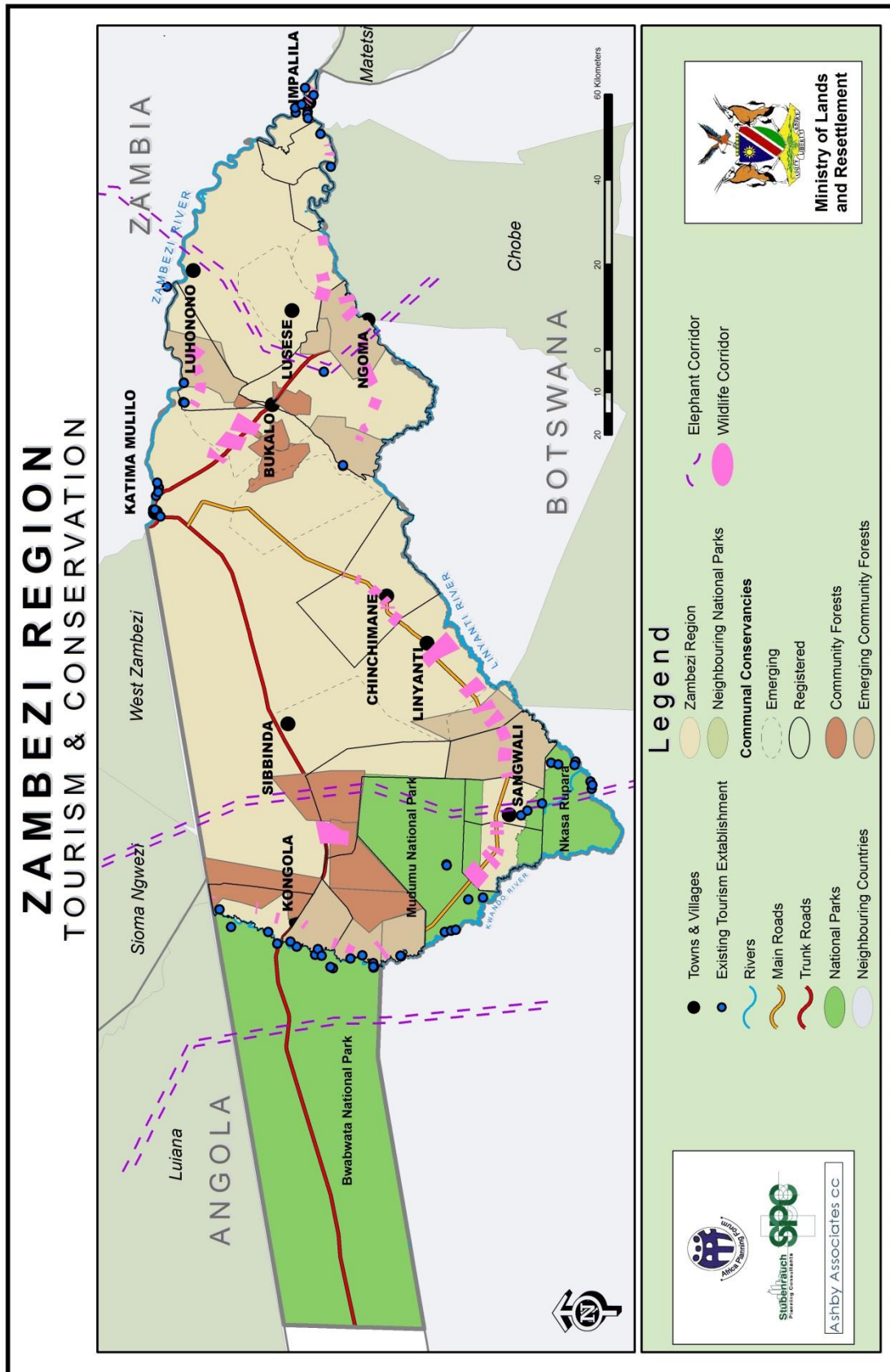


WILDLIFE CORRIDORS/ MOVEMENT ROUTES

An integral component to the wildlife, conservation and tourism growth is the migration of wildlife between the various habitats in the Zambezi Region, Zambia, Botswana and Zimbabwe. Not only are these corridors important for the wildlife numbers but they also contribute to livelihood diversification through supportive activities such as hunting and tourism.

Accurate mapping of wildlife corridors or wildlife access routes is a necessity for communities, decision makers and planners. Knowing where these migration routes are helps to avoid planning or implementing projects that will be in direct conflict with these routes. Planning/ formalising wildlife corridors/ access routes is not a new concept for regional planners and many countries have already been implementing this type of corridor planning. The wildlife corridors/ access routes will be further discussed in Volume 2.

FIGURE 61: EXISTING TOURISM, NATIONAL PARKS, COMMUNAL CONSERVANCIES, COMMUNITY FORESTS AND WILDLIFE CORRIDORS

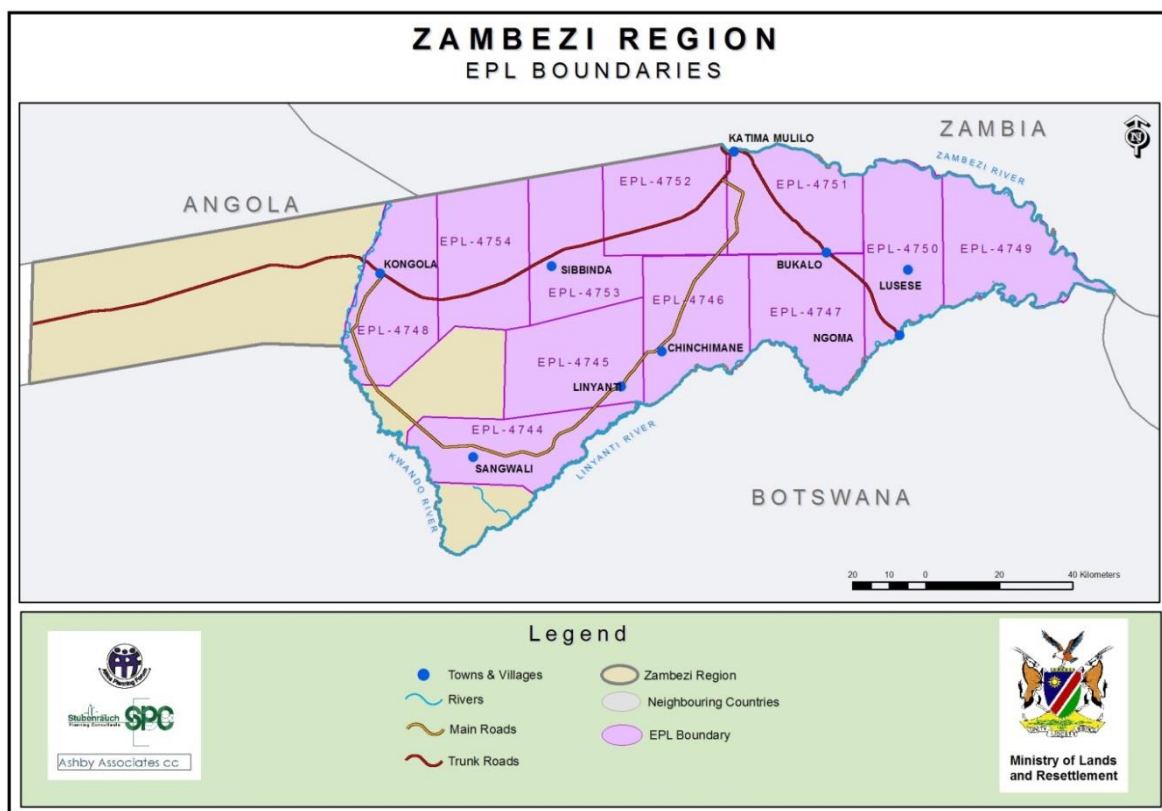


4.3 MINING AND FISHING WITHIN THE ZAMBEZI REGION

4.3.1 MINERAL RESOURCES

The Zambezi Region, as with the rest of the country, is covered by Exclusive Prospecting Licences (EPLs). An EPL is only the first step in establishing whether an area has viable mineral resources and does not necessarily mean that an area has potentially valuable mineral resources. Currently there are 11 registered EPLs, but no mining licenses have yet been issued, and three small-scale mining claims between Katima Mulilo and Ngoma.

FIGURE 62: EPLs WITHIN THE ZAMBEZI REGION



4.3.2 FISHING

Fishing is a common characteristic of the livelihoods of the communities residing next to the river systems and floodplains and an important supplementary income generator for rural communities.

It is one of the few livelihoods providing both a reliable source of income and a daily source of protein. Income generated by fisheries covers the basic needs of the people such as food, clothing and school fees. Fish are important in the diet, especially in years of drought and

stress (Tweddle, 2009). A third of the Zambezi floodplain households depend primarily on fishery (Tweddle, 2009). Off-take from these rivers and Lake Liambezi is quite substantial. According to Tweddle (2009) the Chobe, Zambezi and Kwando/Linyanti Rivers has more than 80 different fish species and the annual flood cycle of these river systems is the main stimulant for fish production.

A variety of fishing tools and methods are used by communities for fishing with gill nets being the most widely used fishing gear on the floodplains. Gill nets are set in the evening and emptied the following morning (Purvis, 2002). Traditional gear such as reeds, traps and funnels are less commonly used these days due to the low catching yields from these methods.

There is currently one fish farm project in the region at Kalimbeza. Although there is more potential for fish farming, it has been said by stakeholders that the method being followed is not conducive to the Namibian environment³ as it originates from Malawi. In order to make fish farming economically viable it is necessary to farm with high value fish species, as the food costs and capital inputs into the farm are high. Water is one of the key components in fish farming. Unfortunately, in the Zambezi Region much of the areas next to the rivers are annually flooded which means infrastructure gets flooded, and fish and infrastructure are lost.

The fact that the Zambezi Region has the Zambezi, Kwando and Linyanti Rivers where fish are readily available, it raises the question of is there a real need for fish farming. Communities rather do their own fishing, therefore have no need to buy fish from a fish farm.

Lake Liambezi plays an important role in subsistence fishery for local communities. The lake comprises of about 300km² of which 100km² is open water when the lake is full (Tweddle et al, 2011). In the 1970s according to Tweddle et al (2011) the Lake Liambezi supported an important subsistence fishery industry but the lake dried up in 1985 and for a long period through the 1980s to the 2000s the lake remained dry and was utilised as grazing and cropping land. Since 2007 the lake received floodwater culminating in April 2009 in a major flood that filled the lake. Consequently, fishing activities have resumed again in the Lake Liambezi (Tweddle et al., 2011).

By the end of 2010 an average of 3 tonnes of fresh fish per day were marketed through the Katima Mulilo market to the Zambia markets. Of this, approximately 90% originated from Lake Liambezi and it is estimated by (Twedde et al.,2011) that the lake has a yield capacity of 1,000 tonnes per year of high value tilapias. Recent discussions with Tweddle⁴ indicated

³ Personal Communication Dennis Tweddle FGD 30 July 2014

⁴ Personal Communication Dennis Tweddle FGD 30 July 2014

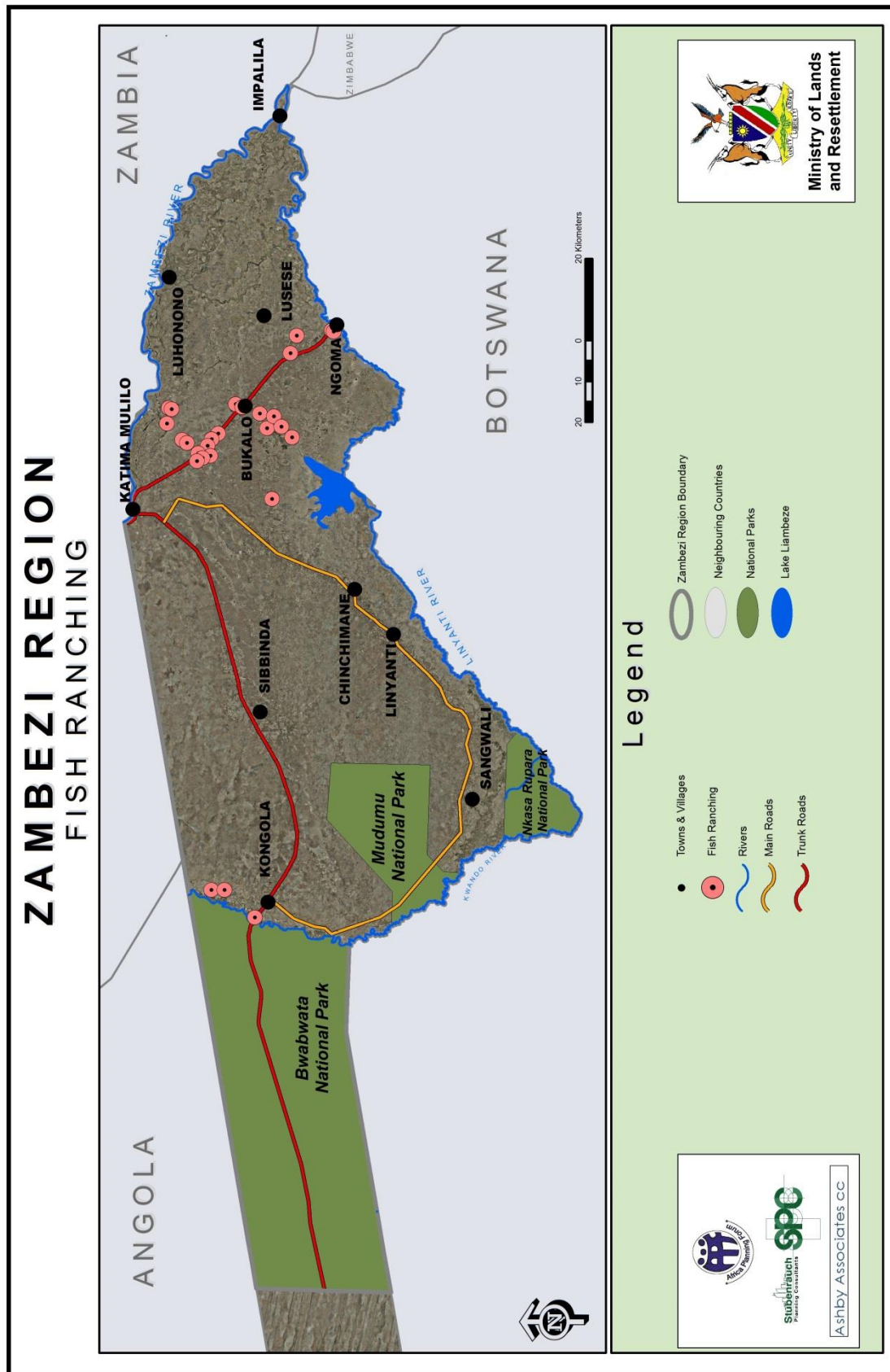
that this yield could be as high as between 2,500 to 3,000 tonnes per year with an estimated monetary value of N\$ 92 million per year.

The Zambezi Region has approximately 30 community fish ranching sites. Fish ranching in the Zambezi Region is an NGO driven project. The difference between fish ranching and fish farming is that fish ranching makes use of natural pans, ponds and old borrow pits and inputs are very low (Murphy & Lilungwe, 2012). Fingerlings are then provided to the sites either annually (depending on whether the pond retains water) or semi-permanent. According to Murphy et al. (2012) the project is viable and the commercial value of fish harvested would have been N\$ 250,000, if the fish were sold at the Katima Market. According to Murphy et al, this was not the case as most of the harvested fish were consumed locally. This is not entirely a bad thing, as it meant that communities did not have to buy food. Therefore this became more of a food security project than an income generation project. Data available for 17 of the sites indicates that over 33,000 fish were caught at the 17 sites with an estimated monetary value of N\$115,500 (Murphy & Lilungwe, 2012). The income received from fish marketed were utilised by communities to buy food, re-investing into the fish ranch and even to pay for school funds.

4.3.3 RECREATIONAL FISHING

There are a number of fishing lodges within the Zambezi Region. Most of the recreational fishing lodges are combined with normal tourism as recreational fishing alone is not economically viable. Therefore combining recreational fishing with normal tourism increases an establishment's revenue basis. A report by Sweeney et al (2010) indicates that fishing lodges and fishing tourism/ angling has the capacity to grow in the Zambezi Region. It also states that this type of tourism has low environmental impacts with economic benefits to the communities through job creation and levies paid to conservancies. It is therefore an opportunity that can be further marketed for the region.

FIGURE 63: FISH RANCHES IN THE REGION



4.4 URBAN CENTRES, SETTLEMENT PATTERNS AND INFRASTRUCTURE

The settlements within the Zambezi Region follow a pattern of linear development. Rural settlements and villages are commonly found along major transport corridors and adjacent to water sources. The trend of rural development by line ministries in Namibia is to provide services to rural communities, this leads to additional linear development. Since most schools, clinics and water are provided to settlements close to major roads, more people settle in these areas so that they can be close to the services. Figure 64 shows the typical settlement distribution pattern following the main roads in the region.

In terms of formal urban development, Katima Mulilo is the only proclaimed town within the region. Katima Mulilo has grown substantially over the years and will continue to grow as urbanisation takes place. The urban structure plan for Katima Mulilo is outdated. The town needs to update this plan in order to guide the town council on development in the town. An urban structure plan is essential for a town to guide its future development and to earmark sensitive areas where no development should take place.

Bukalo is a proclaimed settlement, which means that the townlands have been demarcated and that certain areas have been formally planned.

Chinchimani, Kongola, Ngoma, Linyanti and Sangwali are 'Rural Settlements' that are in the process of being planned. It is expected that upgrading to settlement or village status will take place in the future as these have been earmarked by MRLGHRD for future upgrading.

4.4.1 HEALTH

The Zambezi Region has one hospital that is located in Katima Mulilo and a further 23 clinics and three health centres across the region. Most of the clinics are quite well distributed, as can be seen in Figure 65 where the health facilities are shown as well as the distance communities have to travel to reach these facilities.

According to the Demographic and Health Survey (2006-2007), 77.3% of the population in the Zambezi Region indicated that their nearest health centre was a clinic. In order to reach a clinic or a health facility 87.3% indicated that they walk to such a facility, and 76.6% indicated that they use a bus or taxi service to reach a Hospital (MoHSS and Macro Inc 2008).

FIGURE 64: SETTLEMENT DISTRIBUTION PATTERN IN ZAMBEZI REGION

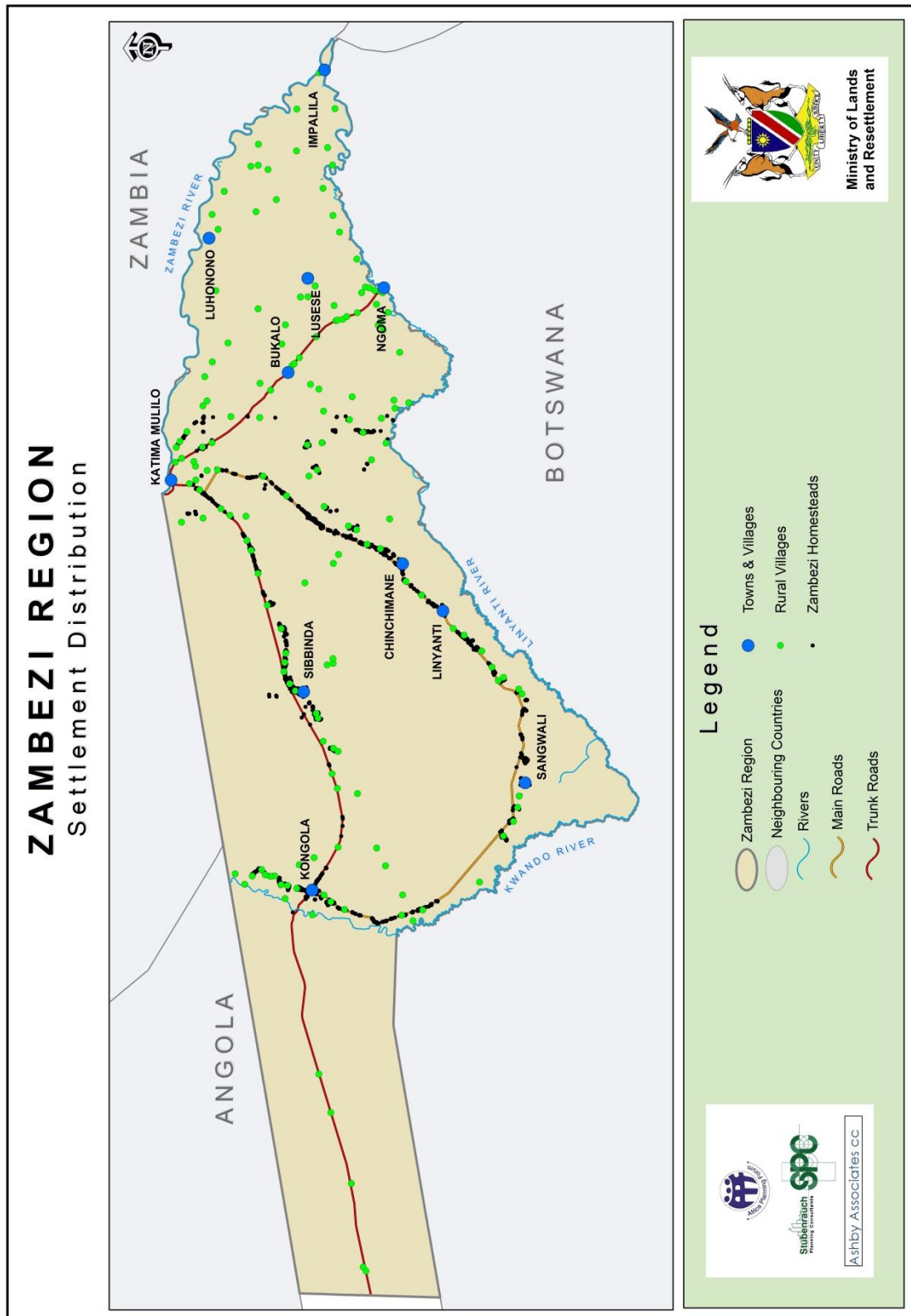


FIGURE 65: HEALTH FACILITY DISTRIBUTION IN TERMS OF WALKABILITY

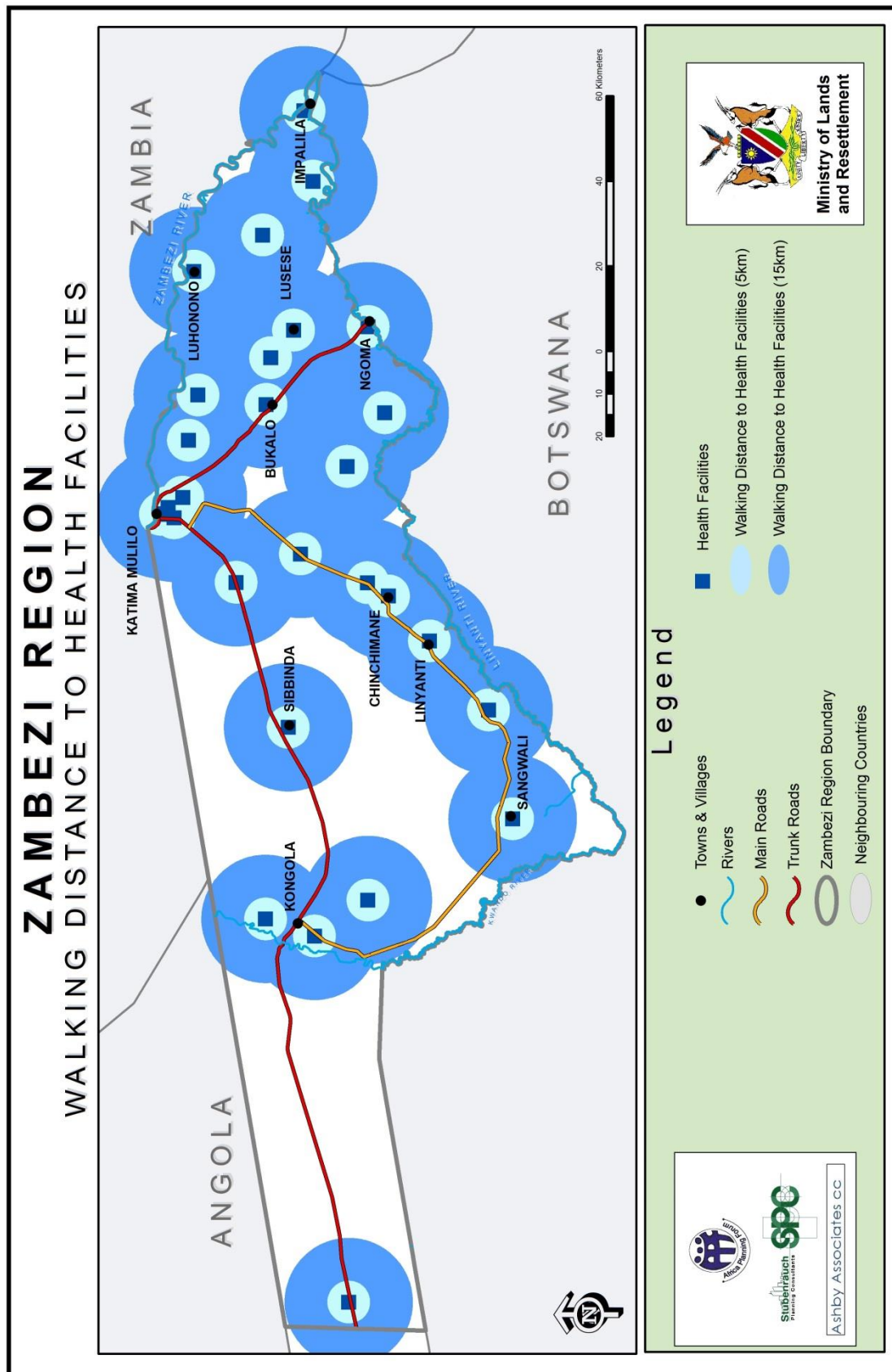
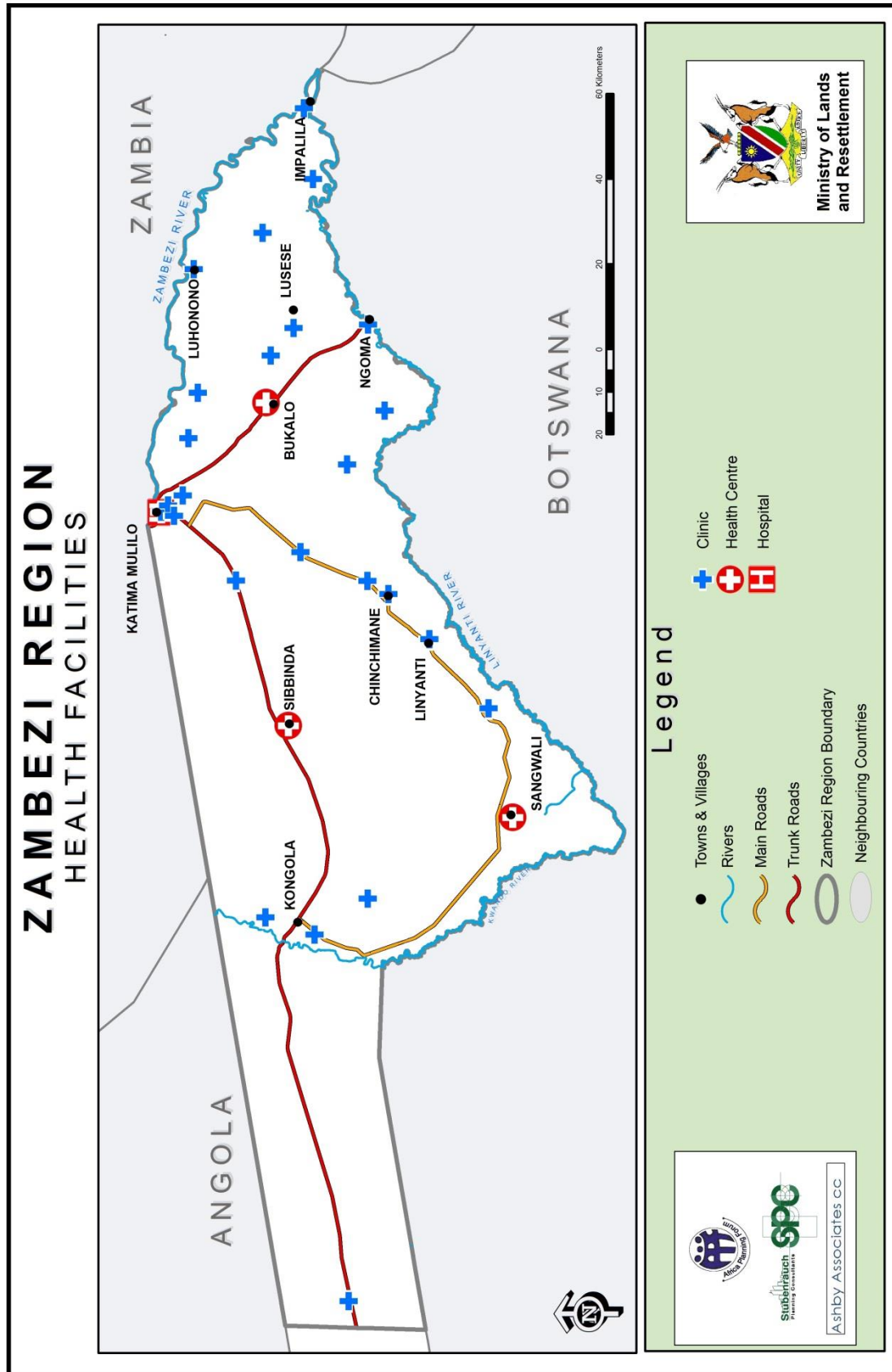


FIGURE 66: HEALTH FACILITIES IN THE REGION



4.4.2 EDUCATION

There are currently a total of 106 schools within the Zambezi Region; 51 are primary schools, 11 are secondary schools and 44 are combined schools.⁵ A combined school refers to a school where primary and secondary levels are combined into one school. These 106 schools have 33,352 learners enrolled and 1,497 teachers giving a teacher/pupil ration of one teacher for every 22 pupils.

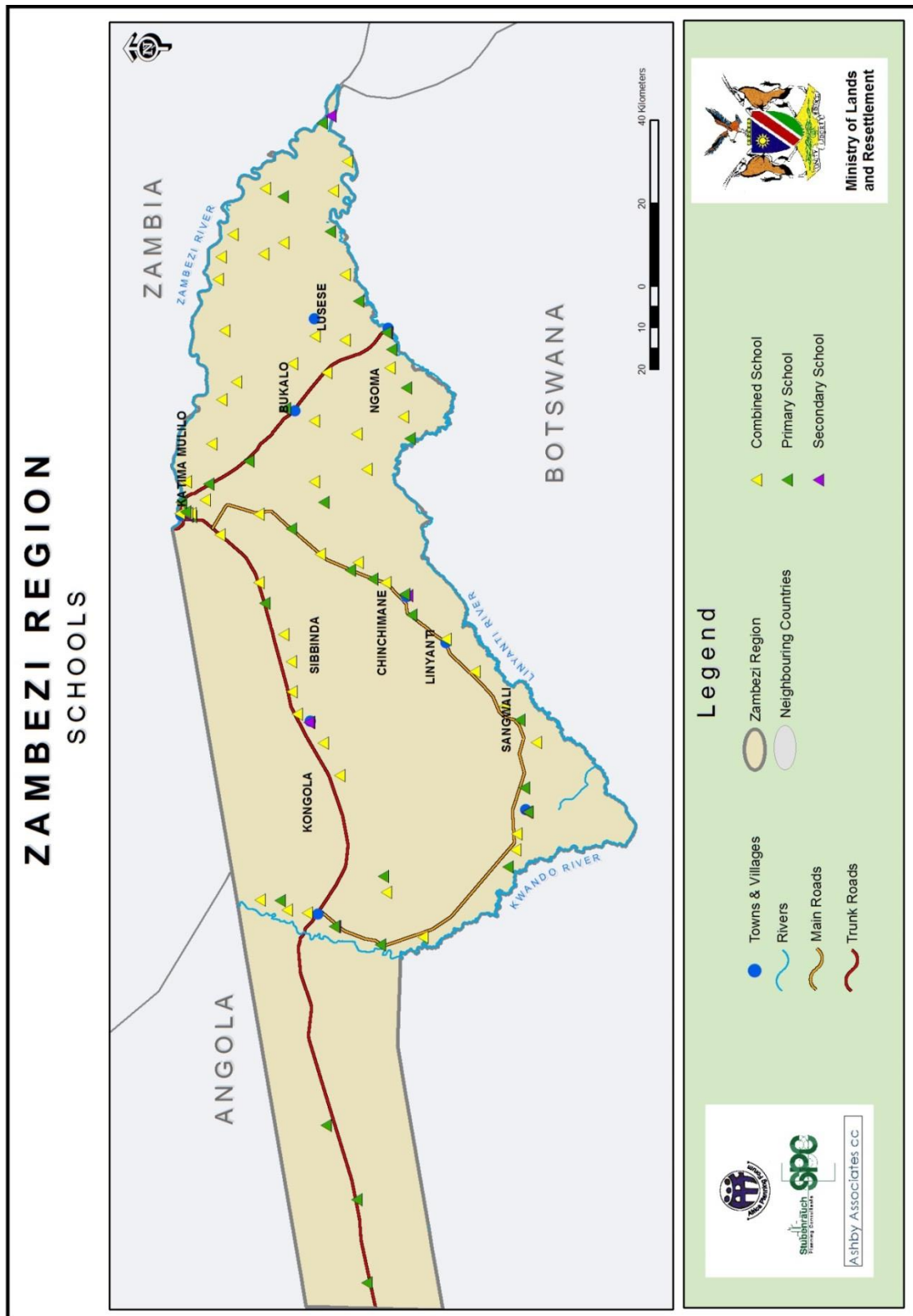
There are just eight hostels within the region to provide accommodation for approximately 2,000 learners. For a rural region, such as the Zambezi, this is insufficient. It is also quite surprising that so little provision is made for hostels to cater for children in the remote areas.

The Namibia Training Authority and UNAM are two of the authorities responsible for providing higher education in Namibia. In the Zambezi Region, there is one Vocational Training Centre (VTC) in Katima Mulilo. This VTC provides training on basic skills such as construction, clothing production, hospitality and tourism.

UNAM has a campus in Katima Mulilo that provides qualifications in the fields of Education, Agriculture and Natural Resources Management.

⁵ Personal Communication. Ms Kapelwa – Zambezi Educational Office – 28 July 2014

FIGURE 67: EDUCATIONAL FACILITIES IN THE REGION



4.4.2 TRANSPORTATION

Railway

There are no railway connections to the Zambezi Region. The Ministry of Works, Transport and Communication (MWTC) is investigating the possibility of linking the proposed Cape Fria harbour development on the coast of Namibia, by means of a railway line, from the harbour to the rest of SADC through the Zambezi Region. At the time of the report there was no clear indication from MWTC whether such a railway line has been proven feasible.

Roads

The region is relatively well connected to the rest of Namibia and SADC countries by means of the Trans-Caprivi Highway. The Trans-Caprivi Highway links the Port of Walvis Bay (on the Namibian coast) with Zambia, the southern Democratic Republic of Congo and Zimbabwe.

The Zambezi Region is also connected to Botswana via the B8 main road from Katima Mulilo to Ngoma and the border post at Ngoma. Informal trade and travelling across the Zambezi and the Chobbe/Linyanti rivers are a regular occurrence between the neighbouring countries. MWTC is currently upgrading the MR125 from Liselo-Linyanti-Kongola-Singalamwe road (212km) to a bitumen road. Meanwhile, construction of the D3608 Isize-Malindi-Sifuha-Luhonono is currently in the design phase. Figure 68 indicates the various roads within the region.

Informal transport to neighbouring countries such as Botswana and Zambia also takes place within the river systems with water taxis. Water taxis are either in dugout canoes (Makoros) or, in some instances, with motorised boats.

There is one airport close to Katima Mulilo at Mpacha where Air Namibia has four scheduled flights from Windhoek to Katima Mulilo per week.

FIGURE 68: ROAD NETWORK WITHIN THE REGION



4.4.4 ELECTRICITY

NamPower is the national power utility company in Namibia for the generation and transmission of electricity. Namibia imports the largest share of its power from South Africa (61%) with a few generating plants of its own generating about 39% of the energy (NamPower, June 2013). Namibia has the following energy generating plants: the thermal coal-fired Van Eck Power Station near Windhoek (120MW), the hydroelectric plant at Ruacana (240MW), the diesel-driven Paratus Power Station at Walvis Bay (24MW), and another diesel-fired power station at Katima Mulilo (3MW). Due to the growing need for power in Namibia, the majority of energy comes from four different SADC projects: AGGREKO; Electricity Supply Commission of South Africa (ESKOM); Zimbabwe Electricity Supply Authority (ZESA) and Zambia Electricity Supply Corporation (ZESCO). Between June 2012 – July 2013 the highest imports were from ESKOM with 44% and ZESA being 37% (NamPower, June 2013).

NamPower, together with neighbouring countries, completed the Caprivi Link Interconnector Project. This project aims at joining the electricity grids in Namibia and Zambia through the Zambezi Region. NamPower is also currently in the process of undertaking the ZIZABONA project with its neighbours. The ZIZABONA project will be a 400/330kV Interconnector line that will link the countries of Zimbabwe, Zambia, Botswana and Namibia. This project will enable the transfer of power between countries.

The Zambezi Region is also served by Northern Namibia Regional Electricity Distributor (NORED). They are responsible for the power supply and infrastructure development within the boundaries of the local authorities. The rural electrification programme of the Ministry of Mines and Energy (MME) is aimed at improving the rural standards of living and to increase the quality of life for rural residents. In addition to this, the programme aims to increase economic and commercial activities and improve the quality of health and educational facilities in the rural areas.

The MME has two projects within the Rural Electrification Project; grid electricity provision and off-grid electrification. With the grid electricity provision, higher priority is given to government and public institutions before being extended to business and private homesteads within a 500 metre radius of the transformer. The off-grid electrification programme is focused on establishing energy shops within a reasonable distance of targeted communities. The Rural Electrification Programme of the MME, together with NamPower, has implemented a number of rural electrification projects in the Zambezi Region in the 2012/13 financial year at Lusu, Sachinga, Ngonga and Isize. For the 2013-2014

financial year, they are planning to undertake rural electrification projects at Malengalenga and Masikili.

According to the 2011 Zambezi Regional Profile the main source of energy for cooking, lighting and heating for households in the Zambezi Region was from wood, while only 14% made use of grid electricity for cooking purposes. The majority of households (61.5%) utilised candles for lighting purposes. Solar energy was not widely used. There was a slightly higher utilisation of solar in the rural areas (2.4%) than in the urban areas (0.3%).

4.4.3 WATER PROVISION

NamWater and the Ministry of Agriculture, Water and Forestry (MAWF) under the Directorate of Rural Water Supply, are responsible for providing water to communities. NamWater is responsible for providing bulk water supply while the MAWF is responsible for rural water supply.

Drinking water for people and livestock in the Zambezi Region is obtained from a variety of sources. Although the Zambezi Region is surrounded in the west, south and east with major rivers, most of the inland part of the region is dry and has no rivers. This means that the majority of the population situated inland need to obtain water from boreholes or from water pipelines provided by government. According to the 2011 Zambezi regional census report, 73% of the population had access to safe water.

The MAWF has undertaken a number of rural water supply projects. The aim of these projects is to provide water to rural communities within communal land through either piped water or boreholes. One such project was the Katima-Linyanti Rural Water Supply Project. This involved the construction of a 78km long bulk pipeline between Katima Mulilo and Linyanti. The pipeline has 78 community water points and has been handed over to the Water Point Associations.

NamWater provides water to urban communities at Katima Mulilo through a treatment plant that abstracts water from the Zambezi River. Water is then treated by means of a filtration and chlorination process. It is then supplied to Katima Mulilo, Mafuta, the army base at Mpacha and the Chinchimani-Linyanti pipeline.

In urban areas 98.9% of households had access to safe drinking water (piped water) while in the rural areas 61.4% have access to safe water. The majority of the rural population obtained water from either a borehole (21.9%) or water pipelines (22.1%) with 18% obtaining water from rivers/dams or streams (unsafe water) (NSA, 2014).

Kabbe has the lowest level of access to safe drinking water (25.4%) with Katima Rural (55.2%), Linyanti (73.5%) and Kongola (80.6%) following. Surprisingly households in Kabbe

have the lowest percentage of access to safe drinking water but the highest access to water from river/dam/streams. This perhaps can be attributed to the fact that large parts of the Kabbe Constituency is inundated by floods during the rainy seasons, which means households have access to water, but these are not necessarily safe drinking water.

It was estimated in the Integrated Water Resources Management Plan for Namibia (IWRM Plan, 2010) that the water resource potential for the Zambezi-Kwando-Linyanti Basin for surface ground water is 4000Mm³/a and for ground water 10Mm³/a with a demand in 2008 of 10.3Mm³/a and an estimated demand in 2030 of 179.6Mm³/a. According to this report, the major consumers of water in the Zambezi-Kwando-Linyanti Basin in 2008 were livestock, irrigation and the town of Katima Mulilo.

TABLE 17: WATER CONSUMED IN 2008 AND EXPECTED WATER DEMAND UNTIL 2030 FOR ZAMBEZI-KWANDU-LINYANTI BASIN

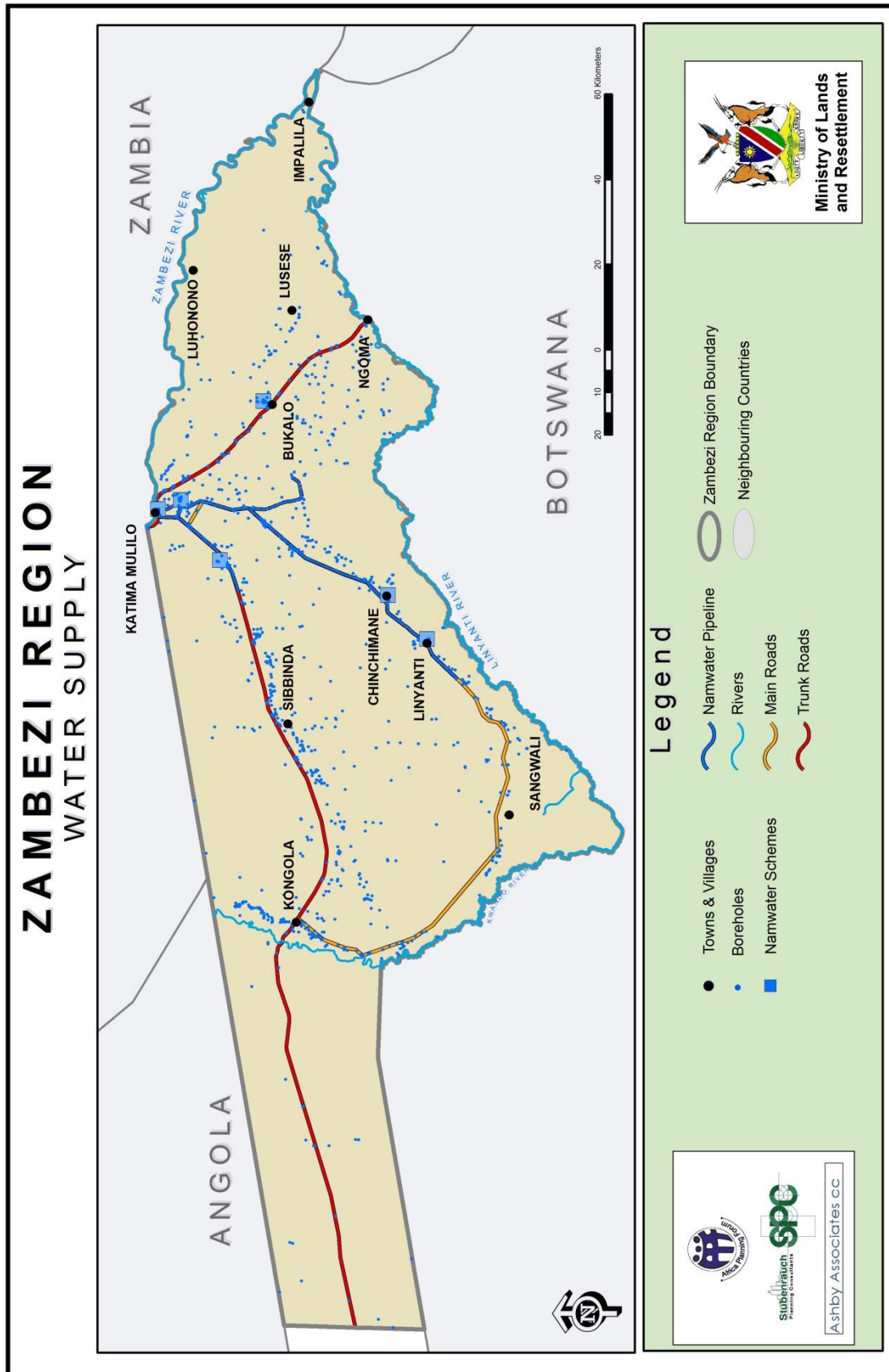
Sector	Water Consumed 2008 (m ³ /a)	Expected Growth (m ³ /annum)		
		2015	2020	2030
Urban Consumers	2,076,201	2,373,574	2,596,467	3,001,927
Rural Consumers	484,088	499,487	510,786	534,155
Irrigation ⁶	3,000,000	13,500,000	96,000,000	171,000,000
Livestock (including wastage)	4,366,833	4,366,833	4,366,833	4,366,833
Tourism	366,061 (demand)	515,084	597,123	727,890

Source: (IWRM Plan, 2010)

Table 16 shows the user with the highest water demand by 2030 is expected to be the irrigation sector. Careful and integrated planning of irrigation schemes within the Zambezi Basin (not only Namibia) need to take place. This is necessary so to ensure that the cumulative impact of abstraction of water does not impact activities and countries downstream.

⁶ Based on assumption for 2015 that area under irrigation will be 900ha; 2020 – 6400 ha and 2030 will be 11,400 ha.

FIGURE 69: WATER INFRASTRUCTURE IN THE ZAMBEZI REGION



5. CONCLUSION

The Zambezi Region has always been known to outsiders as a conservation and wildlife centre, but for communities living in the region wildlife is a much bigger problem, bringing human wildlife conflict and foot-and-mouth disease. For these communities human wildlife conflict is a much larger issue that hides the real benefits of conservation and tourism. However, the solution is not as simple as saying ‘kill all wildlife’ or ‘built a fence to keep wildlife out’. The conservation and wildlife sector also brings benefits to communities, and these benefits should not be disregarded as it also contributes to the livelihood of the communal communities.

Nevertheless, the economy of the region should not be one-sided – it should not only focus on tourism or communal subsistence farming. Rather the economy of the region should focus on a diverse range of activities ranging from subsistence livestock and cropping to commercial livestock, tourism, irrigation to logistics, trade and manufacturing. The region has so much potential not only from the tourism, livestock and crop farming sector, but also from the trade and logistic sector, that it would be ill-advised to focus only on one economic activity.

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

TABLE 18: 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)

Having only one main economic activity makes the region vulnerable to any natural or outside disasters such as drought or flooding or collapsed international markets and therefore diversifying the regional economy will most likely be a safer option for the region.

BIBLIOGRAPHY

- KAZA TFCA. (2013, September). *About Us: KAZA TFCA*. Retrieved from KAZA TFCA: <http://www.kavangozambezi.org>
- Barnard, P. (1998). Biological diversity in Namibia: a country study. *Namibian National Biodiversity Task Force*, 332pp.
- Barnes, J. I. (2013). *Economic Analysis of Land Use Policies for Livestock, Wildlife and Disease Management in Caprivi, Namibia with Potential Wider Implications for Regional Transfrontier Conservation Areas*.
- Barnes, J., Suich, H., & Tarr, P. (2015). *Valuation of ecosystem services in the Zambezi Region, Namibia*. SAIEA.
- Caprivi Wetlands Magazine. (2014, July 22). *Ancient Hydrology: Okavango-Kwando-Zambezi Mega-Basin*. Retrieved from Caprivi Wetlands Magazine: <http://www.caprivimagazine.com/>
- CBS. (2003). *Report on the Annual Agricultural Surveys 1996-2003*. NPC.
- CDC. (2013). *CDC in Namibia Factsheet*. Atlanta. www.cdc.gov/global: Centers for Disease Control and Prevention.
- Chase, M. (2009). *Aerial wildlife census of the Caprivi river systems - A survey of rivers, wetlands and floodplains. Unpublished report to Ministry of Environment and Tourism*.
- Christelis, G., & Struckmeier, W. (2001). *Groundwater in Namibia: an explanation to the Hydrogeological Map*. MAWF.
- Christian, C. A. (2009). *Technical report on Hydro-electrical Power Development in the Namibian Section of the Okavango River Basin*. OKACOM.
- Davis, C. (2011). *Climate risk and vulnerability: a handbook for southern Africa. Council for Scientific and Industrial Research*.
- El Obeid, S., & Mendelsohn, J. e. (2001). *Health in Namibia: Progress and Challenges*. Windhoek: RAISON.
- EMIS. (2013). *Education Statistics for 2012*. Windhoek: MoE.
- FAO. (2013). *FAO Corporate Document Repository*. Retrieved from Guidelines for land-use planning: <http://www.fao.org/docrep/t0715e/t0715e00.htm>
- Geocarta Namibia. (2013). *Process Documentation for Establishing a Regional Planning GIS: Integrated Land Use Plans Kavango, Hardap and //Karas Regions*.
- GOPA; Ambero. (2012). *Road Map for the development of small-scale farming areas on communal land in Namibia*. MLR.
- Hanssen, L. (2014). *Status report: Lions of the Zambezi Region. Unpublished report, Kwando Carnivore Project*.
- Hanssen, L. (n.d.). *Personal email communications re: wildlife observations by camera traps in Zambezi State Forest*. <https://www.facebook.com/KwandoCarnivoreProject>.
- Harring, S., & Odendaal, W. (2012). *"God stopped making land"! Land rights, Conflict and Law in Namibia's Caprivi Region*. Windhoek: LAC.

- Haub, O., & Mujetenga, C. (2012). *Innovating Land Use Planning in Namibia: The development of a new approach for Integrated Regional Land Use Planning*.
- Haub, O., & Mujetenga, C. (2012). *Innovating Land Use Planning in Namibia: The development of a new approach for Integrated Regional Land Use Planning*. World Bank conference on Land and Poverty 2012.
- IWRM Joint Venture Consultants. (2010). *Zambezi-Kwando-Linyanti River Basing*. Ministry of Agriculture, Water and Forestry.
- IWRM Plan. (2010). *Integrated Water Resources Management Plan for Namibia: Theme Report 2 - the Assessment of Resources Potential and Development Needs*. MAWF.
- L, H. (2011). *Spotted Hyena ecology and human-wildlife conflict in Caprivi Region of Namibia*. Unpublished report, Kwando Carnivore Project.
- LAC. (July 2003). *Guide to Communal Land Reform Act. Land, Environment and Development Project*. Legal Assistance Centre and the Advocacy Unit.
- Malan, J. (2003). *Guide to the Communal Land Reform Act*. Legal Assistance Centre and Namibia National Farmers Union.
- MAWF. (2012). *2012 Livestock Census*. MAWF.
- MAWF. (2013). *Ministry of Agriculture, Water and Forestry*. Retrieved from Ministry of Agriculture, Water and Forestry: <http://www.mawf.gov.na/Programmes/greenscheme.html>
- MAWRD. (1998). *Final Feasibility Study for the Caprivi Sugar Sector Project, Namibia*. Compiled by F.C Schaffer & Associates, USA. MAWRD.
- MAWRD. (2003). *Environmental assessment of the Caprivi Agriculture Project and Lake Liambezi rehabilitation. Main Environmental Assessment Report compiled by AfriDev Associates (Pty) and SIAPAC Namibia for MAWRD*. MAWRD.
- Mbapaha, M. (2013). *Community forestry in Namibia. Forest for Food Security and Nutrition*.
- MCA. (2011). *Indigenous Natural Products Producer and Processor Organisations Sub-Activity: EIA for Devil's Claw*. MCA.
- MCA-N. (2013). *Indigenous Natural Products Producer and Processor Organisations Sub-Activity: Quarterly Progress Report 10*. MCA-N.
- MCA-N. (2013). *Proceedings of the Namibian Devil's Claw Workshop (5-7 February 2013)*. MCA-N.
- Mendelsohn, J. (2006). *Farming Systems in Namibia*. RAISON.
- Mendelsohn, J., & El Obeid, S. (2003). *Sand and Water: a Profile of the Kavango Region*. Struik Publishers & RAISON.
- Mendelsohn, J., & Roberts, C. (1997). *An Environmental profile and atlas of Caprivi*. Directorate of Environmental Affairs, Ministry of Environment and Tourism.
- MET. (2004). *Species management plan African wild dog (Lycaon pictus) Unpublished report by R.Lines*. NNF for MET.
- MET. (2013). *Crocodile Management Plan*.
- MET. (2013). *Management Plan for Nkasa Rupara National Park 2013/2014 to 2017/2018*. MET.

- MET. (2013). *Management Plan for the Bwabwata National Park 2013/2014 to 2017/108*. MET.
- MET. (2013). *Management Plan: Mudumu National Park 2013/2014 to 2017/ 2018*. MET.
- Ministry of Health and Social Services (MoHSS) and Macro International Inc. (2008). *Namibia Demographic and Health Survey 2006-07*. Windhoek.
- MOHSS. (2008). *Namibia Demographic and Health Survey 2006-07*. Windhoek: MoHSS.
- MOHSS. (2012). *Report on the 2012 National HIV Sentinel Survey*. Windhoek: MOHSS.
- Mulonda, O. (2011). *Estimation of biomass production in the rangelands of the Caprivi Region*. Windhoek: University of Namibia.
- Murphy, C., & Lilungwe, P. (2012). *Fish Ranching Programme in Caprivi Region: Evaluation and Project Summary Reports for WWF project on Integrated Co-Management of Zambezi/Chobe River Fisheries Resources Project*. WWF.
- NAB. (2014, August). *Controlled crops*. Retrieved from Namibian Agronomic Board: <http://www.nab.com.na>
- NACSO. (2010). *Assessment of climate change impacts and adaptation options for Namibia's CBNRM programme in Kunene and Caprivi. Unpublished report compiled by SAIEA for Namibian Association of CBNRM Support Organisations (NACSO)*.
- Namibia Meteorological Service. (2014, July). Retrieved from Rainfall Progression Charts: <http://www.meteona.com/>
- Namibia Nature Foundation. (2010). *Land Use Planning Framework for the Kavango Region of Namibia within the Okavango River Basin*. Windhoek: NNF.
- NamPower. (June 2013). *Annual Report*. NamPower.
- New Era. (2013). *Crocodile farming report*. New Era.
- NEWFIU. (2014). *Namibia: Crop prospects and food security situation report - March 2014*. MAWF.
- Nott, K. (2014). *2014 Devil's Claw harvesting in the Zambezi Region*. IRDNC.
- NPC. (2012). *Annual Economic Development Report 2012*. Windhoek: Office of the President.
- NPC. (2014). *Development Programmes Medium Term Expenditure framework 2014/2015 to 2016/2017*. NPC.
- NRI. (2012). *Quarterly Progress Report 6: MCA-N Indigenous Naturla Products Producer Report Number 15*. Natural Resources Institute, University of Greenwich, UK.
- NSA. (2012). *Namibia Household Income & Expenditure Survey (NHIES) 2009/2010*. NSA.
- NSA. (2012). *Poverty Dynamics in Namibia: A comparity Study using 1993/94, 2003/04 and the 2009/10 NHIES surveys*. NSA.
- NSA. (2013). *Namibia 2011: Population and Housing Census Basic Report*. Windhoek: Namibia Statistics Agency.
- NSA. (2013). *Preliminary Annual National Accounts*. NSA.
- NSA. (2014). *2011 Population ad Housing Census - Zambezi regional Tables based on 4th Delimitation*. NSA.

- NSA. (2014). *Zambezi 2011 Census Regional Profile*. NSA.
- Otto, A., & Goldbeck, M. (2014). *The people of Namibia's Eastern Zambezi Region: a historical perspective*. Gondwana Collection.
- Purvis, J. (2002, October). Fish and Livelihoods: Fisheries on the eastern floodplains, Caprivi. *DEA Research Discussion Paper: Number 52*.
- SADC/SARDC. (2012). *Zambezi River Basin Atlas of the Changing Environment*. Gabarone, Harare and Arendal: SADC, SARDC, ZAMCOM, GRID-Arendal, UNEP.
- SAIEA. ((in preparation)). *Ecosystem services in Zambezi Region. Report compiled for Ministry of Lands and Resettlement by Southern African Institute of Environmental Assessment*.
- Schlettwein, C., Simmons, R., A, M., & Grobler, H. (1990). Flora, fauna and conservation of East - Caprivi wetlands. *Madoqua*, 17(2): 67-76.
- Schutz, W. (2010). *Presentation: Challenge and action for increasing meat exports to EU countries*. Meat Board of Namibia.
- Simmons, R., Boix-Hinzen, C., Banes, K., Jarvis, A., & Robertson, A. (1998). Important Bird Areas of Namibia. In Barnes K.N (ed) *The Important Bird Areas of southern Africa. BirdLife South Africa*, pp.295-332.
- Spectrum. (2013). *Spectrum Policy Modelling System, Version 4.69_500 (2013); Namibia Model 2013*. Windhoek: MOHSS.
- Stuart-Hill, G. (October 2012). *KAZA wildlife corridors workshop*. WWF: Windhoek Office.
- Sweeney, L., Baker, A., Thaniseb, A., Brown, C., Tweddle, D., Hay, C., & van der Waal, B. (2010). *A Preliminary Economic Assessment of the contribution of fishing lodges in the Caprivi Region to the local economy: Project report for Integrated Co-Management of Zambezi/Chobe River Fisheries resources Project*. WWF.
- Turpie, J., Midgley, G., Brown, C., Barnes, J., Pallett, J., Desmet, P., & Tarr, J. a. (n.d.). *Climate change vulnerability and adaptation assessment for Namibia's biodiversity and protected area system*. Produced for MET by Anchor Environmental Consultants, NNF and SAIEA.
- Tweddle, D. (2009). *Integrated Management of Zambezi/Chobe River System - Transboundary Fishery Resource Namibia/Zambia/ Botswana*. WWF Namibia.
- Tweddle, D., Weyl, O., Hay, C., Peel, R., & Shapumba, N. (2011). *Lake Liambezi, Namibia: fishing community assumes management responsibility*. WWW Project.
- Weaver, C., & Petersen, T. (2008). Namibia Communal Area Conservancies. *Best Practices in Sustainable Hunting*, 48-52.
- Wolski, P. (2013). *Anthropogenic climate change and hydro-climatic conditions in the Okavango River Basin. Unpublished report prepared by P. Wolski, Climate Systems Analysis Group*. University of Cape Town for SAREP.