



# MINISTRY OF NATURAL RESOURCES AND TOURISM

## INTEGRATED MANAGEMENT PLAN FOR THE KILOMBERO VALLEY RAMSAR SITE



### Appendix-I Appraisal and site plan for the Ngapemba Conservation Area

2018



## STRUCTURE OF THE INTEGRATED MANAGEMENT PLAN FOR THE KVRS


The Integrated Management Plan for the Kilombero Valley Ramsar Site is a framework for coordination of actions to conserve and promote the wise use of the wetland landscape.

The IMP is composed of an overall coordination framework and of several specific Component Plans. Some of these Component Plans have been appraised as part of the IMP Foundation phase: these appraisals generated specific reports listed below.

Document	Scope and purpose
<b>Main Report</b>	
<b>Foundation Document</b>	It summarises the rationale, goals and proposed mechanism for the IMP. It presents the summary Action Plan comprising several components.
<b>Appendices: Components' Reports</b>	
<b>I. Ngapemba Conservation Area</b>	Appraisal of conservation rationale and options for the Ngapemba section of the KVRS. Preliminary Conservation Site Action Plan.
<b>II. Site Management Plan for the conservation of Puku</b>	Appraisal of the status of the antelope <i>Kobus Vardonii</i> (puku) in Kilombero Valley; proposed Conservation Plan within the landscape.
<b>III. Ruipa-East Wildlife Corridor Plan</b>	Appraisal of conservation rationale and options for the conservation and rehabilitation of wildlife connectivity between the core valley area and Selous Game Reserve I the central section of the KVRS.
<b>IV. Priority Investment Plan for the Livestock Sector</b>	Appraisal of requirements and opportunities to support the gradual transformation of the livestock sector within the landscape. Priority Investment Plan.
<b>V. Vulnerable Wetlands Appraisal</b>	Appraisal of the status and conservation options of 2 wetland sites at the edge of the valley floor.
<b>Appendices: IMP Foundation Feasibility Appraisals</b>	
<b>VI. Strategic Wetland Review</b>	A summary review of wetland ecosystem status and drivers of change.
<b>VII. Institutional Option Study</b>	Appraisal of options for the establishment of landscape-scale inter-sector coordination within the relevant frameworks of Tanzania.
<b>VIII. Financial Sustainability Appraisal Study</b>	Appraisal of fiscal sustainability of devolution of wetland's natural resource management and fiscal requirements for the establishment and sustainability of landscape-level coordination.
<b>IX. Report on IMP Foundation Consultative events</b>	Record and recommendations from stakeholder workshops organized during the IMP Foundation process at district, landscape, regional and national levels.

The preparation of the Integrated Management Plan for the Kilombero Valley Ramsar Site and associated assessments, consultations, capacity building and other ancillary actions were supported by the Belgian Aid and the European Union, through the Kilombero and Lower Rufiji Ecosystem Management project.

**DOCUMENT DATA**

Project	Kilombero and Lower Rufiji Wetlands Ecosystem Management Project	
Project ID	BTC TAN 094 KILORWEMP	
Document	TECHNICAL ADVISORY SERVICES FOR BIODIVERSITY CONSERVATION AND WETLAND MANAGEMENT IN KILOMBERO VALLEY RAMSAR SITE - NGAPEMBA CONSERVATION AREA	
Authors	AMBERO Consulting	
Document owner	KILORWEMP Project Implementation Unit Ph: + 255 222866375 Email: <a href="mailto:KILORWEMP2013@gmail.com">KILORWEMP2013@gmail.com</a> Physical address: c/o MNRT, Mpingo House, Nyerere Road Dar es Salaam, Tanzania Postal address: c/o BTC PO Box 9372 Dar es Salaam	
Document version	Final	
Document date	May, 2018	
Document status		
Document history	30/12/17	
Disclaimer	This document was produced with the financial assistance of the European Union and the Belgian Aid through the KILORWEMP project. The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the Belgian Technical Cooperation, the European Union or the Ministry of Natural Resources and Tourism	

# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION AND SUMMARY</b>	<b>9</b>
1.1	Overview	9
1.2	Summary	9
1.3	Data Collection and Quality Issues	12
<b>2</b>	<b>ECOLOGICAL ASSESSMENT</b>	<b>13</b>
2.1	Vegetation	13
2.2	Wildlife	19
2.2.1	Summary	19
2.2.2	Large Mammals	19
2.2.3	Distribution of Wildlife other than Puku	21
2.2.4	Puku	21
2.2.4	Birds	22
<b>3</b>	<b>LAND TENURE ASSESSMENT</b>	<b>24</b>
3.1	Land Tenure	24
3.2	Village Land Use	25
<b>4</b>	<b>RAPID SOCIAL ASSESSMENT</b>	<b>27</b>
4.1	Demography	28
4.2	Natural Resources	28
4.3	Livelihoods	29
4.4	Wildlife	31
<b>5</b>	<b>CURRENT LAND USE</b>	<b>33</b>
5.1	Tourism	33
5.1.1	Overview	33
5.1.2	Current Access and Management	34
5.1.3	Hunting Safaris	35
5.1.4	Fishing Safaris	36
5.2	Use of the Area by Local Communities	36
5.3	Land and Resource Use Conflicts	36



<b>6</b>	<b>CONSERVATION OPTIONS .....</b>	<b>39</b>
6.1	Conservation Goals.....	39
6.2	Area Definition.....	40
6.2.1	Case 1: Kilombero District Ngapemba Conservation Area.....	40
6.2.2	Case 2: Greater Ngapemba.....	42
6.3	Conservation Status Appraisal.....	44
6.3.1	Status Quo .....	45
6.3.2	State Protected Area.....	45
6.3.2	Community Protected Area .....	47
6.3.3	Comparative Analysis .....	49
6.3.4	WMA Establishment Plan.....	51
6.3.4	Establishment of Reserved Land .....	55
6.4	Connectivity.....	56
	<b>ANNEX - VSP and VLUP .....</b>	<b>58</b>
	<b>ANNEX - GENERAL MAPS.....</b>	<b>61</b>
	<b>ANNEX - Terms of Reference .....</b>	<b>65</b>
	Activities.....	65
	Outputs .....	66
	Associated project actions .....	66
	<b>ASSOCIATED REPORTS</b>	
	• Botanical Survey	
	• Wildlife Survey	
	• Sociological Assessment	
	• Ngapemba and Tanganyika Analysis 2016	

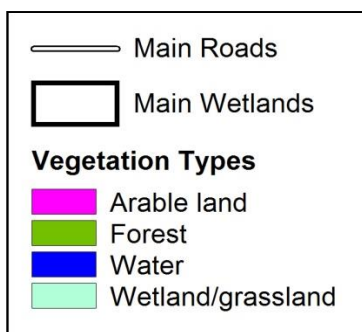
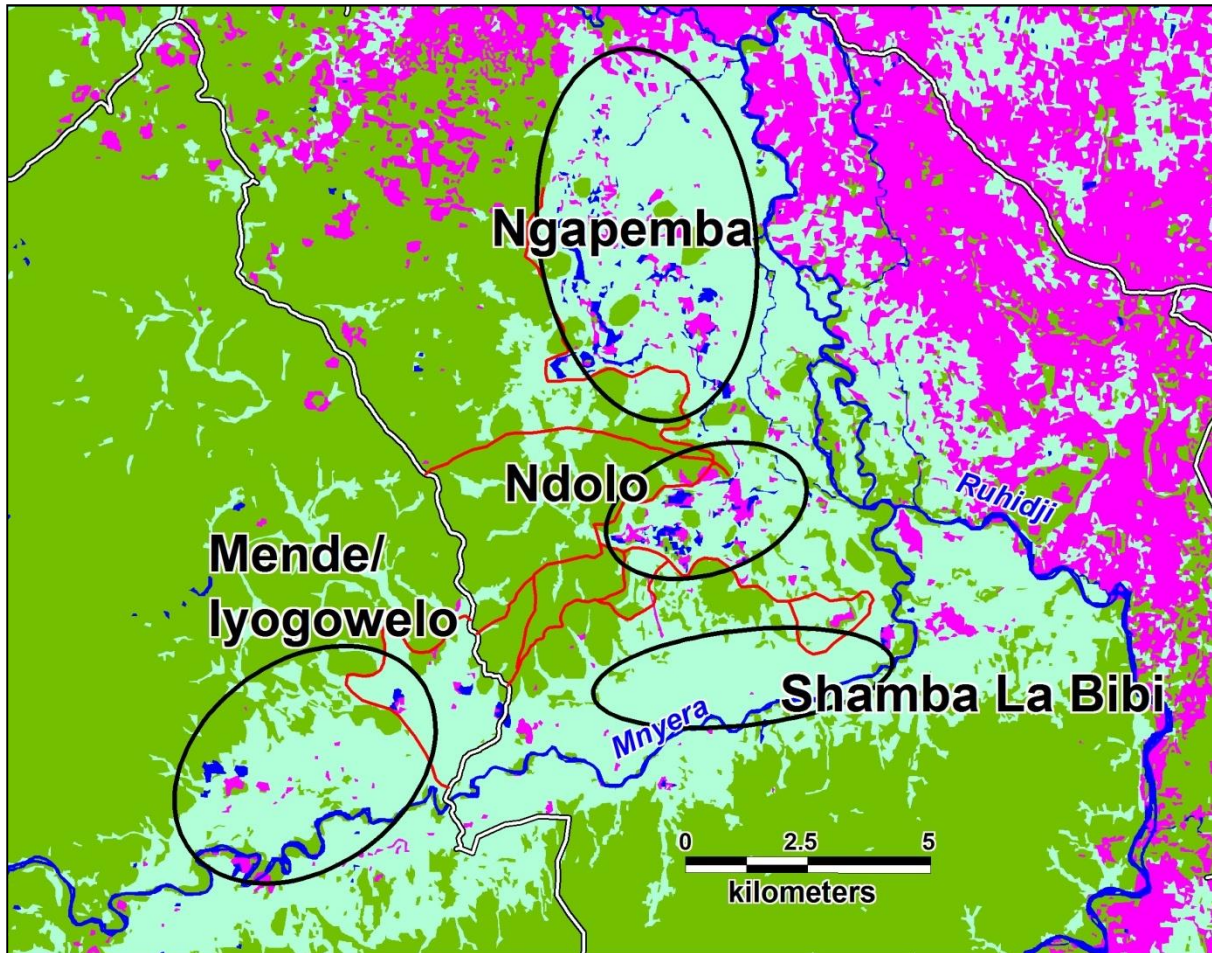
## FIGURES

Ngapemba area showing location of main wetlands, forest, grassland and cultivation .....	7
Ngapemba area showing land tenure (based on MNRT dataset) .....	8
Ndolo Wetland .....	16
Mende Wetland with Mnyera river in background .....	16
Ngapemba Wetland .....	16
The <i>Vertiveria-Panicum</i> community in Ngapemba wetlands: .....	17
Miombo woodland with drainage line.....	17
Ngapemba area showing location of main wetlands, forest, grassland and cultivation .....	18
Mnyera River.....	18
Camera trap locations.....	19
Road strip counts .....	20
Other species distribution .....	21
Puku distribution .....	21
Puku population trend in the Kilombero valley from 1991 to 2014 .....	22
Wildlife caught on camera traps .....	23
LTSP 2018 Database.....	24
2016 MHLSSD database .....	24
PRA Information.....	24
Socio-Economic Assessment - Study Area .....	27
Approximate Extent of Hunting Block .....	33
Current infrastructure in Ngapemba .....	34
Quota and utilisation data .....	35
The wider conservation picture.....	39
Preliminary boundary and zones for the "Kilombero District" Ngapemba Conservation Area showing village boundaries.....	41
Preliminary boundary zones for Kilombero District Ngapemba Conservation Area .....	41
Preliminary boundary zones for the "Greater" Ngapemba Conservation Area .....	42
Preliminary boundary zones for the "Greater" Ngapemba Conservation Area - Landcover .....	43
Potential Corridors .....	56
Extent of cultivation along Ruhidji River in proposed Tanganyika corridor area .....	57
Current boundaries for the Ngapemba BMU .....	61
Estimated extent of cultivation 2015 .....	62
Estimated extent of cultivation 2005 .....	62
Relief and main drainage of the study area .....	63
Hunting blocks outside Selous in Kilombero south area .....	64

## TABLES

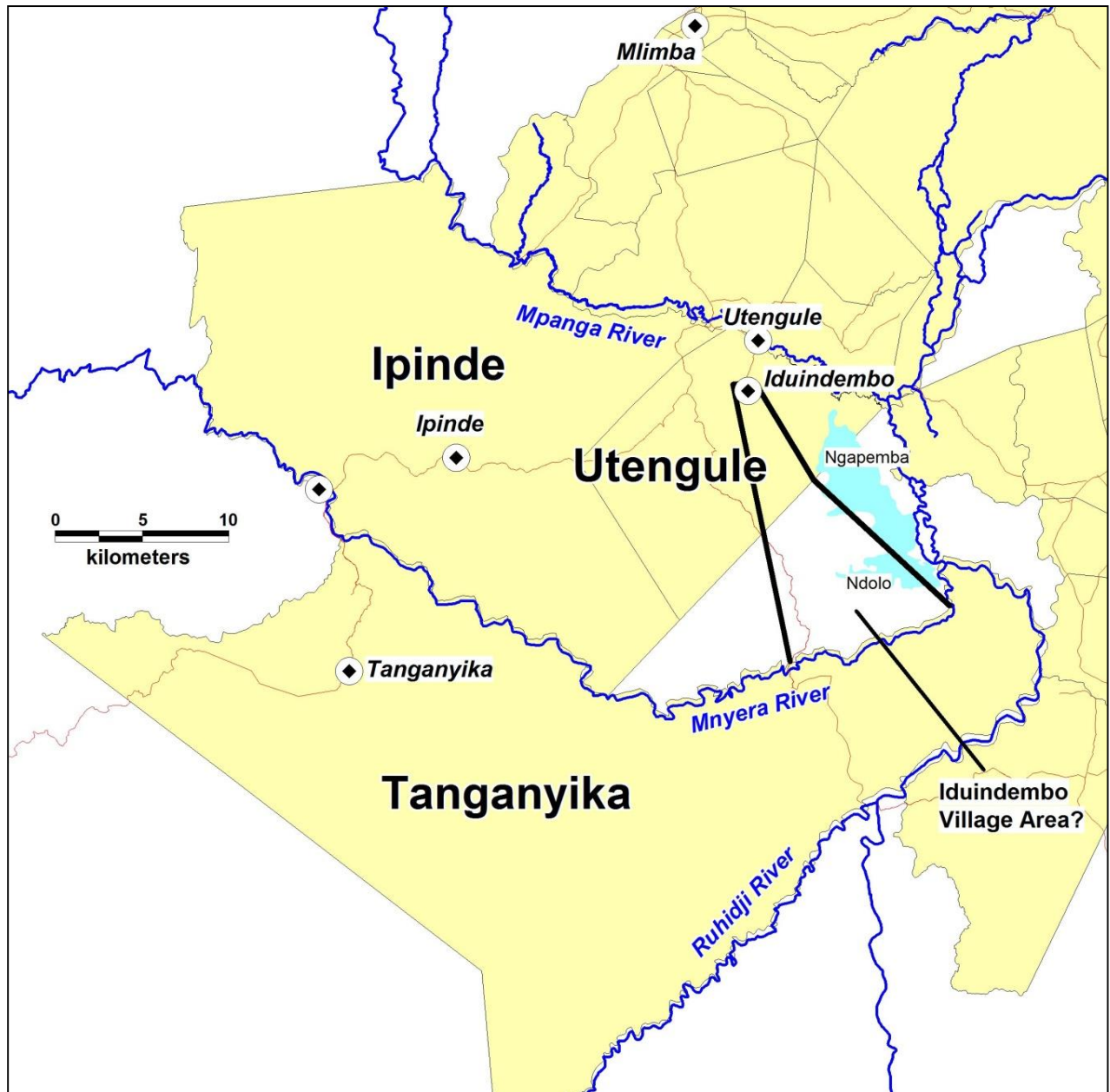
Table 1: Summary background information for Ngapemba.....	9
Table 2: Data collection methods for the Ngapemba area .....	12
Table 3: Data quality concerns for the Ngapemba area .....	12
Table 4: Wetland plant communities in the Ngapemba area.....	13
Table 5: Woodland plant communities in the Ngapemba area.....	14
Table 6: Key botanical elements in the Ngapemba area.....	15
Table 7: Conservation Status of some Wildlife Species found at Ngapemba .....	20
Table 8: Land.....	25
Table 9: People and Settlement .....	28
Table 10: Natural Resources .....	28
Table 11: Livelihoods .....	29
Table 12: Wildlife .....	31
Table 13: Quota and Utilisation Data.....	35
Table 14: Use of Natural Resources.....	36
Table 15: Land and Resource Use Conflicts .....	37
Table 16: Boundary considerations for the Kilombero District Ngapemba Conservation Area ....	40
Table 17: Boundary considerations for the "Greater" Ngapemba Conservation Area .....	42
Table 18: Zones and management considerations for the Ngapemba Conservation Area .....	43
Table 19: Key issues of the protection models .....	44
Table 20: Status Quo .....	45
Table 21: State protected area options.....	45
Table 22: Community protected area options.....	47
Table 23: Comparative Analysis of different Protection Models .....	49
Table 24: Establishment steps and associated capacity building for a WMA .....	52
Table 25: Indicative Budgeting for WMA Establishment.....	53
Table 26: Indicative Time Scale for WMA Establishment.....	54
Table 27: Process of Transferring Village Land to Reserved Land.....	55
Table 28: Potential Wildlife Corridors .....	56

Ngapemba area showing location of main wetlands, forest, grassland and cultivation





Ngapemba area showing land tenure (based on MNRT dataset)



# 1 INTRODUCTION AND SUMMARY

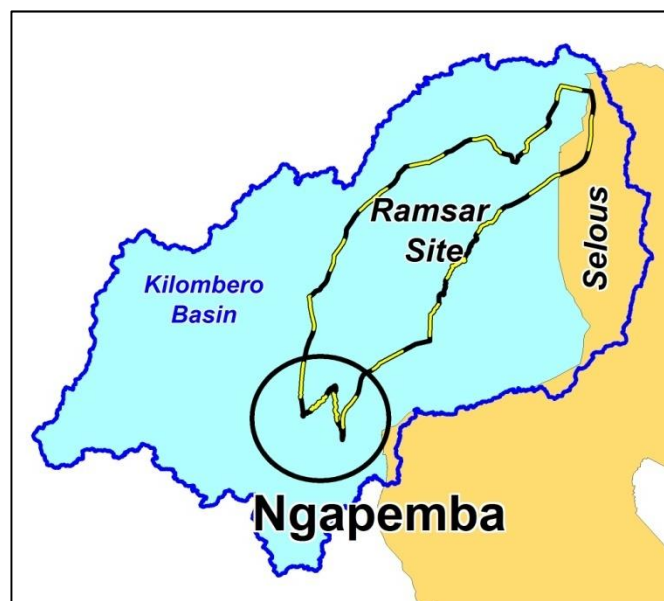
The purpose of this sub component of the integrated management plan process for the Kilombero Valley Ramsar Site was to produce a detailed assessment of the options to improve the conservation status of the Ngapemba wildlife area. The two main options available are either as a village based (Wildlife Management Area) or as a nationally based conservation area (Game Reserve). The assessment was to include area viability, strengths and weakness and to generate detailed data, analysis and conservation management measures required for follow-on planning processes and instruments under the options. It was also to involve local stakeholders in the assessment of options and enable evidence based decision making.

## 1.1 Overview

An isolated pocket of wildlife exists at the southern end of the Kilombero Valley Ramsar Site. Ground surveys in 2015 revealed a significant population of puku, probably the last viable one in the Kilombero Valley. In addition, other wildlife was present in numbers high enough to support a MNRT issued hunting block.

The area is on the transition zone between the Kilombero Valley grasslands and swamps and the miombo woodlands found on higher ground. The habitat mix allows a higher species diversity.

The area is a mix of village and general land and there is a conflict between conservation and livelihood goals in the area. The conservation importance of this area led to the KILORWEMP project to seek a solution through the integrated management planning process.



## 1.2 Summary

Table 1: Summary background information for Ngapemba

Community	Description
Ecological Environment	<ul style="list-style-type: none"> <li>• Important wetland and woodland communities represented with localised degradation of these communities in settled areas</li> <li>• Invasive species found in wetlands (<i>Pistia stratiotes</i> and <i>Mimosa pigra</i>)</li> <li>• Plants with high conservation significance include three orchids</li> <li>• Msagati forest is severely degraded</li> <li>• Perhaps the most important population of puku remaining in Tanzania with estimates of at least 1,000 animals</li> <li>• Significant populations of other wildlife species</li> </ul>

Table 1: Summary background information for Ngapemba	
Community	Description
Land Tenure	<ul style="list-style-type: none"> <li>Land tenure in the Ngapemba area is complicated and appears to be in a state of flux with conflicting village boundary descriptions</li> <li>Utengule was first settled in 1900 followed by Ipinde and Tanganyika in the 1950s. Iduindembo has variously been described as a village sub-division and also as a newly registered village. However, the situation is far from clear.</li> <li>The area between Ngapemba swamp and the Ruhidji River was issued as a hunting block in 2013 to Kilombero North Safaris who run an active anti-poaching programme to sustain their hunting and fishing safaris.</li> </ul>
Demography/ Infrastructure and Governance	<ul style="list-style-type: none"> <li>Ethnically the Wabhena make up the bulk of residents in the four target villages (60%) followed by the Sukuma (30%) who are recent migrants to the area (starting around the mid 1990's and ongoing)</li> <li>There are around <b>14,000 people</b> resident in the four villages (Ipinde - 4,500; Tanganyika - 4,000; Iduindembo - 2,600 and Utengule 2,200)</li> <li>Infrastructure in all villages is poor with Utengule being the most developed (due to being close to Mlimba and having been established in 1900)</li> <li>Village Government includes the General Assembly, the Village Council and various committees, Village Chairman (elected), Village Executive Officer and hamlet leaders.</li> <li>Access to natural resources such as land, rivers, fishing grounds forests and wildlife are mediated by different institutions, which include Village Councils, the District Council and respective committees or offices.</li> </ul>
Natural Resources	<ul style="list-style-type: none"> <li>Land (including farms) was considered the most important natural resource across all four villages, accounting for 84% of the overall Relative Importance Weighting (RIW), followed by forests (9%); water (including rivers, swamps and dams = 4%); fish (2%); livestock (2%) and grazing land (1% - Iduindembo and Utengule).</li> <li>Other commonly used resources include firewood, charcoal, timber, traditional medicines, wild fruits, wild vegetables, mushrooms, wildlife, fish, honey, bamboo, grass (<i>milulu</i>), palm leaves, reeds (<i>malala</i>), sedges (<i>mitete</i>) and sand. Most wildlife is largely confined to the KNS hunting block. In all villages, wildlife is hunted for meat and for selling.</li> <li>All villages access wildlife illegally from the farms and forests, including from within the KNS area. This is used as a source of meat and income, through sales of meat within the villages.</li> <li>In all four villages, the availability of most natural resources, including land, were perceived to have declined markedly over the last 20 years and were expected to continue doing so over the coming years. Important perceived drivers of change include increases in population due to natural growth and migration; increased clearing of land for farming and settlements; loss of habitat due to cultivation and grazing in wetlands; and increased demand for and utilization of natural resources.</li> </ul>

**Table 1: Summary background information for Ngapemba**

Community	Description
Farming	<ul style="list-style-type: none"> <li>• Farming is mostly on small farms (less than 10 acres), Rice and maize are the two main crops. Interestingly, most of the large farmers were reported to be Sukuma immigrants. Lowland areas are cultivated throughout the year while upland areas are used during the rainy season</li> <li>• There are no guidelines or rules regarding the management of individual farms; such that farmers are generally free to do what they want on their own farms. There are a few guidelines regarding where people may farm, such as prohibiting people from farming along rivers. Enforcement of such regulations varies, being considered fairly effective for Utengule and ineffective for Tanganyika.</li> </ul>
Livestock	<ul style="list-style-type: none"> <li>• The main villages with cattle were Iduindembo and Utengule. There were fewer than 20 pastoralists in Ipinde and none in Tanganyika. Grazing areas are very limited in Iduindembo and Utengule villages. The bulk of pastoralists are small producers (about 80%), followed by medium producers (about 15%), with a small number of large producers (about 5%).</li> <li>• Restrictions on grazing in Ngapemba wetland have been relatively effective. This is largely due to the presence of the Ngapemba BMU (Beach Management Unit), who are quick to report offenders to the Utengule village government, and which imposes fines on offenders.</li> </ul>
Fishing	<ul style="list-style-type: none"> <li>• Fishing is carried out in permanent and seasonal rivers with important ones being Mnyera, Luhuji, Nyame, Mfugi and Ilembe. Wetlands are also important fishing areas, particularly Ngapemba and associated areas (for Utengule Iduindembo),. For Tanganyika the Mnyera River is the most important fishing ground, although KNS prohibits fishing in the more productive stretches. People from Ipinde do very little fishing.</li> <li>• Fishing is regulated at district level and requires a license from the fisheries office in Mlimba. In addition the yet to be constituted Ngapemba BMU also controls access and fishing activities.</li> <li>• There are three categories of fishermen: permanent fishermen who stay in fish camps all year round; seasonal fishermen who stay in fish camps seasonally; and village fishermen who do only occasional fishing mainly for food and do not stay in fish camps but in their households in their respective villages. Collectively, the fishing community was estimated to comprise about 50% permanent fishermen, 40% seasonal fishermen and 10% village fishermen.</li> </ul>
Conflicts	<ul style="list-style-type: none"> <li>• There are many points of conflict with Kilombero North Safaris and the MNRT hunting block.</li> <li>• People feel that there is no clear explanation as to how the hunting block was established, where the boundary should be, and what incentives should be provided to constituent and surrounding villages.</li> <li>• The major conflict concerning natural resources, for all villages, concerned restrictions against access and use of resources within the KNS hunting block. These include fishing, farming, grazing and settlement. Two years ago a significant portion of the area (on Utelgule village land) was cleared is now being farmed, Both Tanganyika and Ipinde villages complained that they are prohibited from fishing parts of the Mnyera and Ruhidji rivers.</li> </ul>



## 1.3 Data Collection and Quality Issues

A preliminary report was written in 2016 for the Ngapemba area which identified a number of information gaps. These included detailed information on ecological and sociological information and a field trip was carried out in the area during January 2018 to collect this information. A brief outline of the methodology is shown below and more details are available in the various sector reports (as annexes to this document),

Table 2: Data collection methods for the Ngapemba area	
Data Set	Comments
Botanical	Transect surveys through habitat types in January, 2018
Wildlife	Road strip counts and camera trap data in January, 2018. Secondary data from aerial surveys, quotas and utilisation of wildlife resources
Spatial Data	Remotely sensed image acquisition and analysis. Collection of public domain secondary datasets (e.g. relief, rivers etc)
Rapid Social Appraisal	PRA meetings and structured questionnaires. Data collected in January, 2018. Meetings held in Utengule, Idiudembo, Ipinde and Tanganyika villages. Two days were spent in each village: one, collecting information through a variety of PRA exercises and the other through carrying out Key Informant Interviews (KIIs) with village leaders and other resource use experts.

Interpretation of the situation on the ground was complicated by data quality issues, both for conservation and utilisation purposes and these are briefly described in the table below.

Table 3: Data quality concerns for the Ngapemba area	
Data Set	Comments
Landcover Data	Image analysis is about computerised interpretation of reflectance values from data taken from space. This backed up by ground truthing. It must be remembered that it is an interpretation of the reality. This project had access to several datasets that were used to develop the habitat maps and the draft boundaries for the Ngapemba area. These are as follows: <ul style="list-style-type: none"> <li>• 2014 Kilombero basin-wide interpretation from Landsat (GlobE Project)</li> <li>• 2015 Ramsar Site interpretation of 4 main classes from Sentinel 2 (SWOS, as part of this KILORWEMP project)</li> <li>• 2017 interpretation from Sentinel 2 as part of this KILORWEMP project</li> <li>• Bing 2013 imagery (online resource)</li> <li>• Google Earth 2013-2018 imagery (online resource)</li> </ul>
Village Boundaries	Two datasets are available. In 2016 KILORWEMP obtained a set of VSPs from the Survey Department of MLHSSD (see Land Diagnostic Report).  More recently the LTSP project under MLHSSD has produced a new survey dataset which shows significant differences from the previous dataset, specifically with respect to Iduudembo, but also with the boundaries of the other villages in the study area. KILORWEMP has been unable to establish the final status of tenure within this study period.

## 2 ECOLOGICAL ASSESSMENT

### 2.1 Vegetation

In order to gain a clearer understanding of the habitat types and vegetation within the Ngapemba area a study was carried out in January, 2018 using a transect based methodology in all the main habitat types.. The onset of the rains hampered accessibility and consequently a smaller area was investigated than had been planned. However, the "core area" of the Ngapemba (i.e. the Ngapemba, Ndolo and Mende/ Iyogowelo swamps/grasslands, adjacent miombo woodlands and riverine habitats were covered; see Annex x). In addition, a survey of a remnant of the Masagati Forest was also carried out. For the whole area, a total of 361 plant species were recorded within eight vegetation classes (see below).

- 113 trees
- 86 shrubs
- 9 climbers
- 62 herbs
- 21 sedges
- 16 lianas
- 1 fern
- 51 grasses

Ten plant communities were identified in two vegetation types

#### Wetland Communities

1. *Lagarosiphon-Ceratophyllum*
2. *Trapa-Lagarosiphon*
3. *Nymphaea- Trapa-Ceratophyllum*
4. *Vosia- Echnocloa- Polygonum*
5. *Cyperus- Panicum*
6. *Vertiveria-Panicum*

#### Miombo woodland Communities

1. *Brachystergia –Jubernadia* woodland
2. *Terminalia– Combretum* woodland
3. *Piliostigima thoringii* woodland
4. Masagati Forest.

These are summarised in the tables below and the full text of the vegetation survey is shown in annex 1

Table 4: Wetland plant communities in the Ngapemba area	
Community	Description
<i>Lagarosiphon-Ceratophyllum</i>	Dominated by <i>Lagarosiphon ilicifolius</i> and <i>Ceratophyllum demersum</i> which are submerged aquatic plants providing shelter and food for many freshwater fish and their food sources. They are critical for the recruitment and success of fish and invertebrate species with <i>C. demersum's</i> lime coated leaves providing secure attachment sites. These plants prefer aerated zones and are found just below the surface of water in areas with low light intensity. Individual plants can be longer than 3 metres. They have no roots but attach to the sediments and debris therefore requiring high flow levels.
<i>Trapa-Lagarosiphon</i>	Dominated by <i>Trapa natans</i> , <i>Lagarosiphon ilicifolius</i> and <i>Ceratophyllum demersum</i> . <i>Trapa natans</i> has a leafy cover that can prevent light from reaching the other species in the open water zones.

Table 4: Wetland plant communities in the Ngapemba area	
Community	Description
<i>Nymphaea- Trapa- Ceratophyllum</i>	Dominated by <i>Nymphaea nouchali</i> , <i>Trapa natans var.africana</i> , and <i>Ceratophyllum demersum</i> . These species are found in deeper open waters at Ngapemba, Ndolo and Shamba la Bibi swamps. <i>Nymphaea nouchali</i> is rooted in the substrate with elongated stalk which forms a single green leaf on the surface. The leafy cover of <i>Nymphaea nouchali</i> and <i>Trapa natans</i> provide good habitat and feeding areas for wetland birds and fish that feed upon invertebrates.
<i>Vosia- Echnocloa- Polygonum</i>	Dominated by <i>Vosia cuspidata</i> , <i>Echnocloa scabra</i> , <i>Polygonum senegalensis</i> , and <i>Mimosa pigra</i> (exotic) with a few individual of <i>Phragmites mauritianum</i> This community performs best on the edge of the open water body in deeper zones of the swamps and areas with a defined channel. The community is common in the perennial swamps particularly Ngapemba swamp, Ndolo and Mende. Other species that co-exist with this species include <i>Ipomoea aquatica</i> , <i>Aeschynomene uniflora</i> and <i>Ludwigia stolonifera</i> .
<i>Cyperus- Panicum</i>	Covering large proportion in the east and east-west of Shamba la bibi wetland, this community requires areas with permanent inundation. Common plant species included <i>Cyperus papyrus</i> , <i>Cyperus articulatus</i> , <i>Ludwigia stolonifera</i> , <i>Sesbania sesban</i> , <i>Polygonum senegalensis</i> , <i>Phragmites mauritianum</i> , <i>Leersia hexandra</i> , <i>Panicum maximum</i> , <i>Echnocloa scabra</i> , <i>Ipomoea aquatica</i> and <i>Alloteropsis cimicina</i> .
<i>Vertiveria- Panicum</i>	Covering the largest area in the Ngapemba wetlands this community is found in all swamps, flood plains and all flat land terrain of the lower elevation. The most dominant grass species are <i>Vertiveria nigriflora</i> , <i>Panicum maximum</i> , <i>Alloteropsis cimicina</i> , <i>Panicum subalbidum</i> and <i>Alloteropsis semialata</i> .

Table 5: Woodland plant communities in the Ngapemba area	
Community	Description
<i>Brachystegia – Jubernadia</i>	Dominant woodland type in the study area and also widespread throughout southern Tanzania. The most commonly represented plant species were <i>Jubernardia globiflora</i> , <i>Brachystegia longifolia</i> , <i>Brachystegia speciformi</i> , <i>Brachystegia bussei</i> and <i>Brachystegia boehmii</i> . Other species well represented in this community include <i>Pseudolachnostylis maprouneifolia</i> , <i>Pericopsis angolensis</i> , <i>Diplorhynchus condylocarpum</i> , <i>Combretum phragrans</i> , <i>Uapaca nitida</i> , <i>Terminalia ceresea</i> , <i>Stereospermum kunthianum</i> and <i>Crossopteryx febrifuga</i> .
<i>Terminalia– Combretum</i>	Found in the hillslopes adjacent to the wetland areas (e.g. air strip area). The major composition of this community includes <i>Terminalia brownii</i> , <i>Terminalia ceresea</i> , <i>Strychnos madagascariensis</i> , <i>Diplorhynchus condylocarpum</i> , <i>Dalbergia melanoxylon</i> , <i>Vitex mombasana</i> , <i>Combretum molle</i> , <i>Antidesma venosum</i> , <i>Pterocarpus angolensis</i> , <i>Annona senegalensis</i> , and <i>Maprounea africana</i> . The other species commonly co-existing with <i>Terminalia spp.</i> and <i>Combretum mole</i> include <i>Lannea fulva</i> , <i>Mytenus senegalensis</i> , <i>Bridelia cathartica</i> , <i>Holarrhena febrifuga</i> , <i>Gardenia luteola</i> , <i>Dichrostachys cinerea</i> and <i>Rhus natalensis</i> .

**Table 5: Woodland plant communities in the Ngapemba area**

Community	Description
<i>Piliostigima thoringii</i>	This vegetation types covers the largest portion between the Mnyera and Ruhuji Rivers and south of Mende and Iyogowelo flood plains. It also covers most of the riverine corridor along the Mnyera River. Dominated by <i>Piliostigima thoringii</i> which may co-exist with other trees such as <i>Annona senegalensis</i> , <i>Kigelia Africana</i> , <i>Ficus sycomorus</i> , <i>Syzygium guineense</i> , <i>Acacia xanthophloea</i> , <i>Albizia gummifera</i> , <i>Vitex doniana</i> , <i>Fluegea vilosa</i> , <i>Trichilia emetica</i> , <i>Vangueria infausta</i> , <i>Voacanga Africana</i> , <i>Barringtonia racemosa</i> , <i>Cassia abbreviata</i> and <i>Monanthonotaxis buchananii</i>
Masagati Forest.	Masagati Forest is the only remnant patch of the former extensive lowland forest cover that extended to the Udzungwa Scarp. Lack of protection led to the decimation of this forest with only a few remnant patches remaining. One of these was investigated and the following species identified <i>Antiaris toxicarya</i> , <i>Millicia excelsa</i> , <i>Sena siamea</i> , <i>Dichapetalum edule</i> , <i>Dioscorea buchananii</i> , <i>Dialium holtzii</i> , <i>Rothmannia fischeri</i> , <i>Rothmannia engleriana</i> , <i>Monanthonotaxis</i> , <i>Monodora minor</i> , <i>Millettia usaramensis</i> , <i>Landolphia kirkii</i> , <i>Erythrophloem africana</i> , <i>Erythrocephalum minus</i> , <i>Dombeya rotundifolia</i> , <i>Khaya antheotheca</i> , <i>Psychotria goetzei</i> , <i>Grewia forbesii</i> , <i>Sorindeia madagascariensis</i> , <i>Afzelia quanzensis</i> , <i>Tectona grandis</i> , <i>Tetracera litoralis</i> , <i>Dalbergia obovata</i> and <i>Dalbergia boehmii</i> .

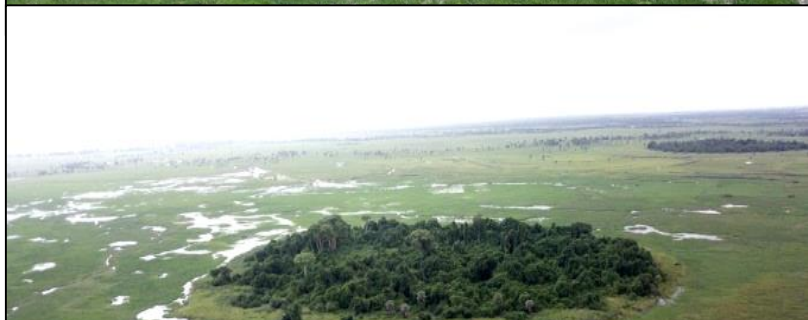
**Table 6: Key botanical elements in the Ngapemba area**

Aspect	Description
<b>Diversity Index</b>	<p>The diversity of plant species varied among sites ranged between 2.0 and 3.4 in the wetland areas with the highest index in data from Ndolo (<math>2.969 \pm 0.153</math>) and Ngapemba wetlands (<math>3.267 \pm 0.128</math>) using the Shannon Diversity Index. The diverse wetland macrophytes are ecological important in this ecosystem because they provide important habitats for aquatic and terrestrial fauna and therefore are critical to the recruitment success of some fish species resident to the rivers and perennial swamps.</p> <p>The species diversity in the woodlands were in a range between 2.0 and 3.44 with highest diversity recorded in Mende woodlands (<math>3.350 \pm 0.093</math>) and Masagati Forest (<math>3.311 \pm 0.067</math>) The terrestrial-wetland ecotone contains conditions that favoured co-existence of both wetland and the terrestrial plants resulting into high richness and diversity in some swamps.</p> <p>Typical values are generally between 1.5 and 3.5 in most ecological studies, and the index is rarely greater than 4. The Shannon index increases as both the richness and the evenness of the community increase.</p>
<b>Medicinal Plants</b>	A number of plants found in the study area are medicinal; however 15 plant species are used by the local communities as fruits and vegetables
<b>Invasives</b>	<i>Pistia stratiotes</i> and <i>Mimosa pigra</i> identified in the study area are invasive in the wetlands.
<b>Conservation Significance</b>	Large number of plant species identified in the study area has high conservation significance which include, three orchid species to include <i>Eulophia angolensis</i> , <i>Disa concinna</i> and <i>Cyrtorchis arcuata</i> listed in Appendix II of CITES, 21 plant species are endemic to the <i>Zambeziyan phytochorion</i> and 17 IUCN threatened plant species. High composition of plant species with different conservation status form the basis of intensified conservation in Ngapemba area



**Table 6: Key botanical elements in the Ngapemba area**

Aspect	Description
<b>Disturbance</b>	The field observation showed that anthropogenic disturbance and level of inundation determined the vegetation pattern in the Ngapemba area. The ecological conditions associated with degradation of Ngapemba wetland vegetation, encroachment in the woodlands, deforestation of Masagati, loss of endemic and threatened species, loss of local aquatic biodiversity and invasive species have been highlighted



Ngapemba Wetland



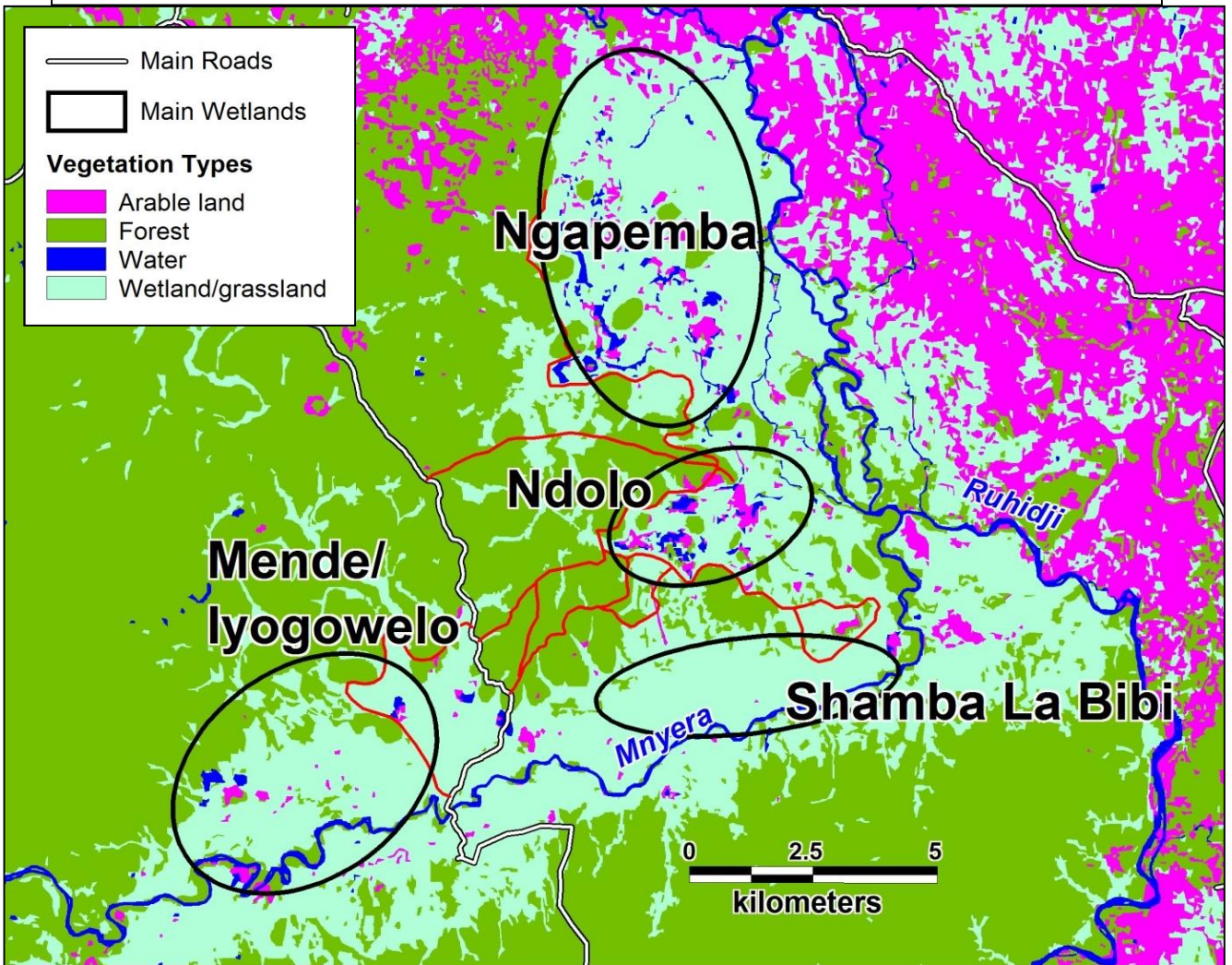
The *Vertiveria-Panicum* community in Ngapemba wetlands:  
(The deep green represents *Vertiveria nigriflora* and the pale green represents *Panicum maximum*, *Alloteropsis cimicina* and *Alloteropsis semialata*)



Miombo woodland with drainage line



Ngapemba area showing location of main wetlands, forest, grassland and cultivation



Mnyera River





## 2.2 Wildlife

### 2.2.1 Summary

The area has significant wildlife populations, especially in the vicinity of the Ngapemba/Ndolo swamps and along the main rivers (Mnyera, Ruhiji and Pitu). Puku are common and are often found in the miombo woodlands. This area can be regarded as one of the strongholds for puku in Tanzania. A range of other species are found in the area and include elephant, buffalo, waterbuck, hartebeest, eland, sable and roan. The protection provided by the hunting company has led to increases in all species in the area (Kilombero North Safaris).

As part of the Integrated Management Plan process under the KILORWEMP project a wildlife and bird survey was carried out in area north of Mnyera river during January 2018. A combination of methods were employed - ground counts, road transects and camera traps. Descriptive and spatial analysis were conducted using various software mainly Microsoft office, R for distance and QGIS. Animal population estimate was conducted only for Puku that had enough samples to produce estimate while for the other species their encounter rates (frequency) were very low. The Ngapemba conservation area was calculated using QGIS and then stratified to Puku areas only especially reducing the area toward high woodland that resulting to 174km<sup>2</sup>.

**Puku estimate:** Our result indicated that there is an estimated of 5032, 95% CI (2703.079 to 11081.45) with average of 4 individuals per group.

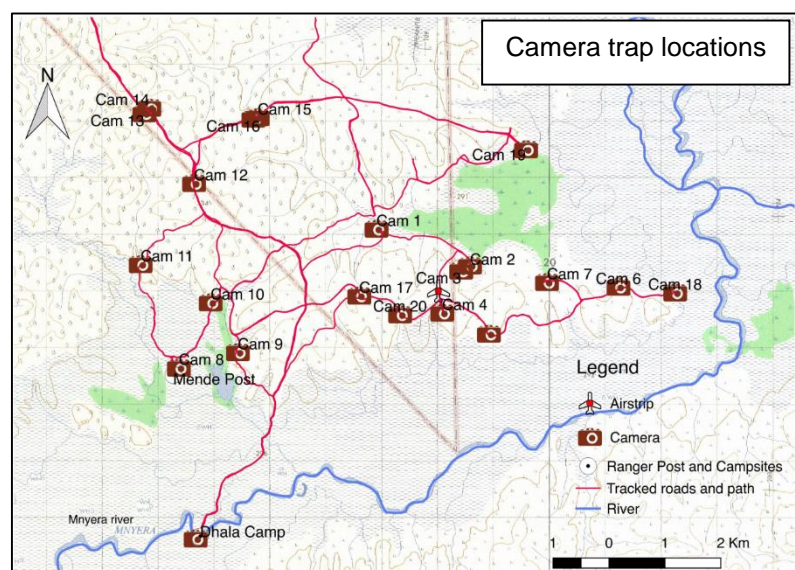
**Species richness:** In camera trap a total of 13 species were recorded include leopard, elephants and bushy tailed mongoose. During the road count only seven species were recorded and only one that was not in the list of camera trap i.e., Buffalo.

**Birds:** The Ngapemba area is rich in bird species, while we covered less than 300km<sup>2</sup> during the survey, a total of 164 species were recorded, which is about 44% of all species in the Kilombero valley.

### 2.2.2 Large Mammals

#### Camera Traps

A total of 13 species were captured in camera traps. The species belong from 10 families (Tables x), of which three species are vulnerable i.e., elephant, leopard and hippo and one near threatened (Puku) category of the Red list of IUCN. Puku and warthogs were the dominant species seen in camera traps at least 25% of the camera captured Puku and 20% captured warthogs.



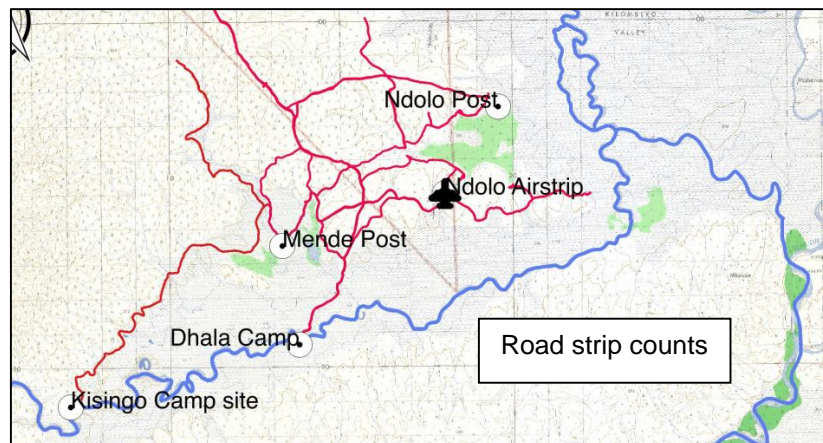


**Table 7: Conservation Status of some Wildlife Species found at Ngapemba**

Species identified	Scientific Name	IUCN
African elephant	<i>Loxodonta africana</i>	Vulnerable
Leopard	<i>Panthera pardus</i>	Vulnerable
Hippopotamus	<i>Hippopotamus amphibius</i>	Vulnerable
Puku	<i>Kobus vardonii</i>	Near Threatened
Bush/Common duiker	<i>Sylvicapra grimmia</i>	Least Concern
Common Waterbuck	<i>Kobus ellipsiprymnus ssp. ellipsiprymnus</i>	Least Concern
Vervet monkey	<i>Chlorocebus pygerythrus</i>	Least Concern
Yellow baboon	<i>Papio cynocephalus</i>	Least Concern
Bush tailed Mongoose	<i>Bdeogale crassicauda</i>	Least Concern
Helmeted guinea fowl	<i>Numida meleagris</i>	Least Concern
Common Warthogs	<i>Phacochoerus africanus</i>	Least Concern
Large spotted genet	<i>Genetta maculata</i> (	Least Concern
Cape Porcupine	<i>Hystrix africaeaustralis</i>	Least Concern

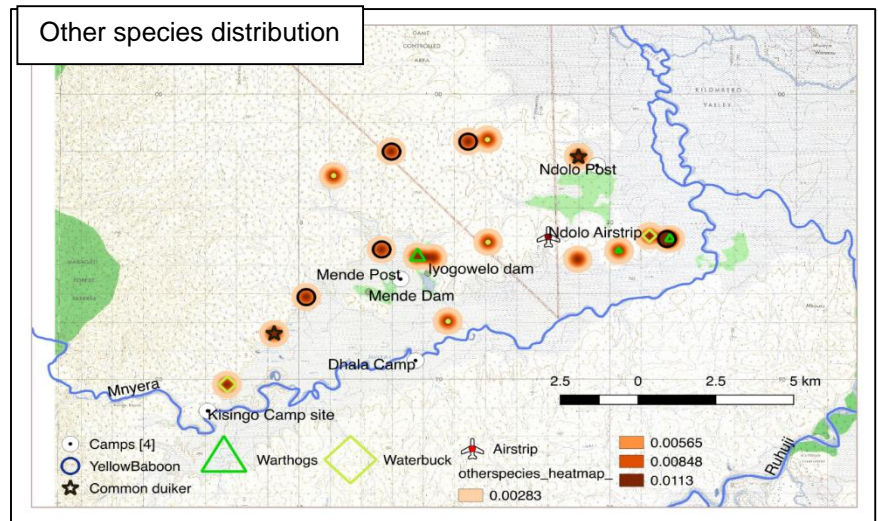
### Road Strip Counts

The Mnyera and Ruhuji rivers form the main water system of the “Ngapemba area”, which then subdivided the area into two main parts that accessibility depends on the water level in the rivers. The area north of Mnyera River is considered the Puku reserve, while the areas south of Mnyera are the most pristine but very few Puku. The south of Mnyera, according to the local knowledge, is rich in many other wildlife species including but not limited to sable, hartebeest, elephants, reedbuck, waterbuck, etc.



### 2.2.3 Distribution of Wildlife other than Puku

Other wildlife species were widely distributed in the Ngapemba area from swamps to woodland habitat but in small groups (Figure 6). The flight distance was high to all species and was even extreme to buffalo.

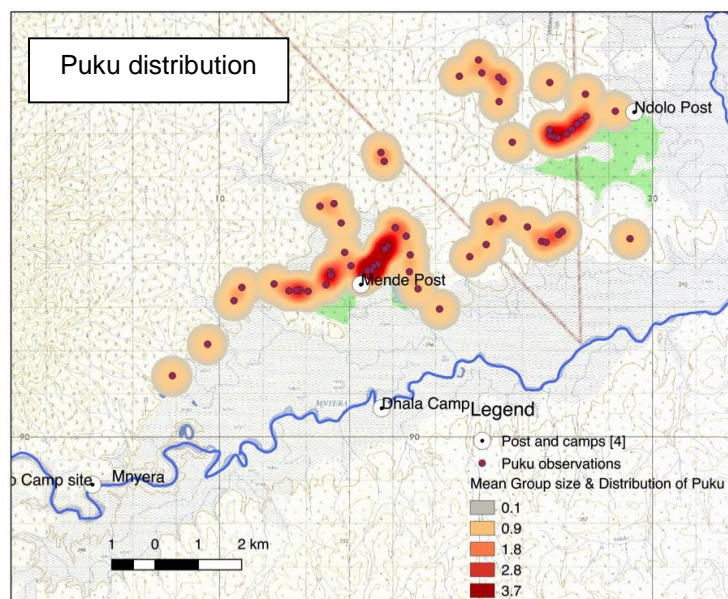


### 2.2.4 Puku

From the survey data, only puku had enough incidences to generate estimates while the rest of the species had less than 10 observations, and calculating estimates need at least 30 observation.

Puku were the most abundant animal species where a total of 279 individuals were counted in 69 incidents in 70 km line, for the area north of Mnyera River. Using R distance, the effective strip width was 58m at half norm distribution that generated with high AIC value, while auto fit the model generated less AIC value.

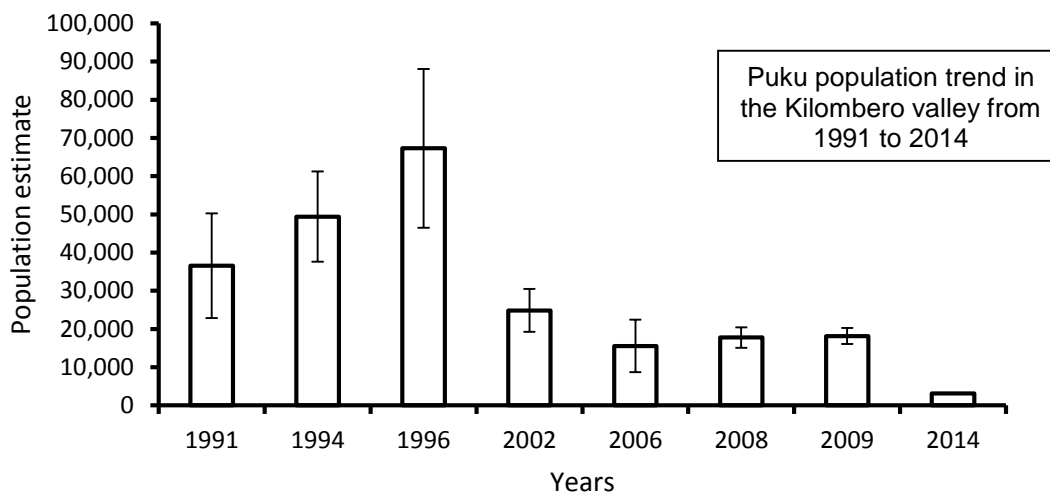
It is estimated a total of 5,032; 95% CI (2703.079 to 11081.45) puku in an area of 174 km<sup>2</sup>. The estimate in R uses half normal model (AIC=508), which had lower AIC value than hazard rate model (AIC 509).



#### Puku Population Trend

Puku has been one of the focal points for conservation priorities in the Kilombero valley due to its global importance of the species in the area. However, the long-term data are showing the worse trend in history of puku conservation due to expansion of human activities in the valley resulting in the collapse of the puku in 2014

In 2014 the aerial survey had only three incidents of count Puku on transect (inside streamer) and two events outside streamers. The counted puku were in Mende and Ndolo, which is the current stronghold of the Ngapemba areas. On ground count we had 69 counting events, and these data indicate that Puku has changed its ranging behaviour to also use woodland areas which could account for the low sightings as the aerial survey was focused on open grassland areas.



## 2.2.4 Birds

Kilombero valley has a rich habitat supporting both resident and migratory bird species; and endemic birds such as the “Kilombero weaver”, and the two warblers under scrutiny of species taxonomy i.e., “Kilombero cisticola” and “White-tailed Cisticola” (Rannestad et al. 2015). Kilombero valley records a total of **372** bird species, with at least known 17 trigger species for which the site has been recognized as an Important Birds and Biodiversity Area (IBA) (Rannestad et al. 2015).

This study found that the Ngapemba area is rich in bird species with a total of 164 birds species recorded. This is around 44% of all birds found in the Ramsar.

**Birds of Prey:** Among the 164 species, nine were birds of prey, which included African fish eagle, Palm-Nut Vulture, White backed vulture, and Bateleur. Others were Osprey, Eurasian marsh harrier, African Hawk eagle, Lizard buzzard and Amur Falcon.

**Game birds:** On game species that are commonly hunted or quota issued in the Kilombero Valley nine species were identified which are Red necked spurfowl, Helmeted guinea fowl, Crested francolin, Common quail, Doves (Ring necked dove & Emerald spotted wood dove), Pigeons (African green pigeon), and ducks (White faced whistling duck, & White faced tree duck).

**Trigger Species:** Kilombero valley has 17 trigger species of the Kilombero IBA; two species were identified in the Ngapemba area - the Kurrichane Thrush (*Turdus libonyanus*) and Shelley's Sunbird (*Nectarinia shelleyi*). As the entire Ngapemba area was not covered due to poor accessibility (rainfall and high water in the flood plain), there might be more trigger species in the area.

Madagascar Pond-heron (*Ardeola idea*) and Kilombero weaver (*Ploceus burnieri*) are species of global concern that are found in the Kilombero valley and Serous Game reserve IBA. These species were not encountered during the survey but due to increased human activities in the Kilombero valley, the Ngapemba area provides refugees for a large number of bird species and they will be there..



Hippo



Puku



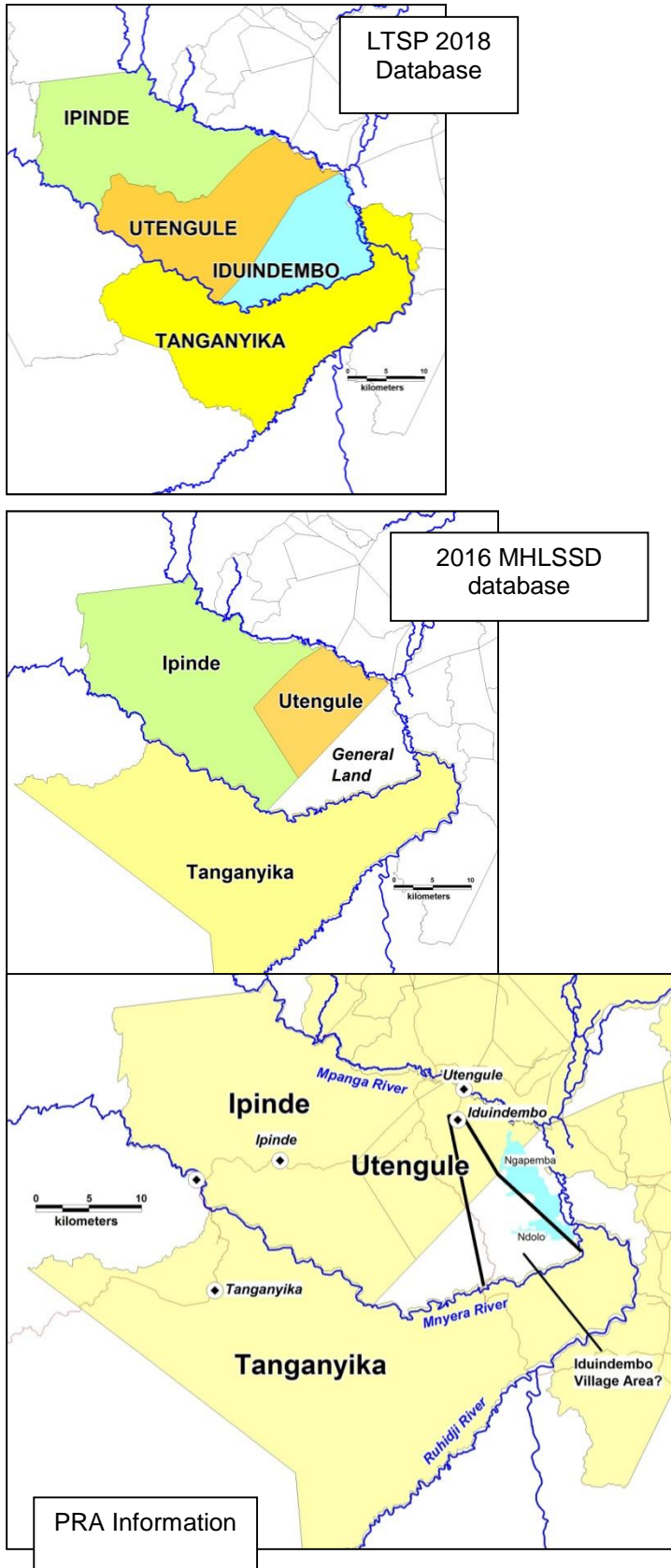
Common Duiker



Bushy Tailed Mongoose

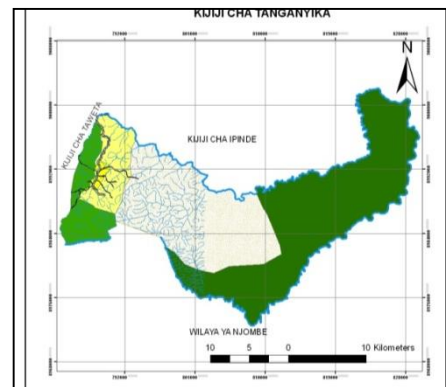
### 3 LAND TENURE ASSESSMENT

#### 3.1 Land Tenure



During the study period, this assignment has been unable to reach a final confirmation of the status of the village boundaries

The current land regularization exercise under MLHSSD is resurveying village boundaries. Initial evidence collected during the study suggests that significant variations arise compared to a dataset of village survey plans obtained from MHLSSD during early 2016. Likewise, this study has been unable to confirm the existence of VLUPs for the villages.



Utengule was first settled in 1900 followed by Ipinde and Tanganyika in the 1950s. Iduindembo has variously been described as a village sub-division and also as a newly registered village. However, the situation is far from clear.

The recent PRA carried out by this project shows the area defined by the villagers as being Iduindembo (see opposite).



## 3.2 Village Land Use

- Land categories and land use.
- Land occupancy/ ownership.
- Access to land.
- Land management.
- Land conflicts (other than those with KNS).
- Trends.

**Table 8: Land**

Aspect	Description
Land categories and land use.	<p>Land categories are common across all villages. In accordance with the Village Land Act No. 14 of 1999, the main land types are occupied land in the form of settlements (household plots, also institutions, commercial use and burial areas), farm land, reserved land in the form of forests and wetlands, grazing land, and land set aside for future use.</p> <p>The three villages of Ipinde, Utengule and Iduindembo each have a village land use plan (VLUP) in process, but not yet completed. In Tanganyika the VLUP is completely non-existent. However, we have a LUP map for Tanganyika but have been unable to locate those for the other three villages</p> <p>Including areas currently under management by KNS, three of the villages are dominated by reserved land (forests and wetlands) as follows: Tanganyika (80%), Iduindembo (60%) and Utengule (50%), whereas farms are the largest land category for Ipinde (35%). Among the three villages with land use plans, the area of land set aside for future use varies from 15% for Ipinde, to 5% for Utengule to nil for Iduindembo, reflecting increasing levels of land scarcity.</p>
Land occupancy/ ownership.	<p>Land ownership and management differs depending on land categories: Farms and household plots are privately occupied and managed by the household members. For privately owned land (settlements and farm lands), the main owners of the rights are men. Management activities are divided between men and women. For example, in crop farming men do slashing to clear the fields, while women and children do planting and weeding, and all members contribute towards harvesting. This was common across all four villages.</p>
Access to land.	<p>Land acquisition and access to natural resources is the same across all four villages. The village government is responsible for allocating land for settlements (for use as household plots, home gardens and grave yards), for fields, for the grazing of livestock (free access by livestock keepers), and for deciding on the allocation of lands reserved for future use. Access to household plots and farms can also be achieved through inheritance and purchase. For natural areas such as rivers, wetlands and forests, use of resources such as fish, timber, poles, firewood and charcoal is regulated through permits, in some cases issued by the Village Government, in others by the District Council</p>
Land management	<p>In all four villages, the land is managed by the Village Government. Within the Village Government, the main body responsible for land management is the Village Council and its constituent Land Committee. The procedure is that applicants send their applications for the use of land to the Village Government; these are assessed by the Land Committee and Village Council, and successful applicants are recommended to the Village General Assembly for final approval. The General Assembly is the highest decision making body for land allocation and no land is allocated without being approved by the General Assembly. This process of land management is common to all three villages, other than Tanganyika Village where these rules are not in operation. In Tanganyika the land is allocated informally following traditional rules and mainly through inheritances and in few cases purchase from individual owners.</p>

**Table 8: Land**

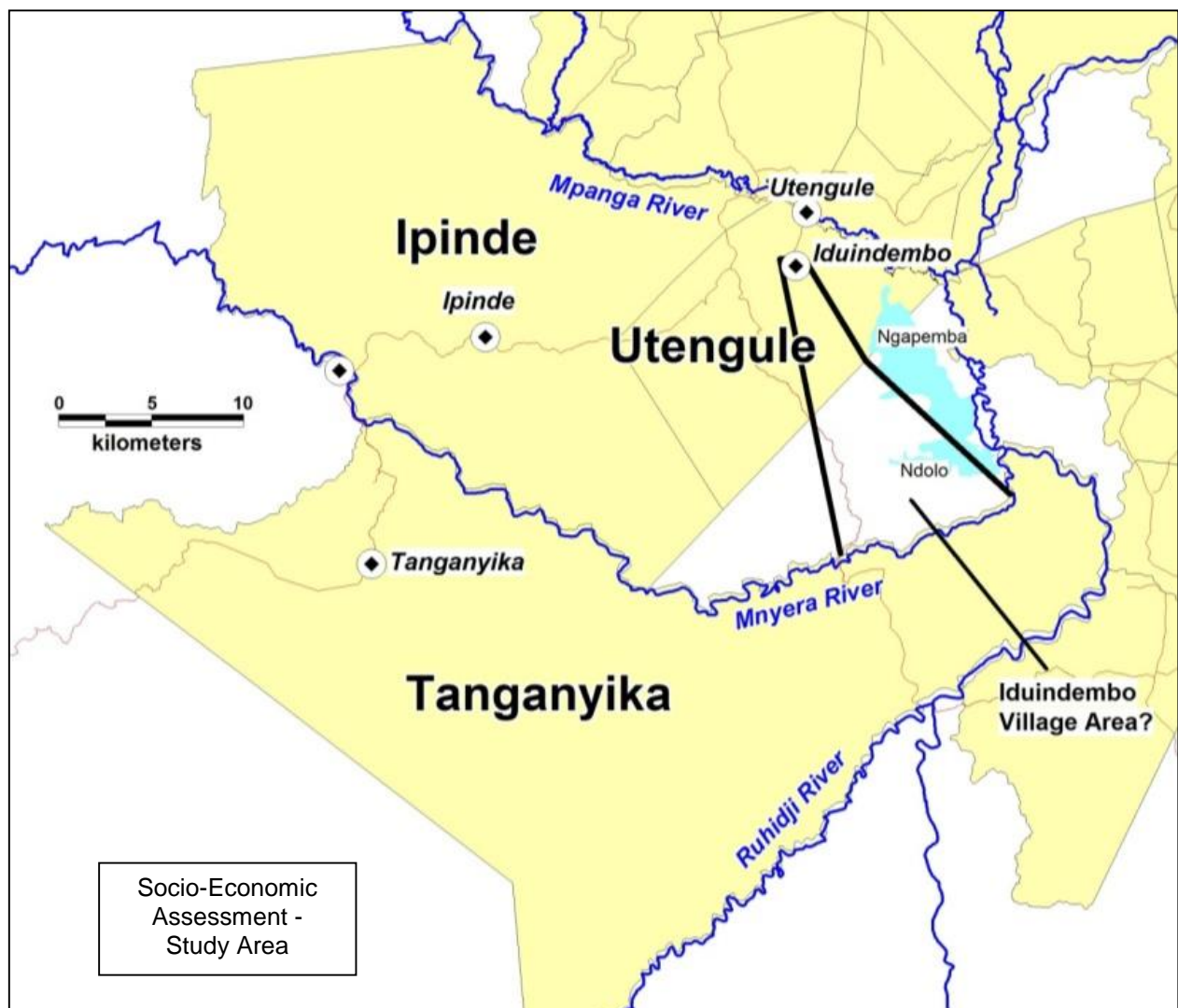
Aspect	Description
Land Conflicts	<p>Additional conflicts, of lesser importance, occur between farmers and also with livestock keepers. Such conflicts about lands, especially those between villagers, are usually settled in the village. The main village organ for conflict resolution is the Village Land Council; if the matter cannot be resolved it is transferred to the higher Ward Land Council for settlement; and if that fails the case is taken to court of law division of Land for judgement.</p> <p>People who transgress rules are usually warned or fined at village level. The magnitude of the fine depends on the fault committed, but normally ranges from TZS 20,000 to TZS 50,000. Those who are taken to the ward level can be recommended to the court for jailing or are sometimes fined.</p>
Trends.	<p>Trends relating to land availability and use were consistent across all four villages. Land is perceived as becoming increasingly scarce and this is predicted to continue. Due to growing populations, fuelled in part by migration, demand for land is expected to continue to grow; increased land will be required for settlements and farms and access to such land will become increasingly difficult. As additional land is converted to farms and settlements remaining land for grazing and forests will diminish. The frequency of land conflicts, in particular, is predicted to escalate dramatically. In Iduindembo, there were reported to already be many people who want to farm but lack the land to do so.</p>

## 4 RAPID SOCIAL ASSESSMENT

The Assessment was carried out through a PRA process and semi-structured interviews in the four villages affected by the current hunting block or the proposed conservation area. The villages are Ipinde, Tanganyika, Utengule and Iduindembo. The status of the village boundaries, the village survey plans and the land use plans is somewhat confused with different versions existing.

The PRA and structured interview process results are presented in the five main thematic areas in this section. The information pertaining to land is presented in that section.

- Demography
- Natural Resources
- Farming
- Livestock
- Fishing
- Wildlife



## 4.1 Demography

Table 9: People and Settlement	
Aspect	Description
History of settlement.	Utengule is the oldest village, being first settled in about 1900 followed by Tanganyika and Ipinde in the 1950s. All three villages were formalised under operation "Sogeza" during 1974. Iduindembo was first settled in 1974 as a hamlet of Utengule, and was only registered as a separate village in 2014 (and under rather unclear circumstances).
Ethnic groups and migration	<p>The estimated ethnic composition over all four villages is roughly Wabhena 60%, Sukuma 30% and other groups 10% (including Wangoni, Wandamba and Wahehe). Wabhena are dominant in all four villages, followed by Sukuma for Ipinde, Utengule and Iduindembo, and for Tanganyika, Ngoni.</p> <p>The in-migration by Sukumas has been relatively recent and rapid, starting around the mid 1990's and they now account for about 30% of the overall population for Utengule and Iduindembo, 13% for Ipinde and &lt;10% for Tanganyika. In-migration has been a strong contributor towards the growing scarcity of land across all four villages.</p>
Population and land pressure.	The current population for <b>Ipinde is 4,500</b> , for <b>Tanganyika 4,000</b> , for <b>Iduindembo 2,600</b> and for <b>Utengule 2,200</b> (based on village records). Land pressure, is lowest for Tanganyika, followed by Ipinde, then Utengule, and highest for Iduindembo.
Village development.	Utengule is the best developed village (having a road, primary school, health dispensary, electricity and cell communication), although everything is in bad condition. Infrastructure in all villages poor and Tanganyika has no power and a shocking access road.
Village governance	Access to natural resources such as land, rivers, fishing grounds forests and wildlife are mediated by different institutions, which include Village Councils, the District Council and respective committees or offices.

## 4.2 Natural Resources

Table 10: Natural Resources	
Aspect	Description
Occurrence and use of natural resources.	<p><b>Land, forests and water</b> are the key natural resources across all villages. Other commonly used resources include firewood, charcoal, timber, traditional medicines, wild fruits, wild vegetables, mushrooms, wildlife, fish, honey, bamboo, grass (<i>milulu</i>), palm leaves, reeds (<i>malala</i>), sedges (<i>mitete</i>) and sand.</p> <p>Forests occur among farms in settled areas, and particularly within the KNS hunting block. Tanganyika is particularly well endowed with forest resources, while Iduindembo has virtually no remaining forests outside of the KNS. Most wildlife is largely confined to the KNS hunting block. In all villages, wildlife is hunted for meat and for selling.</p> <p>Tanganyika comprises particularly broken and hilly terrain with narrow intervening valley areas; Ipinde is intermediate; while Iduindembo and particularly Utengule comprise gentler terrain with much more expansive lowland areas</p> <p>.The availability of natural resources is perceived to have declined greatly over the last 20 years, due to population growth, habitat decline due to the conversion of forests and wetlands to farms, and increased demand for resources; and this trend is expected to continue.</p>

**Table 10: Natural Resources**

Aspect	Description
Management of natural resources.	In all villages there are regulations and bylaws that govern access to timber, wildlife and fish resources as well as management of forests and water resources. In general, there are no regulations governing access to natural resources, such as water, wild fruits, vegetables, mushrooms, tubers, bamboo, grass, reeds, sedges and sand, although no resources can be harvested from within the KNS area without a permit.
Conflicts over natural resources.	<p>Except for Ipinde, the three other villages all have boundary conflicts with neighboring villages. Also, all villages had issues with farm boundaries among themselves. Other conflicts were between farmers and pastoralists, and pastoralists and fishermen (Utengule Village).</p> <p>Major constraints concerning access to natural resources were:</p> <ul style="list-style-type: none"> <li>• lack of rights to sell land;</li> <li>• restrictions against encroaching into the KNS area and Ndefi Forest;</li> <li>• restrictions on fishing access within the KNS area (Tanganyika/ Ipinde);</li> <li>• difficulties in obtaining permits for commercial exploitation of timber</li> </ul>
Degradation of natural resources.	<p>The main causes of degradation were reported to be</p> <ul style="list-style-type: none"> <li>• cultivation around water sources for rice production;</li> <li>• uncontrolled cutting of trees/clearing of land for fields,</li> <li>• uncontrolled grazing of livestock, particularly around Ngapemba wetland.</li> </ul> <p>Resulting impacts include the drying of water sources; decrease in water flows; were impaired water quality; destruction of forests and reduced forest resources; reduced wildlife habitat and decrease in wildlife populations; destruction of crops by livestock; reduced fish populations.</p>

### 4.3 Livelihoods

**Table 11: Livelihoods**

Aspect	Description
General	<p>Farming is by far the most important livelihood activity in all villages.</p> <p>Livestock production is the second most important livelihood activity; for Iduindembo and Utengule livestock production is dominated by cattle, goats and sheep; Ipinde has just a few cattle and these are absent from Tanganyika, such that chickens are the most important animals in these villages.</p> <p>Fishing is common in Iduindembo, Utengule and Tanganyika, but not for Ipinde (due to restrictions against fishing within the KNS area).</p>
Farming	<p>Farming is practiced by all households across all villages. Most farmers cultivate less than 10 acres, but there is a minority of households who cultivate larger areas (10-30% of households, and who are often Sukumas). All villages have a mixed farming system whereby crops are grown in upland areas during the rainy season, but for the intervening lowland areas it is possible to grow crops throughout the year.</p> <p>The main food crops are rice and maize, and together with sesame these are also the main cash crops. Most crops are sold in the villages to traders, although some farmers take their produce to Mlimba for storage so as to take advantage of higher prices that prevail later in the season.</p>



**Table 11: Livelihoods**

Aspect	Description
	<p>Other than Tanganyika, people no longer practice shifting cultivation (due to land limitations) and there has been a move away from previous multi-cropping to mono-cropping. Expansion of fields is being further fuelled by a growing shift from subsistence towards a more commercial approach to production.</p> <p>The use of draft animals for ploughing is increasing rapidly, including among small farmers (other than Tanganyika where there are few cattle ). This enables cultivation of larger areas and is fuelling growth in the number of cattle producers and thus cattle populations.</p> <p>The main constraints to farming concern access to support services such as finance, inputs, storage facilities, markets and extension services; additional constraints include crop diseases and, for Tanganyika, losses to wildlife.</p> <p>Farming is recognized as causing significant environmental impacts in the form of land conversion, deforestation and desertification, as well as siltation, reduced water flows and pollution of water sources (due to the use of herbicides).</p> <p>Land pressure is already leading to a decline in the size of individual fields (other than for Tanganyika), and decreased yields per unit area, due to continuous cultivation in the same fields and a resulting loss of soil fertility and increase in crop diseases.</p>
Livestock production	<p>Chickens are kept by virtually all households in all villages; Ipinde has a few cattle, and for Utengule and Iduindembo the dominant livestock are cattle, sheep and goats. The bulk of livestock producers in Utengule and Iduindembo (80%) are small pastoralists (&lt;10 animals); some 15% are medium pastoralists (10-50 or 100 animals) and 5% are large pastoralists (with &gt;100 animals).</p> <p>Pastoralists from Utengule and Iduindembo use common grazing areas and water points for cattle (formerly these were one village); grazing being mainly in the uplands in Iduindembo during the rainy season and predominantly in the lowlands in Utengule during the dry season.</p> <p>The main livestock products are live animals, meat and milk, and cultivation services. Village governments do have rules concerning restrictions on numbers of animals per household, but are not able to enforce these. Restrictions against grazing around Ngapemba wetland are effective, due to the protection provided by KNS and the Ngapemba BMU (Beach Management Unit).</p> <p>The shortage of grazing areas is the principal challenge facing pastoralists in Utengule and particularly Iduindembo. For Tanganyika and Ipinde, the main challenge is poultry diseases (Newcastle disease), coupled with the absence of veterinary support and difficulties in accessing veterinary products.</p> <p>Other than Tanganyika, where the terrain is marginal for cattle, the numbers of small pastoralists and cattle populations are predicted to continue increasing, driven by population growth and increasing demand for cattle for draft animals.</p>
Fishing	<p>Fishing is mainly carried out by people from Utengule, Iduindembo and Tanganyika villages; Ipinde has very few fishermen.</p> <p>The fishing community is dominated by Wangoni, Wabena and Wandamba peoples. Across the four villages the fishing community is estimated to comprise 50% fishermen who stay permanently in camps; 40% who stay seasonally in camps and 10% who stay in villages.</p>

**Table 11: Livelihoods**

Aspect	Description
	<p>Fishing is mainly carried out in rivers and wetlands. Ngapemba wetland is the main fishing area for Utengule and Iduindembo villages, and the Mnyera River for Tanganyika village. Gill netting is the predominant fishing method used, followed by the use of hooks and bait.</p> <p>In order to fish, or trade in fish, it is necessary to have a license, which is obtained from the Fisheries Officer based in Mlimba. Enforcement of fishing rules is weak except within the Ngapemba BMU and the KNS hunting area. KNS restrict people from fishing in parts of the Ruhidji and Mnyera Rivers, and this is a principal cause of conflict, particularly with Ipinde and Tanganyika villages.</p> <p>For Utengule and Iduindembo the number of fishermen was reported to be increasing and to be leading to a decline in fish availability and catches; for Tanganyika, due to protection provided by KNS, the number and size of fish in the Mnyera River was reported to be increasing.</p>

## 4.4 Wildlife

**Table 12: Wildlife**

Aspect	Description
<p>Occurrence of wildlife.</p>	<p>For all villages, most wildlife species were reported to be found in the KNS hunting block. Some smaller species are found in remnant forest patches near farms, such as baboons, wild pigs and cane rats. Illegal use of wildlife for meat and income was reported for all villages.</p> <p>Tanganyika seems to have more wildlife than the other villages, apparently due to the larger extent of undisturbed wildlife habitat in this village.</p> <p>Crop raiding is the main form of Human Wildlife Conflict (HWC) for Tanganyika, Ipinde and Utengule, and is particularly severe for Tanganyika; the main species involved are baboons, monkeys and rats.</p> <p>For Iduindembo, the main form of HWC is the loss of livestock to lions.</p> <p>Across all villages, wildlife populations of all species have declined markedly over the last 20 years, and this is expected to continue. The main drivers of change are human population growth and the expansion of farms resulting in loss of habitat for wildlife, coupled with increased levels of poaching.</p> <p>The frequency of eating bush meat was also reported to have declined, since wildlife is no longer readily available and because of enhanced protection measures by KNS in the hunting block.</p>
<p>Management and use of wildlife.</p>	<p>Wildlife resources are managed by the central government through the District Council (District Game Officer) who issues hunting permits to residents, provides technical advice to villagers, demarcates boundaries and educates villagers on wildlife matters. However, the most effective protection body on the ground is KNS who manage and protect the area within the hunting block.</p> <p>All villages access wildlife illegally from the farms and forests, including from within the KNS area. This is used as a source of meat and income, through sales of meat</p>

**Table 12: Wildlife**

Aspect	Description
	<p>within the villages. There have been some incidences of people caught and beaten while hunting wildlife in KNS hunting block. It was also acknowledged that without the protection provided by the KNS all wildlife would rapidly be depleted from the area.</p> <p>The villages of Tanganyika, Ipinde and Utengule have received some wildlife-based income and support from KNS. In Tanganyika KNS has supported construction of the school (classrooms), village government office, the dispensary, bridges, and has provided desks for the school and sporting equipment. For Ipinde, KNS has supported renovation of teachers' house and the village government office, and also compensated 6 million TZS to each household whose houses were mistakenly burnt near the KNS in 2013. Utengule Village has received 7.4 million TZS of which 2 million was used to build a doctors house. Iduindembo has not received any support from KNS, partly because it is a new village.</p> <p>Despite the support received, the villagers perceived it as being very small, unpredictable, and lacking in transparency at all levels, particularly as to what amounts of benefits they should receive, and concerning the flow of money from KNS to the district level and then back to the village.</p>
<p>Threats to wildlife</p>	<p>The major threats to wildlife were seen to be encroachment into, and continued reduction of wildlife habitat, coupled with continued poaching. Other less important perceived threats were forest fires and growth of cattle populations.</p> <p>The perceived trend in all villages is that wildlife populations of all species have declined greatly over the past 20 years and will continue to do so. This was ascribed to more people and more clearing of forests for farms, leading to decreased habitat for wildlife, coupled with an increase in poaching.</p> <p>People are concerned about the environment and wildlife and there was a sentiment that wildlife should remain but that there needs to be more community participation in the management and protection of the KNS hunting block.</p>

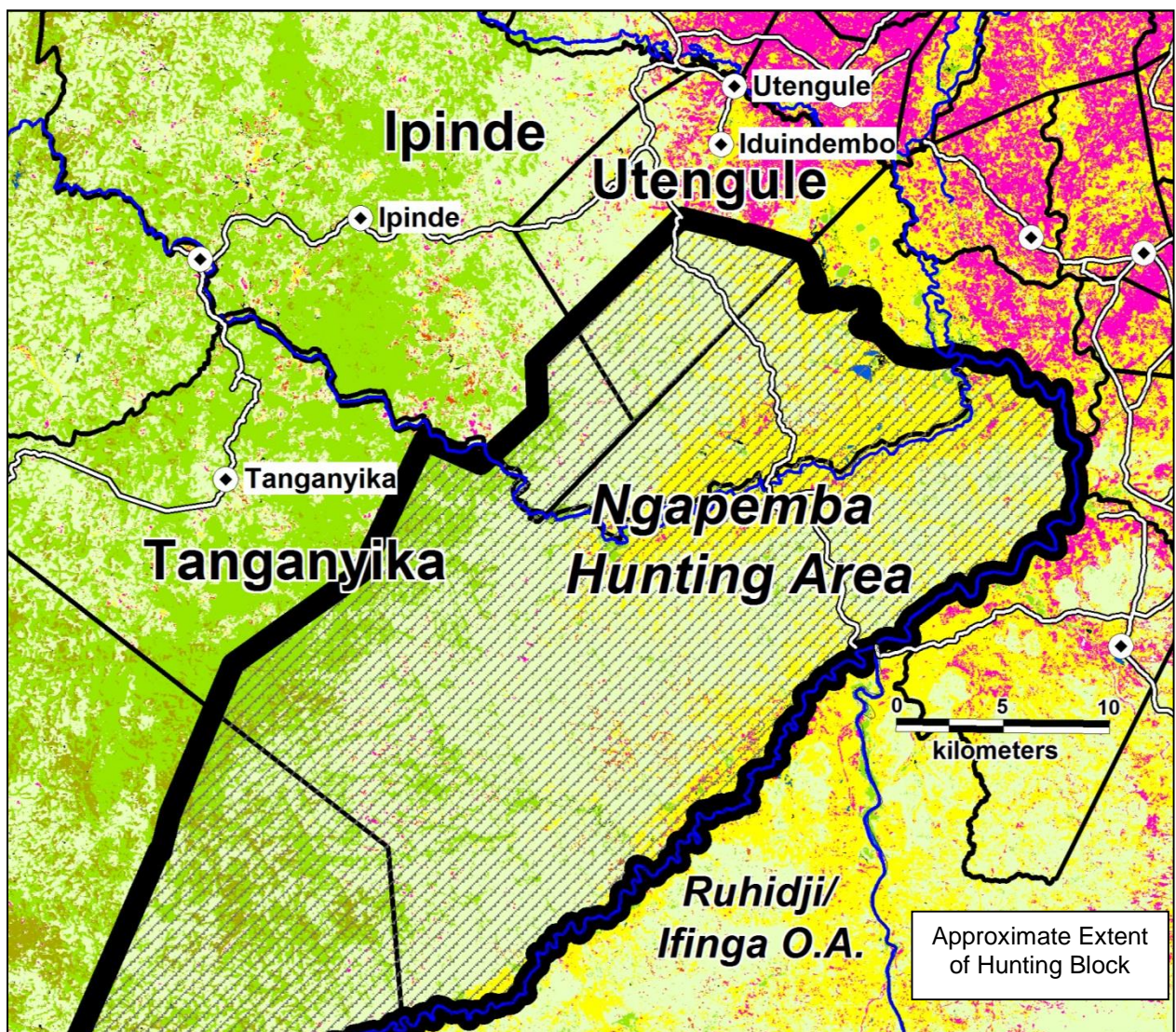


## 5 CURRENT LAND USE

### 5.1 Tourism

#### 5.1.1 Overview

Part of the Ngapemba area has been defined as a hunting block by TAWA and leased to a hunting company - Kilombero North Safaris - who are actively carrying out hunting and fishing safaris. Although there is a defined block boundary in the TAWA records it is far larger than the area that is actually used for hunting activities. The approximate extent of the area used by the hunting company is shown below. It should be noted that, apart from a contested boundary falling within Utengule village and that adjacent to the Ngapemba wetland, the boundaries are not fixed on the ground. Parts of the boundary within Utengule village are marked and enforced.

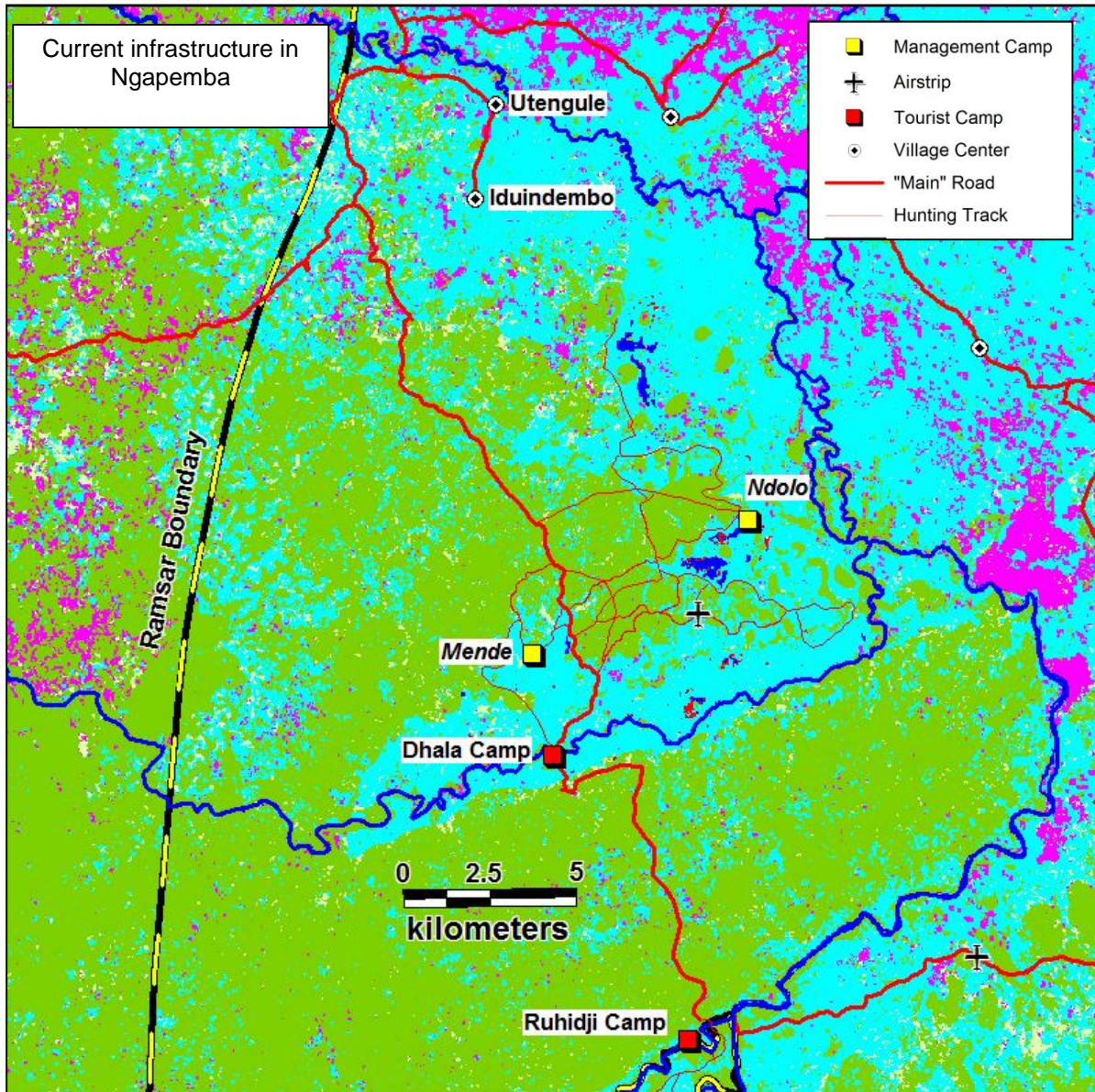




### 5.1.2 Current Access and Management

Access to the area is via a poor quality road from the main Tanganyika-Mlimba District road. At times during the wet season the road becomes impassable. The opening of new fields along part of this road also affects the status of the road. A network of hunting tracks exists between the Ngapemba/Ndolo swamps and the Mnyera river. A pontoon allows seasonal access to the area between the Mnyera and Ruhidji rivers where a further network of hunting tracks have been opened. In addition, a pontoon on the Ruhidji River provides seasonal access to the Ruhidji Open Area hunting block.

The area has been leased to Kilombero North Safaris who is expected to provide all management. The company is responsible for opening and maintaining roads and tracks, the airstrips and the pontoons, essential for crossing the Mnyera and Ruhidji Rivers. In addition the company carries out its own anti-poaching activities from the two main tourist base camps (Dhala and Ruhidji), as well as from smaller management camps (Ndolo and Mende). Anti-poaching activities are limited to vehicle and foot patrols from the bases and apprehending poachers.



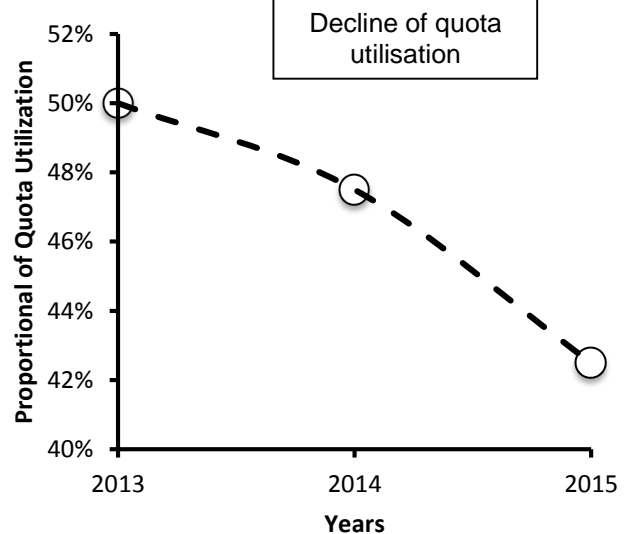
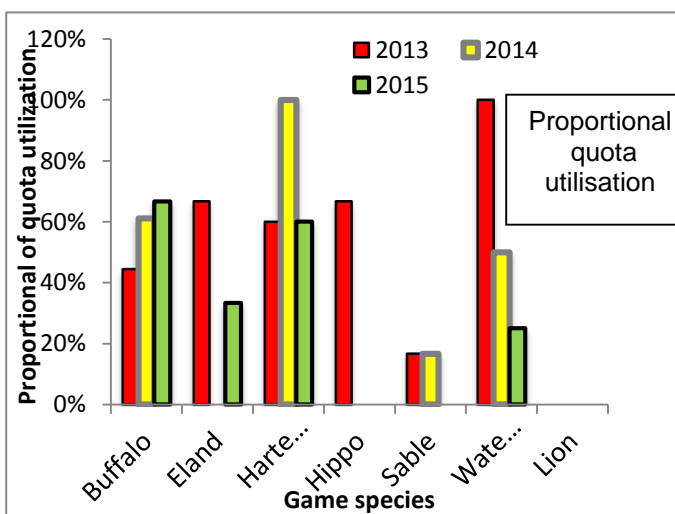
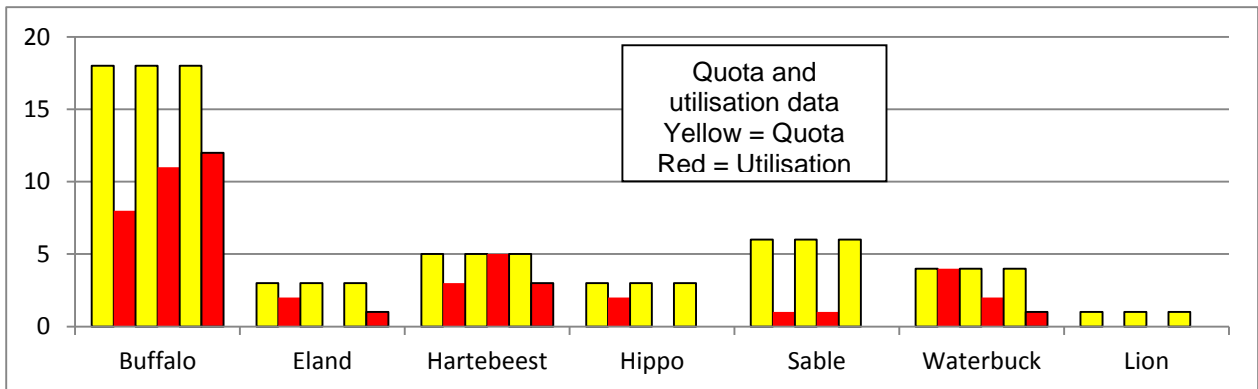


### 5.1.3 Hunting Safaris

The area around the Ndolo and Mende swamps and the surrounding woodlands are used for hunting by Kilombero North Safaris. Quotas are issued for plains game, hippo, crocodile and predators such as lion. Offtakes of most species are lower than the quotas and the company claims that this is to allow numbers to build up. It also reflects the increasing importance of fishing to the company as the proportion of the quota utilised has been dropping steadily. (Figure x). No lions have been shot for the last 5 years.

	2013		2014		2015	
	Quota	Offtake	Quota	Offtake	Quota	Offtake
Buffalo	18	8	18	11	18	12
Eland	3	2	3	0	3	1
Hartebeest	5	3	5	5	5	3
Hippo	3	2	3	0	3	0
Sable	6	1	6	1	6	0
Waterbuck	4	4	4	2	4	1
Lion	1	0	1	0	1	0

**Note:** (Source: Kilombero North Safaris)  
 Official quotas for this area are reflected in the Kilombero Mlimba quota list and the listing was confusing, hence we approached the hunting company for the information.



### 5.1.4 Fishing Safaris

Sport fishing, with the main drawcard species being the tigerfish have developed into a popular activity on the Mnyera and Ruhidji River. Operating from two permanent camps as well as two temporary fly camps, the company has a fishing season of around five months, Approximately 30 safaris are run each year?

## 5.2 Use of the Area by Local Communities

Use of the natural resources by villagers is described in more detail in the sociological assessment. This section is a short summary to place the conflicting use of the area in context.

Table 14: Use of Natural Resources	
Corridor	Comments
Village Use	<p><b>Fishing:</b>The main fishing areas in Ngapemba are the Ngapemba Swamp (Utengule and Iduindembo villages) and the Mnyera River (Ipinde village), Ngapemba BMU is still in formation but has a positive role in managing the fishing in the area.</p> <p><b>Farming:</b> Farming is the main livelihood strategy in the Ngapemba area being practiced by all households across all villages with the main crops being rice and maize.. Land, especially in Utengule and Iduindembo villages, is scarce and this has lead to a shift away from shifting agriculture and also into monoculture production. This has the effect of decreasing yields therefore creating more pressure for land</p> <p><b>Grazing:</b> Livestock numbers in the area have increased with the in-migration and settling of the Sukuma people. More and more local people are keeping livestock as well. Grazing areas in Utengule and Iduindembo are extremely limited.</p>

## 5.3 Land and Resource Use Conflicts

This section details land and resource use conflicts between Kilombero North Safaris and the residents of Ipinde, Tanganyika, Utengule and Iduindembo villages. The text is taken from a compilation of the material gathered during the PRA and structured interviews and is in the following categories

- Land
- Natural Resources
- Farming
- Livestock
- Fishing
- Wildlife

**Table 15: Land and Resource Use Conflicts**

Aspect	Description
Land	<p>Land conflicts are very common in all four villages, principally concerning the boundary with KNS and encroachment across this (99% of overall importance score). The intensity of this conflict is highest in Iduindembo and least in Tanganyika (KNS is bearable there). There is no clear explanation as to how the hunting block was established, where the boundary should be, and what incentives should be provided to constituent and surrounding villages. The villagers are of the perception that the hunting block is established on village land, and therefore they demand adequate compensation for forgoing potential benefits that could be derived through alternative use of the land. Utengule has received some payment almost every year, Ipinde once and Tanganyika and Iduindembo (since establishment in 2014) never; even in Utengule there is considerable confusion as to what the payments relate to. In general there is a lack of transparency as to the provision and management of such incentives.</p> <p>Another related conflict is with the District Council, particularly in Iduindembo where community members would like to see a map to show the establishment of the hunting block, and the extent of overlap or otherwise with village land.</p>
Natural Resources	<p>The major conflict concerning natural resources, for all villages, concerned restrictions against access and use of resources within the KNS hunting block. For Utengule and Iduindembo villages, the conflict is mainly due to the absence of a clear boundary between the villages and KNS. For Tanganyika, the source of conflict concerns access to fish resources within the KNS hunting block. For Ipinde village, conflict with KNS relates both to the boundary and access to fish resources.</p> <p>KNS argue that when people used to come into their area for fishing some of them would also poach wildlife. Villagers stated that they had been told by KNS to form a fishing group, and that they would be allowed to fish within the hunting block from February to June (during the low hunting season). Villagers argue that this period is not satisfactory to them (rains, poor fishing time, fish processing issues due to humidity, lack of cash in the market as crops are still in the fields).</p>
Farming	<p>The main forms of conflict concerning farmers were with KNS (encroachment into the KNS area – Iduindembo, Ipinde and also Tanganyika). The conflict with KNS was largely attributed to the lack of clarity concerning the boundary between the village and the hunting block. For Ipinde, respondents claimed that although the boundary was known it is disputed, as previously it was extended so as to annex part of the village land.</p>
Livestock	<p>The two major conflicts identified were, for Utengule, between pastoralists and farmers, concerning the destruction of crops by livestock and, for Iduindembo, with KNS regarding the boundary between the village and the hunting block. The shortage of grazing within Iduindembo is particularly acute, and villagers claim that a considerable area is included within the hunting block and from which they are restricted from grazing.</p>
Fishing	<p>The key form of conflict is with the KNS, since many other wetland areas, in addition to Ngapemba, are under their control. The highest conflict was reported for Iduindembo and Utengule, where Ndolo, Mende and Iyogovelwa wetlands are located but are under control of KNS. The impact is particularly severe during the dry season when typically a large part (40%) of Ngapemba wetland (which is the main fishing ground) dries out. Fishermen complained about harsh treatment received from KNS staff, particularly for those caught fishing at Ngapemba without a license (including beatings and confiscation of equipment)..</p>

**Table 15: Land and Resource Use Conflicts**

<b>Aspect</b>	<b>Description</b>
Wildlife	Crop raiding was the major form of Human-Wildlife Conflict (HWC) for Tanganyika, Ipinde and Utengule villages. Farmers in Tanganyika stated that if farmers do not guard their crops they will not reap anything, but if careful guarding is done they can manage to harvest 60-90% of the crops. For Iduindembo, where livestock are most abundant and important, predation was identified as being the major form of HWC (followed by crop raiding). Only Tanganyika reported incidences of wildlife killing and injuring people. People feel that, if the hunting block did not exist they would not have these issues.

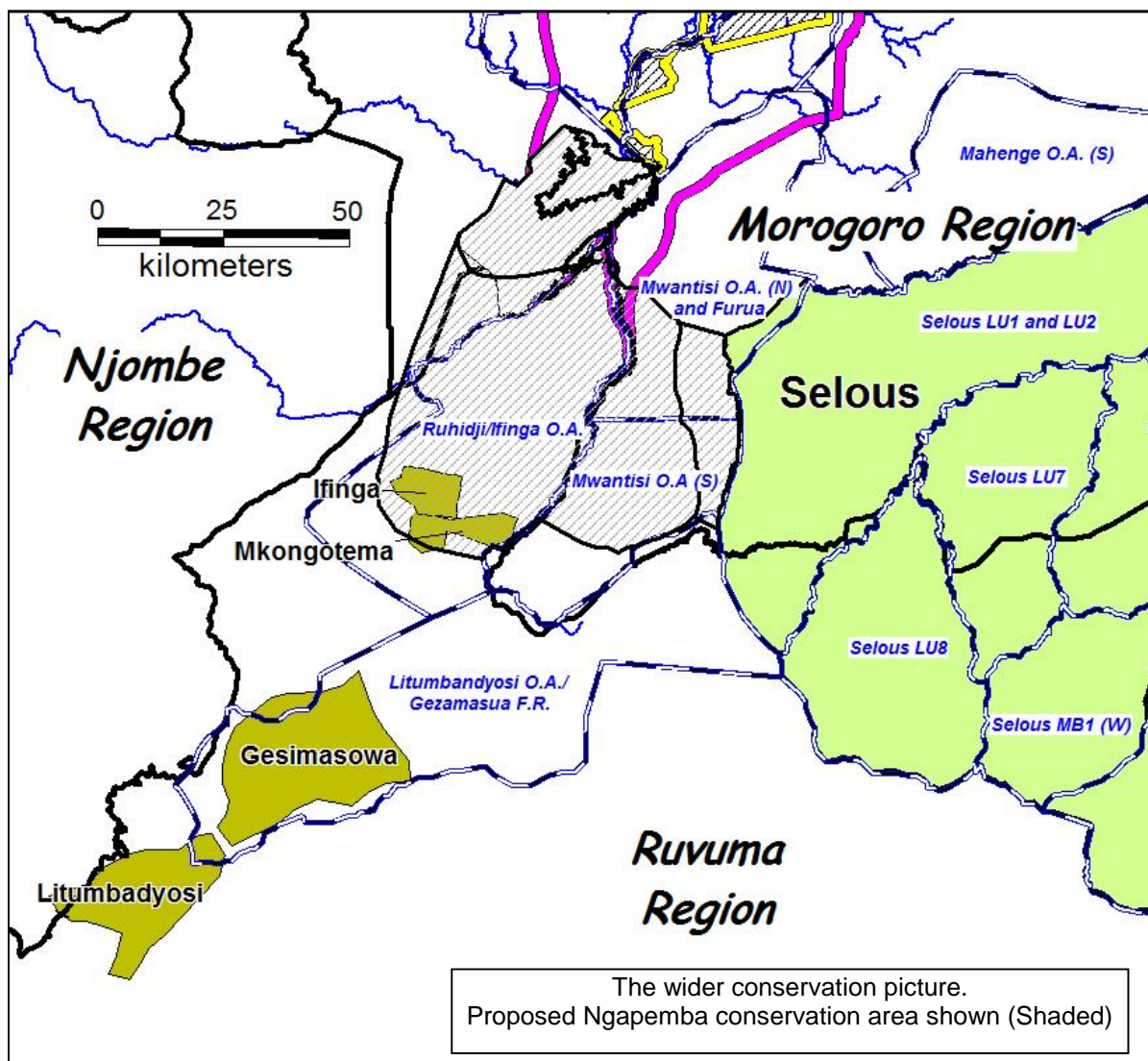


## 6 CONSERVATION OPTIONS

### 6.1 Conservation Goals

Aware that piecemeal conservation of small areas can lead to ecosystem fragmentation it is worth looking at the Ngapemba area in the wider conservation context. In addition, conservation of catchments should be considered a priority where possible.

The Ngapemba area is located to the south of main Kilombero wetland and the Kilombero GCA (currently under development). To the east lies the Selous Game Reserve and to the south is a currently largely uninhabited area containing several hunting blocks and existing Forest Reserve, TAWA is currently working on upgrading the status of the Gesimasowa and Litumbadyosi Forest Reserves to game reserve.



That the Ngapemba area represents a valuable part of Tanzania's conservation heritage is beyond doubt. The area needs to be conserved - but the main question is how to do this and what form will it take? As a first step three conservation goals are put forward to focus the future of the Ngapemba area.

- To conserve the Ngapemba wetlands and their vegetation and wildlife
- To conserve the surrounding catchment forests to maintain hydrological inflows to the Ngapemba and Kilombero wetlands
- To protect the last remaining significant population of puku in Tanzania

## 6.2 Area Definition

There are two scales to be considered for conserving the Ngapemba area and its ecosystem:

1. Protect the core wetland area and its wet season dispersal areas
2. Protected the upstream catchment on which the wetland depends (mainly the Mnyera, Ruhidji and Pitu river catchments).

At this preliminary stage two cases are proposed, as directions or options to address these requirements. These may not be seen necessarily as alternative options, but may be seen as sequences or complementary measures.

**Case one** is focuses on the core wetland area. We propose to limit this case to within the Kilombero District boundary for efficiency. This includes land from the four affected villages - Tanganyika, Iduindembo, Utengule and Ipinde. Although there are reports of wildlife in the Kilosa Kwa Mpepo area to the east of the Ruhidji River our investigations revealed reduced wildlife populations and an increase in settlement in this area.

**Case two** – this would include extending conservation measures to a "Greater" Ngapemba Conservation Area - is more extensive and extends into Songea District with a possible extension to Selous considered,

In addition, the case for inclusion of the Kilosa Kwa Mpepo area should be considered. Conflicting reports were received during this work. On one side the hunting company returned the block in 2015 to the MNRT as being uneconomic. Ground investigations revealed significant new clearing and settlement towards the Ruhidji river. On the other side there are reports of increasing wildlife in the area and reports of the WMA in operation. The situation needs to be clarified.

### 6.2.1 Case 1: Kilombero District Ngapemba Conservation Area

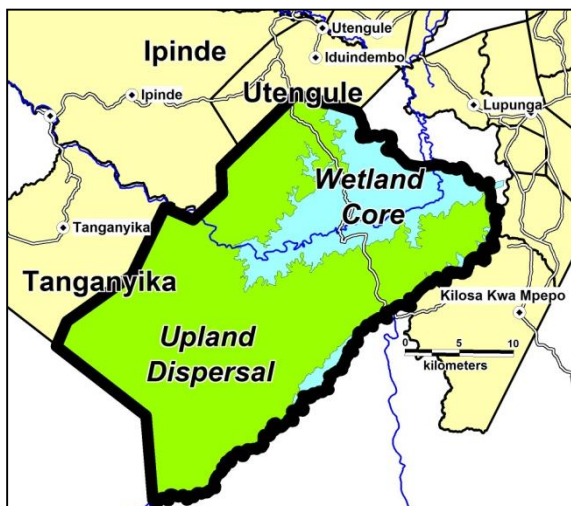
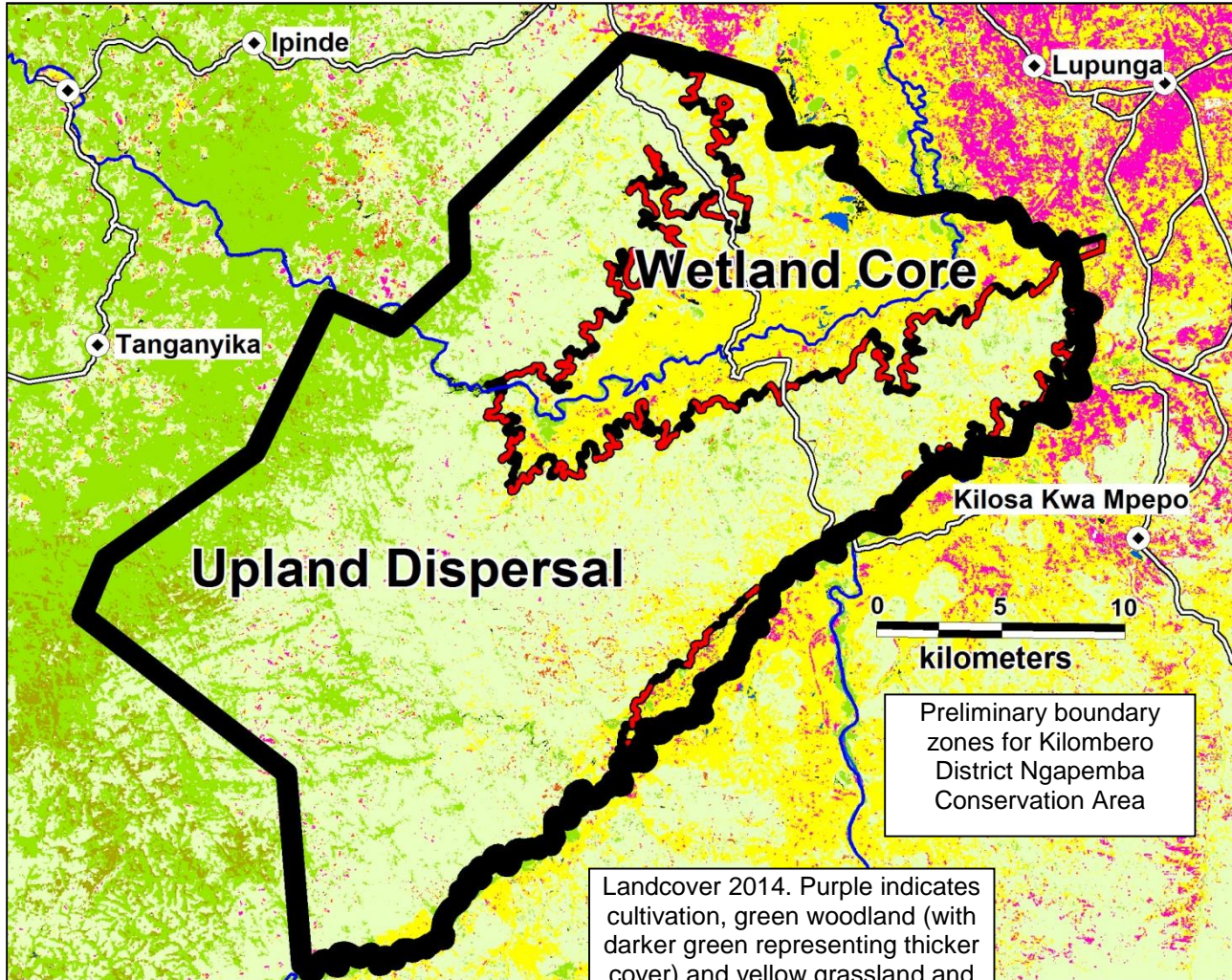
Two zones are proposed for the area which is 720 km<sup>2</sup> - the wetland core and the upland dispersal area. Justification for the proposed zoning is shown below.

Zone	Justification	Comments
Core conservation area	High-value permanent and seasonally inundated wetland and grassland. Currently with expanding puku population plus other species, including predators. 320 m. asl used to define boundary. Ndolo wetland area = 145 km <sup>2</sup> . Ruhidji wetland area = 32 km <sup>2</sup> .	Important, largely intact, wetland in the Kilombero floodplain



**Table 16: Boundary considerations for the Kilombero District Ngapemba Conservation Area**

Zone	Justification	Comments
Dispersal area	Wildlife dispersal area during high flood periods. Home to upland species such as sable and utilised by buffalo. 570 km <sup>2</sup> .	Does not include Masagati FR and avoids settled areas



## 6.2.2 Case 2: Greater Ngapemba

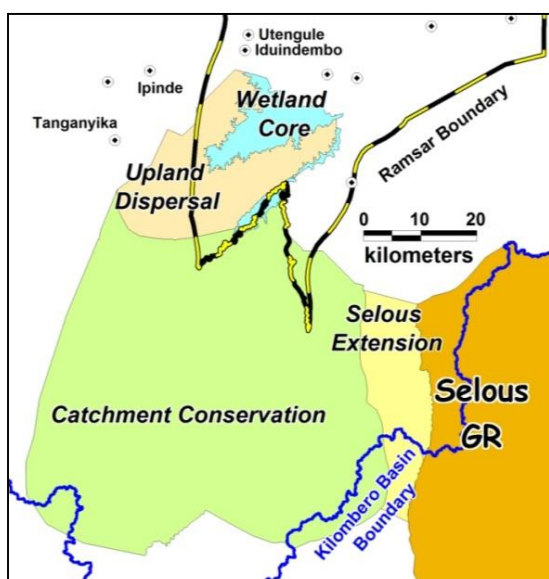
The rationale for the drafting of tentative boundary options and zones for the "greater" Ngapemba Conservation Area is outlined below. This is based on current conservation knowledge of the area and of settlement and cultivation. It does not take into account political and village boundaries. Settled areas were avoided when defining the boundary using a variety of image interpretations as well as recent Google Earth imagery (2017). Based on the above we are reasonably confident that the proposed boundary excludes all settlement (as of late 2017/early 2018). However, this would need to be investigated further using aerial and ground surveys.

The catchment conservation goal can in principle be pursued through two alternative options

- Including the catchment area in a same conservation area as the core area (case 1) with a different zoning system
- Complementing the establishment of the core area as a conservation area with catchment conservation measures within the existing land tenure system across the upstream catchment area

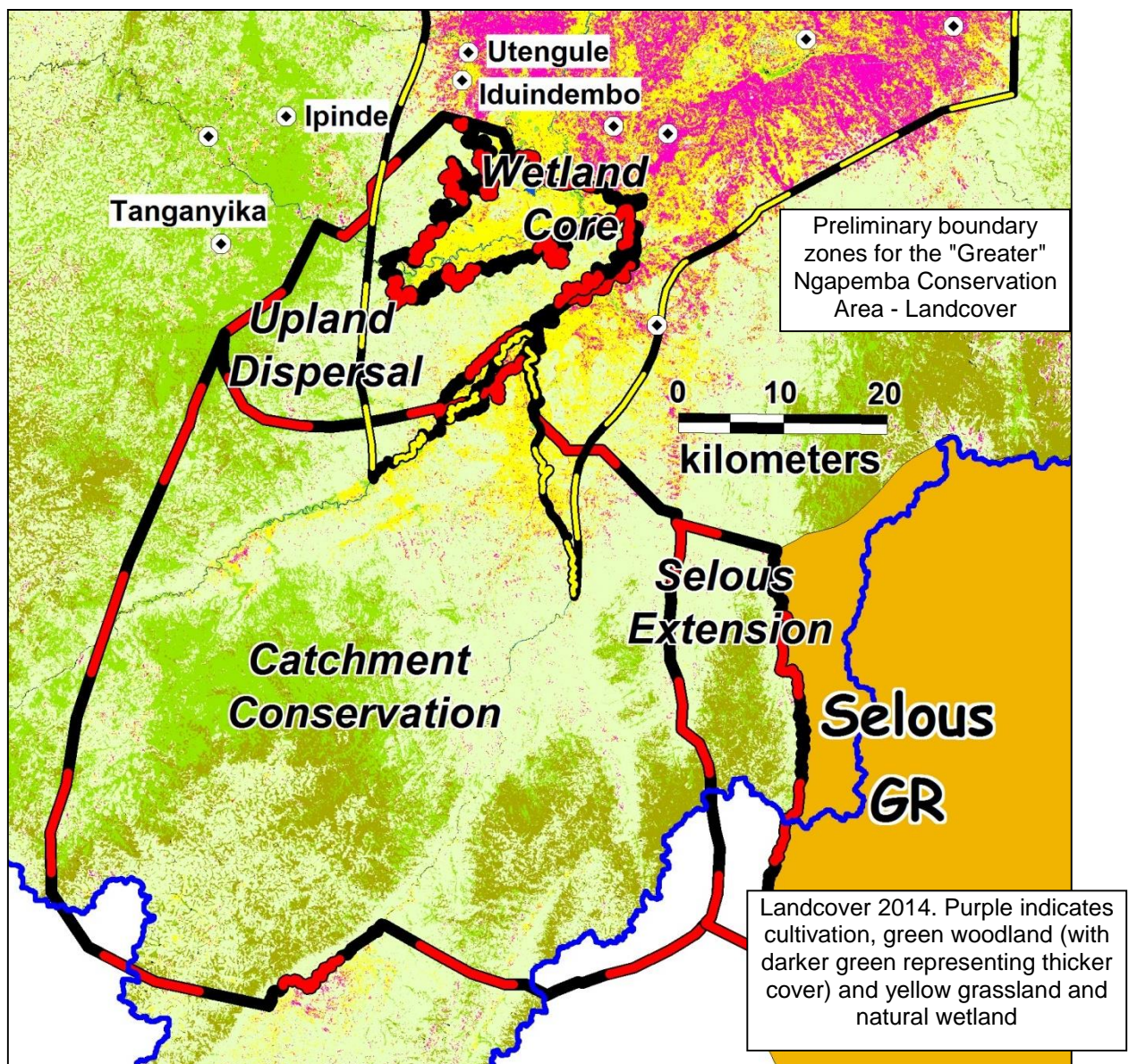
**Table 17: Boundary considerations for the "Greater" Ngapemba Conservation Area**

Zone	Justification	Comments
Core conservation area	High-value permanent and seasonally inundated wetland and grassland. Currently with expanding puku population plus other species, including predators. 320 m. asl used to define boundary. Ndolo wetland area = 145 km <sup>2</sup> . Ruhidji wetland area = 32 km <sup>2</sup> .	Important, largely intact, wetland in the Kilombero floodplain
Dispersal area	Wildlife dispersal area during high flood periods. Home to upland species such as sable and utilised by buffalo. 520 km <sup>2</sup> .	Does not include Masagati FR and avoids settled areas
Catchment Conservation	Covers currently uninhabited area of existing hunting blocks such as Ruhidji/Ufinga, Mwatisi and Furuu Open Areas. 3,000 km <sup>2</sup> . Important for conserving the hydrological balance of the Ngapemba water inflows	Overlaps with village land in Kilombero District Includes significant portions of Ruhidji River catchment
Selous Extension	Possibility of extension of area to include in Selous Game Reserve, 337 km <sup>2</sup> .	Malinyi to Songea proposed road will attract settlement and be a management issue



Preliminary boundary zones for the "Greater" Ngapemba Conservation Area





**Table 18: Zones and management considerations for the Ngapemba Conservation Area**

Zone	Use	Management
Core conservation area	Main scenic and good hunting area.	Intensive protection with road network, airstrip and outposts. Woodland areas accessible year round. Boat access via Mnyera and Ruhidji Rivers
Dispersal area	Wet season wildlife dispersal area	Less intense protection protocol. Road network to be developed
Catchment Conservation	Catchment conservation includes other hunting blocks which may have legal complications	Area south of Ruhidji River accessible from existing camp. Limited road network in place

Table 18: Zones and management considerations for the Ngapemba Conservation Area		
Zone	Use	Management
Selous Extension		Existing route to Namtumbo. Possible upgrade with transit and settlement issues.

## 6.3 Conservation Status Appraisal

There is no doubt that the Ngapemba area is ecologically valuable and needs to be protected. Apart from being an intact representation of relatively undisturbed Kilombero Valley wetland it is also home to the remnant puku population which was once the valley's dominant wildlife species. In addition the upland miombo and forest areas are important catchment areas for the major feeder rivers of the Kilombero floodplain - the Ruhidji, Mnyera and Pitu.

However, the best way forward to ensure that this area is protected and endures into the future still needs to be decided. The three main models proposed are

- To continue the status quo (TAWA issued hunting block)
- To gazette a state run protected area (e.g. game reserve or game controlled area)
- To define a community based model for protection (e.g. wildlife management area or game ranch).

This section of the report outlines the pros and cons of the different options to assist decision makers on the best way forward. The table below summarises the key issues between the different protection models. In addition, especially when considering the "Greater" Ngapemba Conservation Area perhaps a mix of conservation models should be considered. For example, partial community and partial state protection.

Table 19: Key issues of the protection models	
Option	"Issue"
Status Quo (Hunting Block)	<ul style="list-style-type: none"> <li>• Not a legal protected area</li> <li>• Could be subject to legal challenges by communities</li> <li>• LA</li> </ul>
State Protection	<ul style="list-style-type: none"> <li>• Alienation of present land tenure and establishment of reserve land</li> <li>• Exclusion of villagers</li> <li>• Revenues to state</li> <li>• Communities may actively resist and oppose the PA, undermining its viability</li> <li>• High cost to the state</li> </ul>
Community Protection	<ul style="list-style-type: none"> <li>• Negotiated access to benefits</li> <li>• Weak capacity may undermine protection status</li> <li>• High cost to communities and operator, especially in initial stages</li> <li>• Low cost to Government</li> <li>• Can create incentives for community ownership of conservation status</li> </ul>

### 6.3.1 Status Quo

Table 20: Status Quo			
Option	Background	Pros	Cons
Hunting Block	<ul style="list-style-type: none"> <li>Under the Act is "any area with game animals delineated or set aside and approved by the Director for trophy hunting". Such as the current status for Ngapemba</li> <li>Conceivably any area defined as a protected area outside national parks and the Ngapemba Conservation Area can also become a hunting block</li> </ul>	<ul style="list-style-type: none"> <li>Already existing</li> </ul>	<ul style="list-style-type: none"> <li>Conflict issues with adjacent villages</li> <li>Settlement and land conversion on general and village land is permitted. New villages could be declared on general land</li> <li>It is not a protected area in legal terms</li> </ul>

### 6.3.2 State Protected Area

Table 21: State protected area options			
Option	Background	Pros	Cons
New Game Reserve/ Game Controlled Area	<ul style="list-style-type: none"> <li>Can be declared under Part IV (Sections 14 and 16) of the 2009 WCA</li> <li>Restrictions on use outlined in the Act (no cultivation; grazing under permit)</li> <li>Income is directly to TAWA with specified sharing options for adjacent villages</li> </ul>	<ul style="list-style-type: none"> <li>Under direct control of TAWA/MNRT</li> </ul>	<ul style="list-style-type: none"> <li>Will require taking of village land and compensation for this</li> <li>Will require staff and management structure</li> </ul>
Inclusion into Selous	<ul style="list-style-type: none"> <li>The possibility of inclusion of this area into the Selous GR could be considered</li> </ul>	<ul style="list-style-type: none"> <li>Under direct control of TAWA/MNRT</li> </ul>	<ul style="list-style-type: none"> <li>Will require taking of village land and compensation for this</li> <li>Stretching an already overburdened management structure</li> <li>Planned upgrade of the road between Malinyi and Songea may render this option unviable.</li> </ul>



**Table 21: State protected area options**

Option	Background	Pros	Cons
Wetlands Reserves and Areas	<ul style="list-style-type: none"> <li>• Can be declared under Part IV (Section 16) of the 2009 WCA (although the wording of Section 16 is weak in this regard)</li> <li>• Regulations can be made in conjunction with Minister of Environment (Sect 16(3))</li> <li>• Wetland Reserves can also be declared under Section 56 of the 2004 Environmental Management Act. Regulations for wetlands can be defined through the Environmental Management (Sustainable Management Of Wetlands) Regulations, 2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple use permitted</li> <li>• Management could be entrusted to TAWA from Vice President Office</li> </ul>	<ul style="list-style-type: none"> <li>• Regulations and use restrictions not yet gazetted, although in process. Potentially cumbersome and bureaucratic process. Still untested.</li> <li>• New type of protected area so some suspicion</li> </ul>
Corridors, Dispersal Areas, Buffer Zones etc	<ul style="list-style-type: none"> <li>• Can be declared under Part IV (Section 22) of the 2009 WCA</li> <li>• Dispersal area is "an area habitually used by wild animal species for feeding, laying, storing eggs, rearing of feeding young and includes breeding places"</li> </ul>	<ul style="list-style-type: none"> <li>• New regulations for these areas have now been defined (The Wildlife Conservation (Wildlife Corridors, Dispersal Areas, Buffer Zones And Migratory Routes) Regulations, 2018)</li> </ul>	<ul style="list-style-type: none"> <li>• The regulation and the model foreseen are untested. Procedural provisions are heavy.</li> </ul>
Species Management Area	<ul style="list-style-type: none"> <li>• Can be declared under Part IV (Section 23) of the 2009 WCA</li> <li>• "Area subject to active intervention for management purposes in order to ensure the maintenance of habitat or to meet the requirements of specific species",</li> <li>• No specific regulations required under the Act</li> </ul>		<ul style="list-style-type: none"> <li>• Regulations and use restrictions not yet gazetted. Not sure at what stage these are</li> </ul>

### 6.3.2 Community Protected Area

**Table 22: Community protected area options**

Option	Background	Pros	Cons
Wildlife Management Area	<ul style="list-style-type: none"> <li>• A Wildlife Management Area is an area of communal land set aside exclusively as habitat for wildlife by member villages. Villages need to be willing to establish the WMA</li> <li>• Can be declared under Part V (Sections 31 to 33) of the 2009 WCA. (see text box next page for procedure summary).</li> <li>• WMAs may be established in areas which are (i) outside of core protected areas; (ii) used by local community members; and (iii) within village land.</li> <li>• Hunting rights are usually put out to tender</li> </ul>	<ul style="list-style-type: none"> <li>• Does not require alienation of village land</li> <li>• Only a few villages involved so process may be simpler and potential benefits to villagers greater</li> <li>• Likely high financial viability due to existing hunting/fishing operation by Kilombero North Safaris</li> <li>• Donor support easier</li> <li>• Increased conservation incentives from nearby villagers due to revenue stream from concession</li> <li>• Provides for a structured and legal system to handle community and investor relations, currently fraught with conflicts</li> <li>• Initial consultations at District level have established support for concept</li> <li>• More decision-making power by the communities</li> <li>• Proportion of benefits to the communities is higher than other conservation options</li> <li>• Boost the local economy</li> <li>• Reduces conflicts between government and locals</li> <li>• Allows multiple utilization of land through zonation</li> </ul>	<ul style="list-style-type: none"> <li>• Establishment of WMAs can be time consuming</li> <li>• Lower revenues to Government as income to be split between WMA, LGA and TAWA as per WMA regulations</li> <li>• Generally lower security of conservation status (tenure) compared to reserved land</li> <li>• Conservation relies on outcome of negotiations with CBOs with regard to zonation and management.</li> </ul>

**Table 22: Community protected area options**

Option	Background	Pros	Cons
Game Ranch	<ul style="list-style-type: none"> <li>• A game ranch is defined as a fenced or non-fenced wildlife area of extensive multiform utilisation of wildlife species where a wide range of complementary wildlife management practices are professionally managed so as to render them compatible, including sport hunting, cropping, sale of live animals, tourism and fishing (Wildlife Conservation (Non-Consumptive Wildlife Utilization) Regulations, 2007).</li> <li>• Villages with land in the conservation area would need to grant derivative rights to the project proponent. The basis of derivative rights lies in the Village Land Act (Cap. 114/2002; Section 32)..</li> <li>• The project proponent would need to apply for user rights for the area from WD/TAWA in terms of the Wildlife Management Area Regulations, the Non-Consumptive Regulations and the Tourist Hunting Regulations, depending on the activities that it will undertake in the area.</li> </ul>	<ul style="list-style-type: none"> <li>• Partnership between land holders and commercial entity. And possibly much simpler and quicker to establish than a WMA.</li> <li>• It can be established recognising the existing hunting enterprise and can provide a basis for direct negotiations and contracting between the operator and the villages, leading to a clearer and formalised relationship than currently existing</li> </ul>	<ul style="list-style-type: none"> <li>• Relatively untested form of protection. Very few precedents</li> </ul>

### 6.3.3 Comparative Analysis

**Table 23: Comparative Analysis of different Protection Models**

Option	Access Restrictions	Management Protocol	Enforcement Protocol	Resettlement/ Land Acquisition	Indicative Establishment Costs
Status Quo (Hunting Block)	<ul style="list-style-type: none"> <li>No Settlement</li> <li>No Agriculture</li> <li>No livestock</li> <li>No Fishing</li> </ul>	<ul style="list-style-type: none"> <li>Management by hunting company</li> </ul>	<ul style="list-style-type: none"> <li>Enforcement by hunting company</li> </ul>	<ul style="list-style-type: none"> <li>None although restriction on use of village land</li> </ul>	<ul style="list-style-type: none"> <li>None to Govt</li> </ul>
New Game Reserve/	<ul style="list-style-type: none"> <li>No Settlement</li> <li>No Agriculture</li> <li>No livestock</li> <li>No Fishing</li> </ul>	<ul style="list-style-type: none"> <li>Management by MNRT</li> <li>HQ to be established</li> <li>Outposts</li> </ul>	<ul style="list-style-type: none"> <li>MNRT scout force responsible for enforcement</li> </ul>	<ul style="list-style-type: none"> <li>Transfer of village land to reserved land</li> </ul>	<ul style="list-style-type: none"> <li>Medium under TZ law if all farming and settlements excluded</li> <li>Potentially high under international standards for resettlement</li> </ul>
Wildlife Management Area	<ul style="list-style-type: none"> <li>No Settlement</li> <li>No Agriculture</li> <li>Negotiated fishing</li> <li>Negotiated grazing</li> </ul>	<ul style="list-style-type: none"> <li>Zoning in VLUPs</li> <li>WMA Zoning Plan</li> <li>WMA User Rights</li> <li>CBO to be established</li> <li>Tourism and fishing concession agreement</li> </ul>	<ul style="list-style-type: none"> <li>Village Game Scouts</li> <li>Enforcement by hunting company</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Planning and establishment process</li> <li>CBO infrastructure and means</li> <li>CBO capacity building</li> </ul>
Game Ranch	<ul style="list-style-type: none"> <li>No Settlement</li> <li>No Agriculture</li> <li>Negotiated fishing</li> <li>Negotiated grazing</li> </ul>	<ul style="list-style-type: none"> <li>Derivative Rights under Village Land Act</li> <li>Like for WMA</li> </ul>	<ul style="list-style-type: none"> <li>Village Game Scouts</li> <li>Enforcement by hunting company</li> </ul>		<ul style="list-style-type: none"> <li>Transaction costs uncertain but possibly lower than for WMA if building on existing situation and investor.</li> </ul>





### 6.3.4 WMA Establishment Plan

#### Overview

The process is clearly defined in the 2012 WMA Regulations. It is cumbersome, however far less so than the establishment of reserved land on village land. In this specific case the analysis already produced (this study) and the relatively small number of villages involved are clear advantages.

At present, after almost two decades of experience in establishing WMAs across the country, there is a sense of disappointment across a section of stakeholders. This is due to a mix of factors against a different set of expectations. Reforms have been long advocated to simplify the establishment procedures and to increase the share of revenues retained by local communities. These reforms have been delayed. Meanwhile many WMAs show weak enforcement and conservation status and struggle to gain financial self-sustainability.

The specific case of Ngapemba presents clear opportunities: it involves a limited number of villages. This decreases transaction costs and negotiation time. It also involves a de-facto established conservation area, although this is not established in law as such. The establishment of a WMA could therefore be pursued with confidence with regard to the financial viability and the existence of a future stream of revenues.

#### Summary of Steps for the Declaration of a WMA

- Village Assembly meeting or meetings in the relevant village or villages must decide to form a WMA on the village lands.
- Once this has happened the villages must form a CBO to represent the community members and manage the WMA. This CBO must have a constitutions, rules of membership, qualifications of office bearers, financial management procedures, etc
- The CBO is to prepare Land Use Plans (LUPs) for the relevant villages. These LUPs should show where the proposed WMA will lie in the village or villages' lands, they should follow the procedures laid out by the National Land Use Planning Commission
- The CBO must form a General Management Plan, or alternatively as an interim measure (for up to five years) can compose a more basic Resource Management Zone Plan providing for the zonation of resource uses in the proposed WMA
- After completing the above prerequisites, the CBO can apply to the Director of Wildlife for the Minister to declare for the CBO to become an AA and gazette the WMA. If the application is approved by the Director, and the WMA is gazetted, the CBO becomes an Authorized Association (AA), which then applies for a user right

#### Financial Viability

The area currently has an existing and successful tourism model. Currently fishing is more successful than hunting but the operator is allowing wildlife populations to build up prior to re-establishing safari hunting as a major form of land use. Major species are buffalo, crocodiles, sable and puku. Predators are on quota and will be sold once numbers have increased. Up-market photographic tourism is also an option but access to the area is costly which may make this type of operation non-viable in the short to medium term. Current revenue sharing for hunting income is unclear, as is the status of income streams for fishing activities.

## Work flow and Capacity Building

The establishment of the WMA will require extensive capacity building support to the communities (4 villages) to participate in and lead the establishment process: this includes consultative and deliberative events; the establishment of the core bodies of the WMA (executives and their downward accountability system); support to contractual negotiations, preparation of business plan and revenue sharing system; establishment of village game scouts; etc.

Kilombero District has gained experience in the establishment of WMA though several years of work with Iluma WMA. Building on this, the new WMA may be twinned to Iluma (via meetings and local exchange) to leap frog capacity building. In addition, the WMA may establish an early link to the sector association (CWMAC): this can extend support for capacity building the formal establishment processes.

The WMA establishment often suffers of mission creep, especially when external funding is involved: workshops are multiplied, efficient capacity building methods such as mentoring and coaching are overlooked in favour of formal and expensive training. These in turn grow expenditures and stretch the time line. Based on lessons learned during the Iluma process, it is suggested that a clear understanding on these aspects be established early on, involving any supporting agency, the District and CWMAC. Lines of downward accountability to the village structures should also be established early on.

Table 24: Establishment steps and associated capacity building for a WMA

Step	Comments
1. Consultations and deliberations of the establishment of the WMA	
2. Establishment of Joint Mgt Committee across villages	
3. Development of WMA constitution	
4. Field appraisals	Confirm land tenure and use Identify any conflicting land use
5. Review of VLUPs	
6. Boundary demarcation and Resource Zone management plan	
7. Establishment of Village Game Scouts capacity building	At MNRT Training center and via LGA and TAWA support
8. Formulation of by-laws	Supported by Kilombero DC and availing of experience of Iluma WMA
9. Official gazettelement	
10. User Rights	
11. Tender / contracting / negotiations	Supported by CWMAC
12. Business planning for WMA CBO and capacity building for administration and governance	Requires external support
13. Operations and review	

## Indicative budgeting

Establishment steps and associated capacity building	Million TZS	Lead	External technical inputs
1. Consultations and deliberations of the establishment of the WMA	10	LGA	
2. Establishment of Joint Mgt Committee across villages	10	LGA	
3. Development of WMA constitution	5	CWMAC	✓
4. Field appraisals	10	LGA	✓
5. Review of VLUPs	20	LGA	
6. Boundary demarcation and Resource Zone management plan	20	LGA	✓
7. Establishment of Village Game Scouts capacity building	10	LGA	
8. Formulation of by-laws	10	LGA	
9. Official gazettelement	5	WD	
10. User Rights	5	WD	
11. Establishment of Trust	20	LGA	
12. Tender / contracting / negotiations	10	CWMAC	
13. Business planning for WMA CBO and capacity building for administration and governance	30	CWMAC	✓
14. Operations and review		CBO	
<b>TOTAL</b>	<b>165</b>		

The above budgeting does not include infrastructure and equipment, which typically may include:

- Office building and facilities for CBO
- Field gear and equipment for VGS
- Transport for CBOs

These may be funded as part of the establishment cost or pursued for the revenue sharing mechanisms



## Indicative Time Scale

Table 26: Indicative Time Scale for WMA Establishment				
Establishment steps and associated capacity building	Q1	Q2	Q3	Q4
1. Consultations and deliberations of the establishment of the WMA	■			
2. Establishment of Joint Mgt Committee across villages		■		
3. Development of WMA constitution		■		
4. Field appraisals	■	■		
5. Review of VLUPs		■		
6. Boundary demarcation and Resource Zone management plan		■		
7. Establishment of Village Game Scouts capacity building			■	■
8. Formulation of by-laws			■	
9. Official gazettelement				■
10. User Rights				■
11. Establishment of Trust			■	
12. Tender / contracting / negotiations				■
13. Business planning for WMA CBO and capacity building			■	■

### 6.3.4 Establishment of Reserved Land

The process of establishing the Ngapemba Area as reserved land is briefly outlined below.

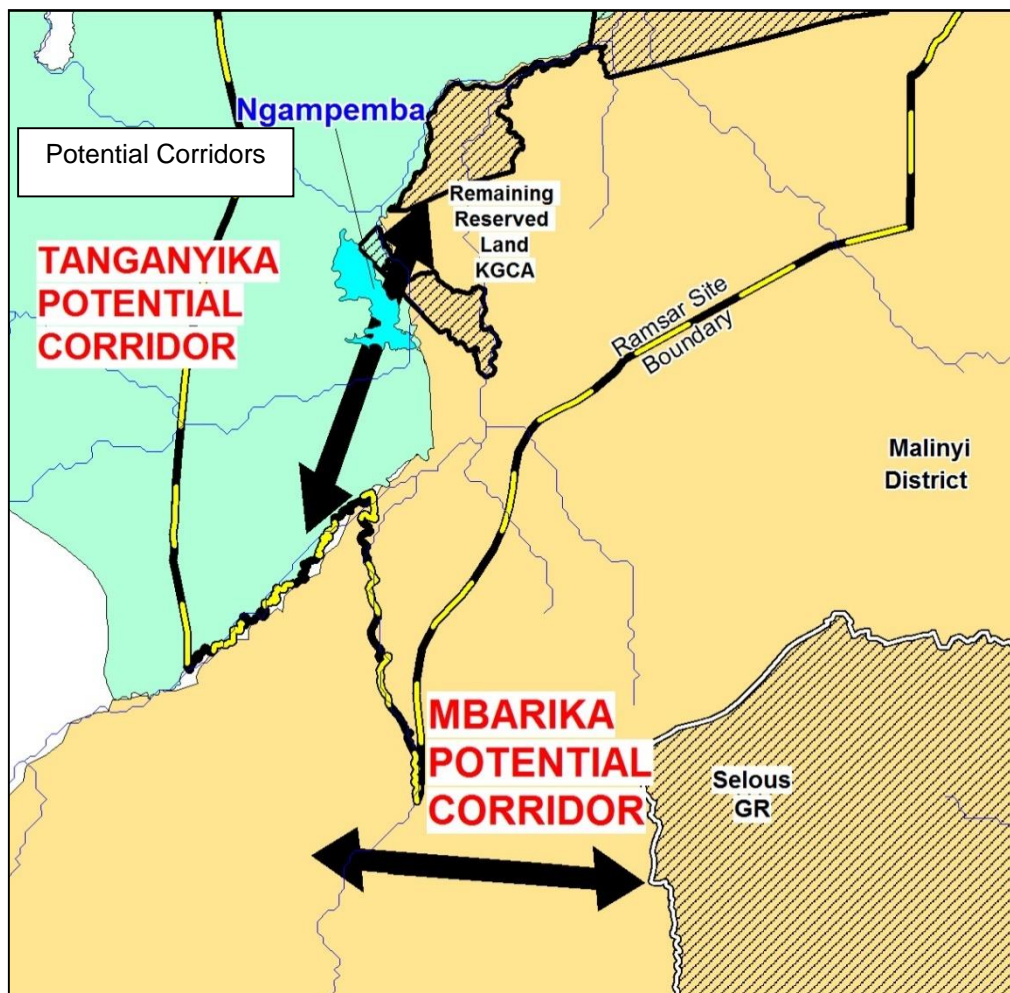
<b>Table 27: Process of Transferring Village Land to Reserved Land (Section 4 of the Village Land Act)</b>	
<b>S/N</b>	<b>Activity</b>
<b>1</b>	The President is advised to transfer village land to reserved land
<b>2</b>	The President directs the Minister ( for lands) to initiate the transfer process
<b>3</b>	The Minister publishes a notice of intention to transfer village land to reserved land. Contents of the notice must be made available to the respective Village Council and individual villagers
<b>4</b>	Villagers to make their representations on the proposed transfer to the Village Council and the Commissioner for Lands or any authorized officer
<b>5</b>	Approval of the transfer by either the Village Assembly(where the size of the village transfer land is less than 250 hectares) of the Minister ( where the size of the village transfer land exceeds 250 hectares)
<b>6</b>	Payment of Compensation – if the transfer is approved
<b>7</b>	The President transfers village land to reserved land

## 6.4 Connectivity

Two possible wildlife corridors were identified in the area and these are briefly described below.

**Table 28: Potential Wildlife Corridors**

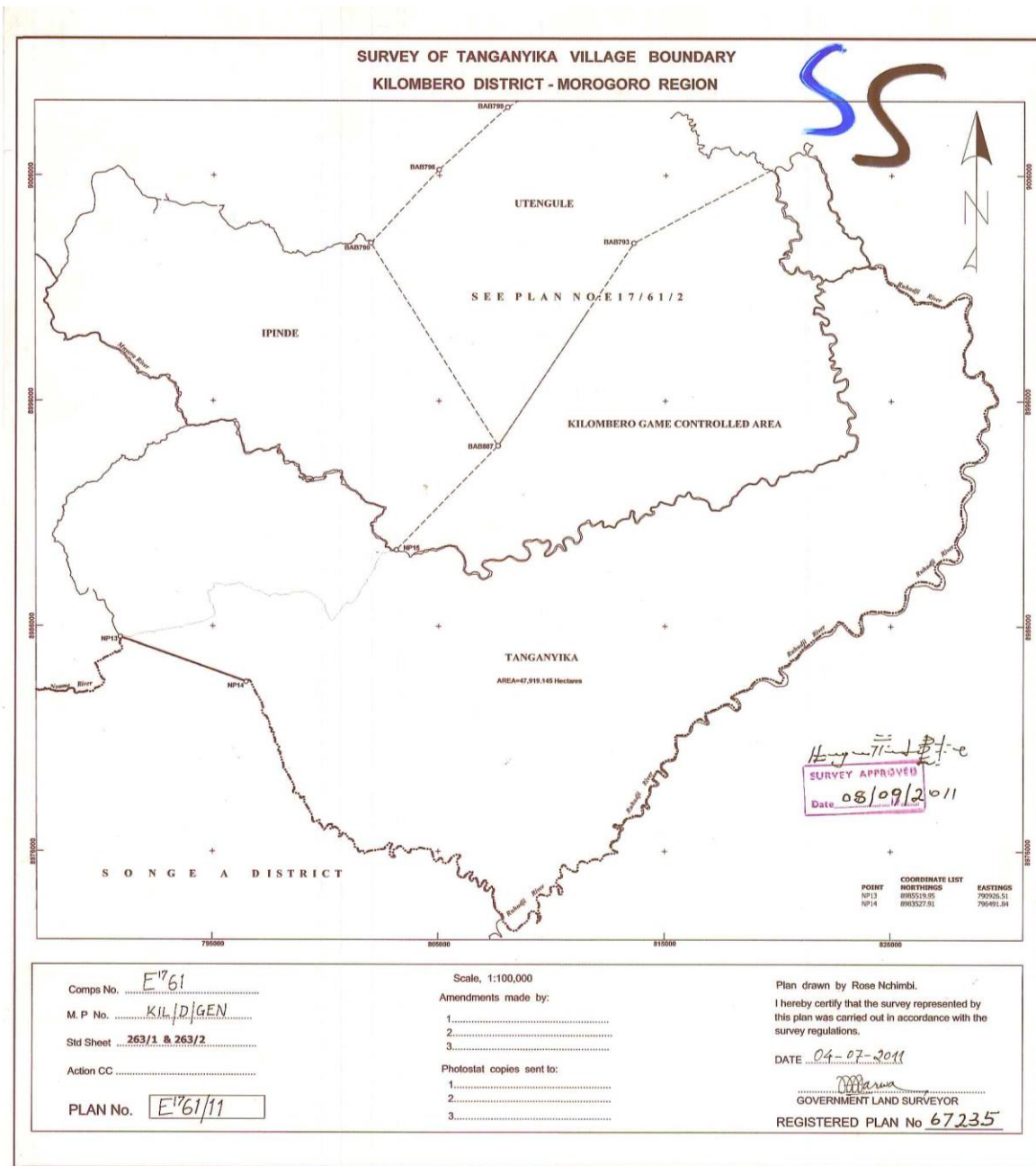
Corridor	Comments
Tanganyika	Proposed as a possible link between the Ngapemba wildlife area and the GCA that is being consolidated. If open this could allow movement of wildlife, especially puku, into the GCA. It is expected that any possible links would be along the main rivers such as the Ruhidji. However, at present the linkage has been completely cut off by agriculture which extends up to the river bank.
Mbarika	Conceived as link between the Selous Game Reserve and the Ngapemba area, through the Ruhidji Open Area which is currently used as a hunting block. Currently this appears to be a viable corridor which would allow movement of large mammals. There is very little settlement and agriculture in this area. It is recommended that most of this area is included in the "greater" Ngapemba Conservation Area.

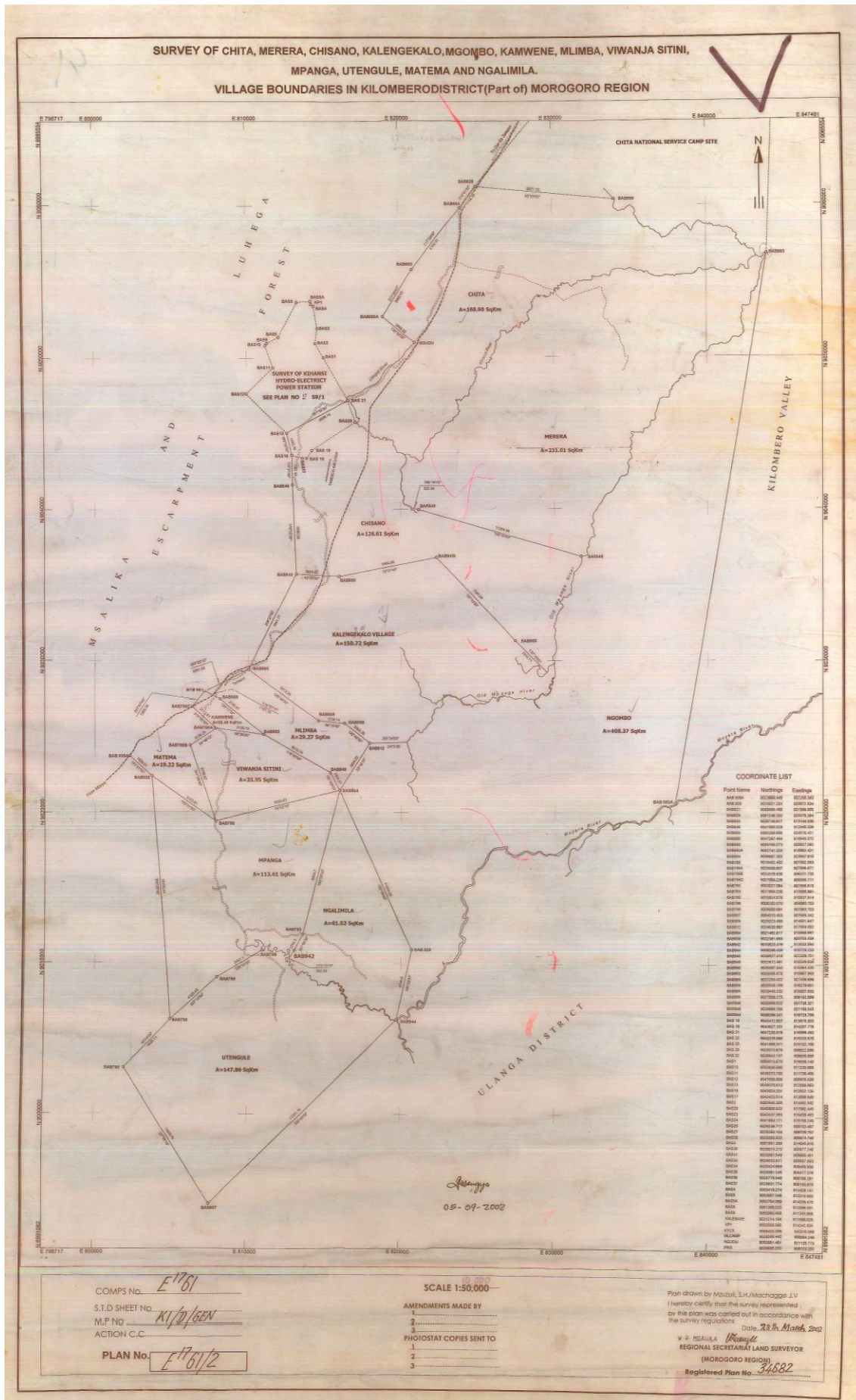


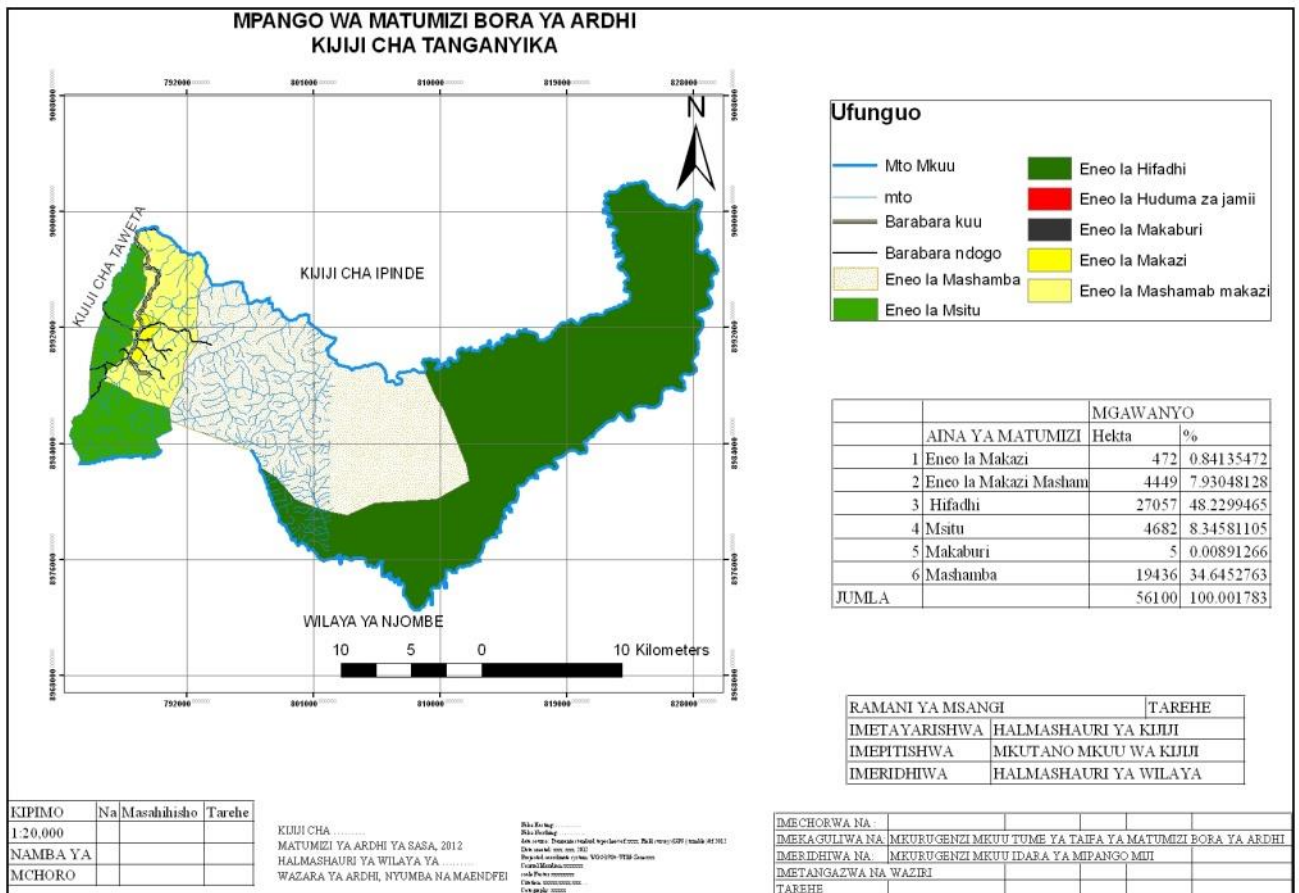




## ANNEX - VSP AND VLUP

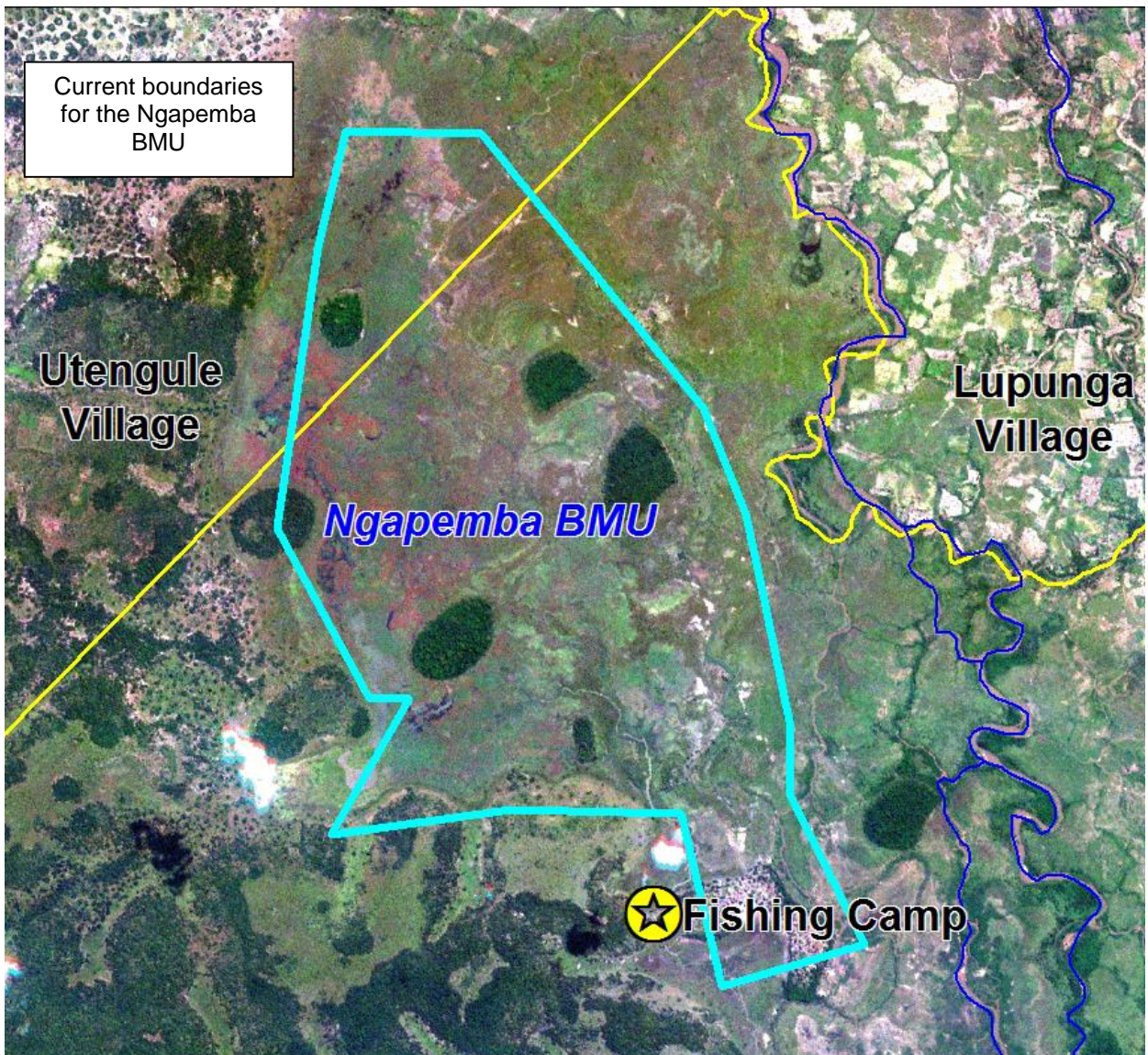




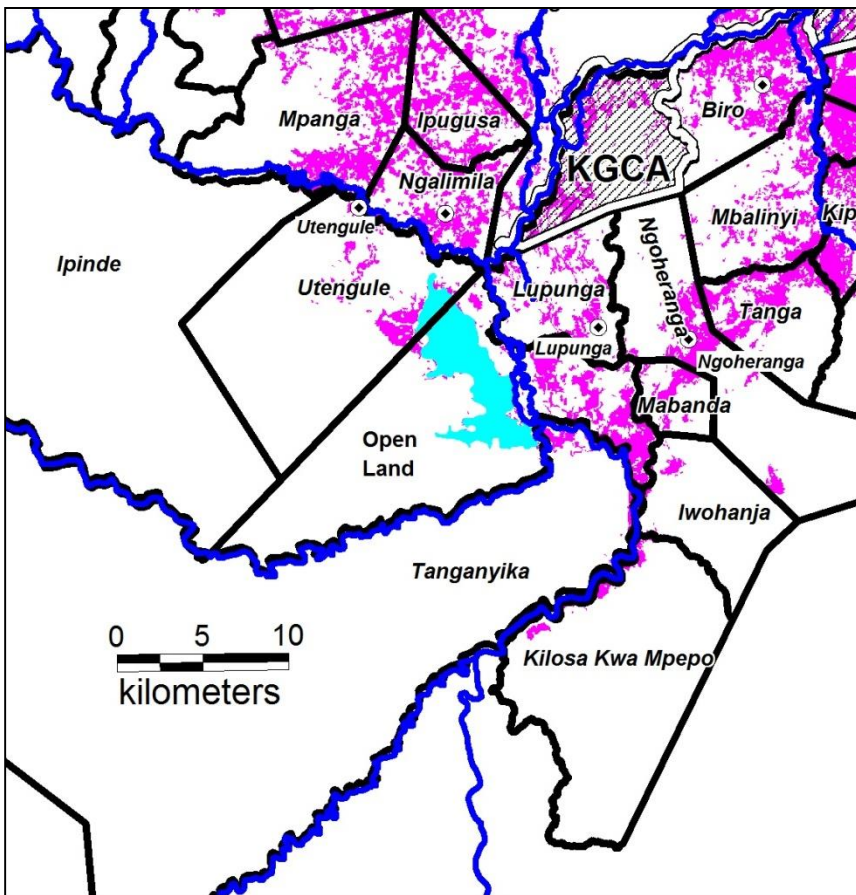




## ANNEX - GENERAL MAPS





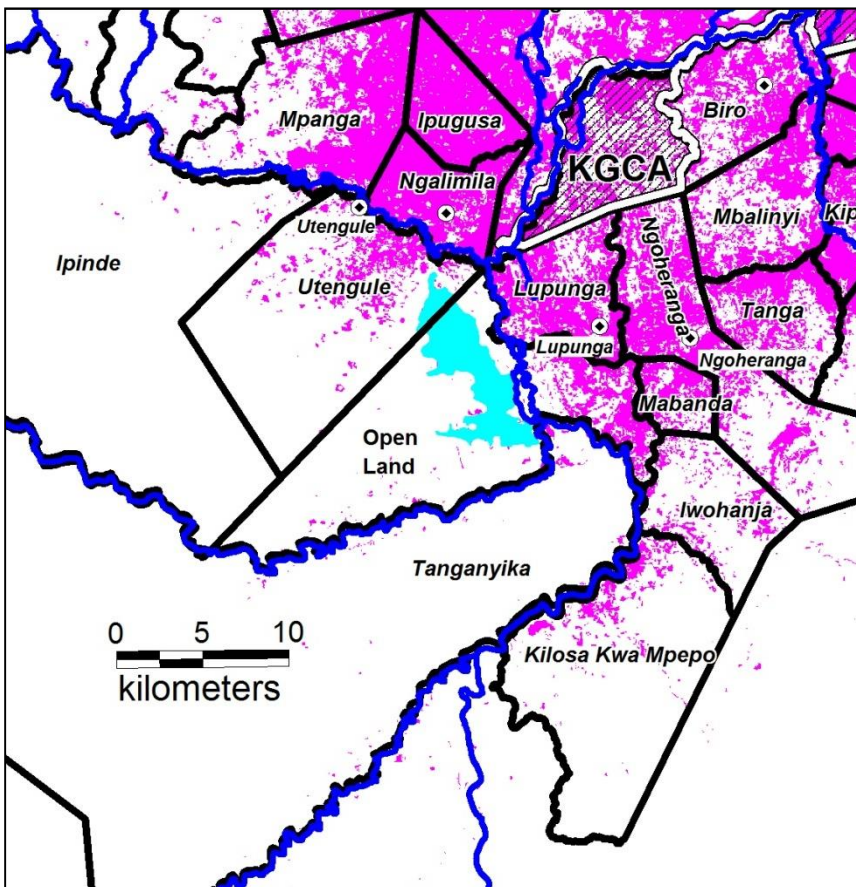


Estimated extent of cultivation 2005  
 SWOS, 2016  
 Purple = Cultivation  
 Light Blue = Ngapemba wetlands

**Main differences 2005-1025**

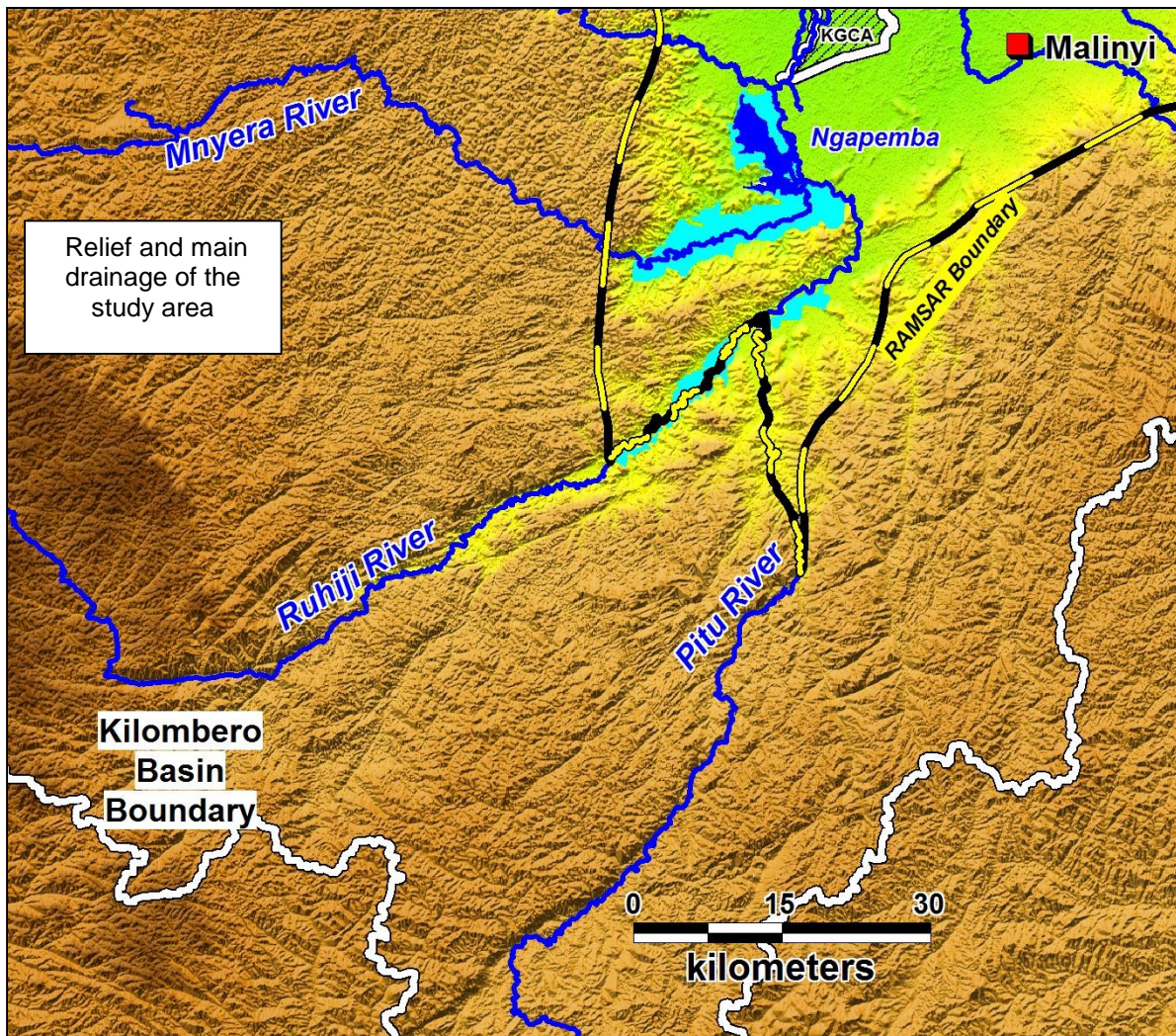
- Significant consolidation of cultivation in all villages to north of Ngapemba
- Increase in cultivation south of Utengule Village. Some new clearing during 2016 (after image date)
- Significant increase of cultivation along Ruhiji river in Kilosa kwa Mpepo village

"Open land" refers to non village land

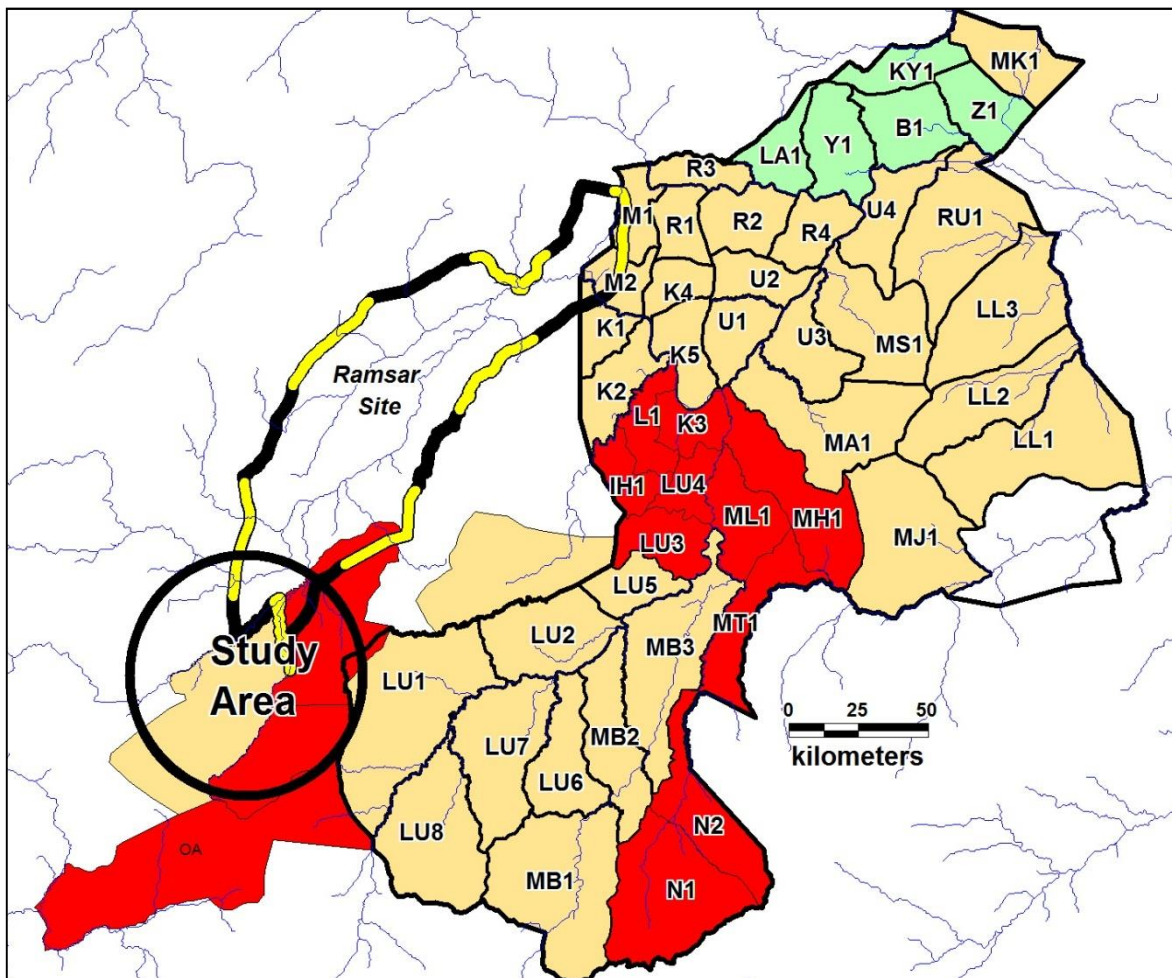
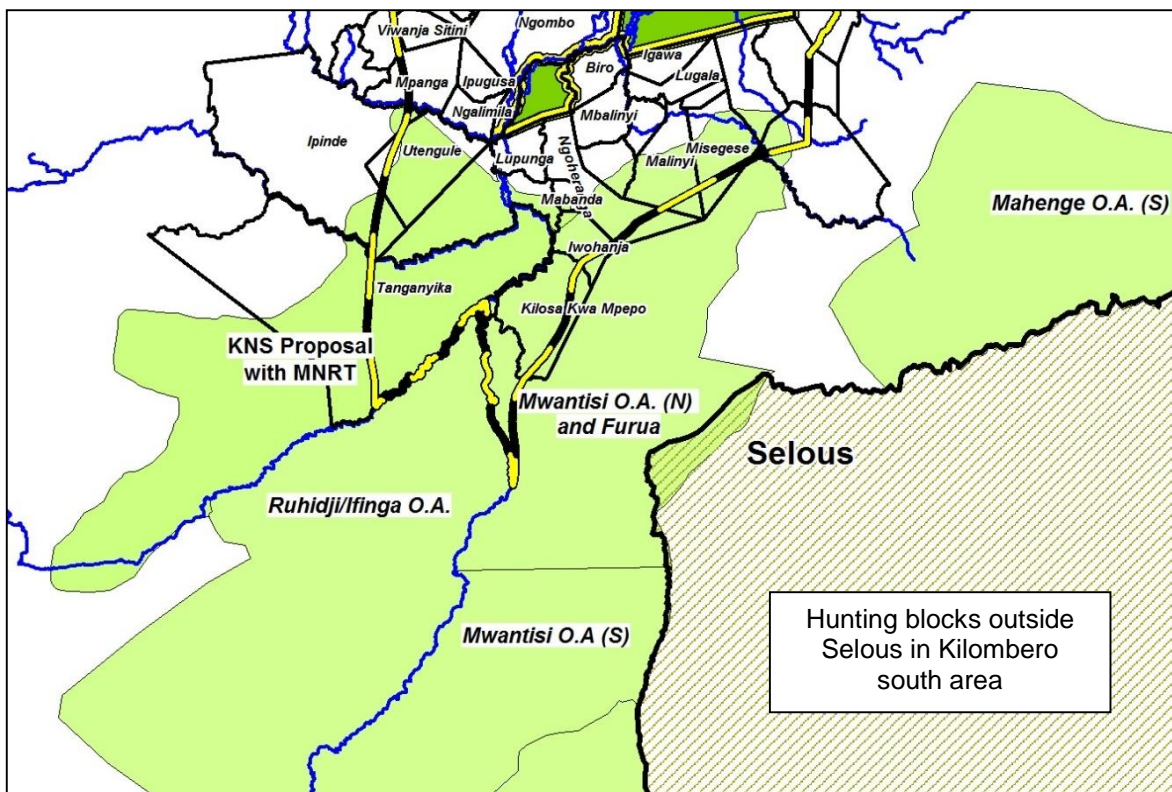


Estimated extent of cultivation 2015  
 SWOS, 2016









## ANNEX - TERMS OF REFERENCE

Produce a detailed assessment of the options to establish the area as a Wildlife Management Area or as a Game Reserves, including viability, strengths and weakness; generate detailed data, analysis and conservation management measures required for follow-on planning processes and instruments under the options; involve local stakeholders in the assessment of options and enable evidence based decision making.

### Activities

1. Baseline assessment: conduct an integrated environmental and socioeconomic study to describe the key environmental features and values, present land use within and around the area (across neighbouring villages: Tanganyika, Utengule, Ipinde) and communities' socio-economic description:
  - 1.1. Environmental assessment:
    - 1.1.1. Bio-physical survey of habitat: habit classification and descriptions, soils, hydrological conditions, floral composition; present habit management measures. (this activity will be complemented and closely coordinated with WP 3.1)
    - 1.1.2. Wildlife census: Under this specs herewith the contractor shall:
      - 1.1.2.1. collect secondary data on large game: records of quotas, population numbers from TAWA and the hunting operator;
      - 1.1.2.2. carry out a bird survey to produce a species checklist and baseline;
      - 1.1.2.3. puku population and habitat assessment
    - 1.1.3. Land assessment:
      - 1.1.3.1. Detailed land use and habitat assessment within and around the area,
      - 1.1.3.2. Land use and cover survey for connectivity assessments towards Selous GR: appraisal of Tanganyika and Mbarika corridors:
      - 1.1.3.3. Surveys of biophysical and spatial features through remote sensing and reconnaissance level field survey
      - 1.1.3.4. Collection and analysis of land tenure data: key informant interviews with village officials, and data collection extending to Songea: collection and validation of land tenure data: village survey plans, village land use plans, database of land lease agreements issued by village government; granted rights; deemed rights based on customary practices
  - 1.2. Socio-economic assessment: Preparation of village socio-economic profile based on secondary data; PRA survey. Issues of focus: historical and present use of land and resource access; land use changes; demographic dynamics; status of land use planning; cultural sites; grazing patterns and livestock management; social infrastructure. This activity is to be closely coordinated with WP XX below.
  - 1.3. Fisheries assessment – this will be carried out as a part of WP: 3.1 to be closely coordinated with the village assessment hereby.
2. Conservation options assessment:
  - 2.1. Appraisal of conservation measure required, including:
    - 2.1.1. Definition of site conservation goals
    - 2.1.2. Indicative boundary and zoning plan based on current land use and environmental values
    - 2.1.3. Habitat management goals and measures
    - 2.1.4. Landscape connectivity options, including assessment of options for riparian habitat conservation and rehabilitation to support wildlife dispersal towards the KGCA (i.e., riparian strip connecting to core valley area).
    - 2.1.5. Reflection of specific site management measures for puku (see separate activity)
    - 2.1.6. Access restrictions required under the two options and mitigation measures (fisheries, NTFPs)



- 2.1.7. Law enforcement
- 2.1.8. Conservation monitoring plan
- 2.2. Preliminary viability assessment:
  - 2.2.1. Present conservation and sustainable utilization practices: activities, infrastructure, harvesting, impacts, sustainability.
  - 2.2.2. WMA option:
    - 2.2.2.1. Detailed WMA establishment plan according to WMA Regulations 2012 including costing of outstanding steps
    - 2.2.2.2. Financial viability assessment assuming continued hunting business (use business plan appraisal template developed by KILORWEMP for Iluma WMA and/or viability assessment tool developed by USAID PROTECT).
    - 2.2.2.3. Infrastructure requirements (e.g., offices, WMA outfitting)
    - 2.2.2.4. Capacity building needs
  - 2.2.3. GR Option:
    - 2.2.3.1. Legal framework and process for the establishment of reserved land (Land Act; Village land Act; Land acquisition Act; Wildlife Conservation Act) and outline of resettlement plan and detailed requirements for its preparation.
    - 2.2.3.2. Indicative appraisal of resettlement costs for land acquisition required to transfer village land to reserved land
  - 2.2.4. Comparative analysis: cost/benefits and institutional and social impacts and requirements.
- 3. Stakeholder consultations:
  - 3.1. Facilitate Launch event of assessment at village meetings
  - 3.2. Interviews to collect stakeholders' views on conservation issues (hunting company, village leaders, MNRT, KDC, RAS) – consultant to prepare a checklist/guideline
  - 3.3. Facilitate consultative workshop (local stakeholders) presentation of results of assessment, including analysis of strengths and weaknesses of conservation options – collection of stakeholder feedback (village leaders, village members, CSOs active in the area).

## Outputs

1. Inception report: detailed methodology for assessments
2. Final assessment report including stakeholder consultations

## Associated project actions

1. Coordination and consultation with Kilombero DC
2. Technical meetings and workshop

Field logistics