Local institutions and the Functional Landscape Approach in the Kafue flats

Research Report for PRESERVE

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Executive Summary

The Kafue Flats (wetlands) in the south of Zambia comprise a natural resource of high value and immense importance for sectors such as hydropower generation, fisheries, livestock, agriculture and tourism. There are two types of wetlands in the Kafue sub-basin, namely upland dambos and stream valleys, and flats or floodplain. Each of these has distinct hydrologies, ecologies and economic opportunities. In recent years the environmental sustainability of the Kafue wetlands and their ability to support a range of ecosystem services that are important for local communities, have been compromised by the unsustainable use of land and water resources. This has been driven by the development needs of an increasing population, whose natural resource use includes cattle grazing, fishing, farming, water abstraction, fuelwood collection, construction and sand mining. Environmental change has also exacerbated these pressures, as has the uncoordinated operation of the Itezhi-Tezhi and Kafue Gorge dams upstream and downstream of the wetlands respectively.

In order to improve the wellbeing of communities in the Kafue sub-basin, Self Help Africa (SHA), with support from the Jersey Overseas Aid (JOA), has been implementing the Protecting and Restoring the Environment and Supporting the Emergence of a Resilient and Vibrant Economy (PRESERVE) Project in the Kafue sub-basin. The project aims to improve the resilience, food, income and nutrition security of 3,600 households through increased production and returns from smallholder livelihoods. The project promotes a Functional Landscape Approach (FLA), a balance between conservation of natural resources and promotion of livelihoods of the beneficiaries and the surrounding communities. It has been implemented in Mazabuka, Monze and Namwala of Southern Province.

The overall goal of the research presented in this report was to undertake post-intervention analysis of community experiences of implementing the FLA, with a particular focus on the project's institutional capacity building for wetland management through Village Natural Resource Management Committees (VNRMCs). A series of participatory activities were undertaken in 6 wards out of 12 where the FLA has been implemented, namely: Itebe and Munenga in Mazabuka, Malundu and Keemba in Monze, and Baambwe and Nakamboma in Namwala.

The research findings suggest that PRESERVE's capacity building activities have effectively empowered VNRMCs and facilitated the development of bylaws for natural resource management. Moreover, field evidence suggests that these have already had positive environmental impacts in terms of reducing pressure on wetlands and deforestation in some areas. The VNRMCs have also made a critical contribution to social capital in terms of facilitating knowledge exchange and coordinating other FLA interventions that have directly improved the livelihoods of beneficiaries. However, whilst there is evidence that most people support the VNRMCs and their bylaws, in some instances community members have declined to follow them. The reasons behind this are complex and require further research, but we suggest this may be linked issues of inclusivity and coverage during the formation of VNRMCs, and / or the lack of perceived benefits of participating in FLA / VNRMC activities, which itself may be linked to an overly prohibitive set of bylaws. Hence, there is need to explore and develop mechanisms through which the bylaws can achieve greater and a more inclusive 'buy-in' from the wider community. Nonetheless, the research suggests that the institutional capacity building elements of PRESERVE have so far made a significant contribution to enhancing social-ecological resilience, through functioning and adaptive VNRMCs and via the specific livelihood developments they have helped coordinate.

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List of Acronyms and Abbreviations

ASCA	Accumulated Savings and Credit Association
CLAs	Community Livestock Auxiliaries
CSA	Climate Smart Agriculture
CRB	Community Resource Board
CBO	Community Based Organisation
DoF	Department of Forestry
DNPW	Department of National Parks and Wildlife
FLA	Functional Landscape Approach
FGD	Focus Group Discussion
FPGs	Farmer Producer Groups
Ha	Hectare
JOA	Jersey Overseas Aid
KII	Key Informant Interviews
LFs	Lead Farmers
MASL	Metres Above Sea Level
MCM	Million Cubic Metres
MoA	Ministry of Agriculture
MFL	Ministry of Fisheries and Livestock
NGO	Non-Governmental Organisation
SHA	Self Help Africa
SI	Statutory Instrument
TSB	Technical Services Branch
VNRMCs	Village Natural Resources Management Committees
WaSH	Water, Sanitation and Hygiene
WDC	Ward Development Committees

1.0 Introduction

1.1 PRESERVE and the Kafue Flats

The Kafue Flats (wetlands) located in the south of Zambia comprise a natural resource of high value and immense importance for several sectors such as hydropower generation, fisheries, livestock, agriculture and tourism amongst others. Wetlands are water-controlled environments, subject to flooding or high ground water tables for at least part of year. Two types of wetlands dominate the Kafue sub-basin: upland dambos and stream valleys, and flats or floodplain. Each type exhibits distinctiveness in terms of hydrologies and ecologies, and hence there exists significant variation in the ecosystem services and livelihood opportunities that these wetlands support.

In recent years the environmental sustainability of the Kafue wetlands and their ability to support a range of ecosystem services that are important for local communities, have both been compromised by the unsustainable use of land and water resources, a situation exacerbated by uncoordinated operation of the Itezhi-Tezhi and Kafue Gorge dams upstream and downstream of the wetlands respectively. The hydrology of the Kafue River and Kafue Flats have been significantly altered by the operation of Itezhi-Tezhi dam. Water demand in the Kafue catchment is estimated at 11,284 million cubic metres (MCM) per year, whose use include hydropower generation, municipal, industrial, agriculture (irrigation and aquaculture), and recreational amenities (WWF, 2018). Hydropower generation at 8195 MCM/year is the highest user of water in the catchment although it is non-consumptive. This is followed by commercial agriculture (1022 MCM/year), industrial use (268 MCM/year), domestic use (220 MCM/year) and tourism (87 MCM/year). Any increase in water abstraction and/or a decrease in the water availability inevitably impacts downstream water availability and hydropower generation, and this, together with a decline in rainfall over the years, has greatly affected water availability and hence livelihood activities downstream. Furthermore, water shortages have also been compounded by the environmentally destructive actions of some communities that has included the clearing of vegetation in catchments and wetlands leading to more rapid runoff and soil erosion. Destructive farming practices have similarly resulted in sediment deposition from catchments, soil erosion, and the creation of gullies. Such activities have largely been driven by population pressure and the need to increase food security in the face of climate change-induced low rainfall.

Self Help Africa (SHA) is implementing the Protecting and Restoring the Environment and Supporting the Emergence of a Resilient and Vibrant Economy in Kafue (PRESERVE Kafue), a three-year project (March 2019-February 2022) funded by the Jersey Overseas Aid Commission. The goal is to improve the resilience, food, income and nutrition security of 3,000 households in Monze, Namwala and Mazabuka districts of Zambia. The project has adopted Wetland Action's Functional Landscape Approach (FLA) (See Box 1) to build capacity among communities to facilitate the sustainable use of natural resources for diversified livelihoods and increased incomes, whilst protecting and restoring essential ecosystems within the Kafue Sub-basin.

The PRESERVE project has the following aims:

1. To build the resilience, food, income and nutrition security of 3,600 households in the Kafue Sub-basin.
2. To increase production and returns from smallholder livelihoods.
3. To improve the management of natural resources.

The project aims to realise the main aims by implementing the following specific objectives:

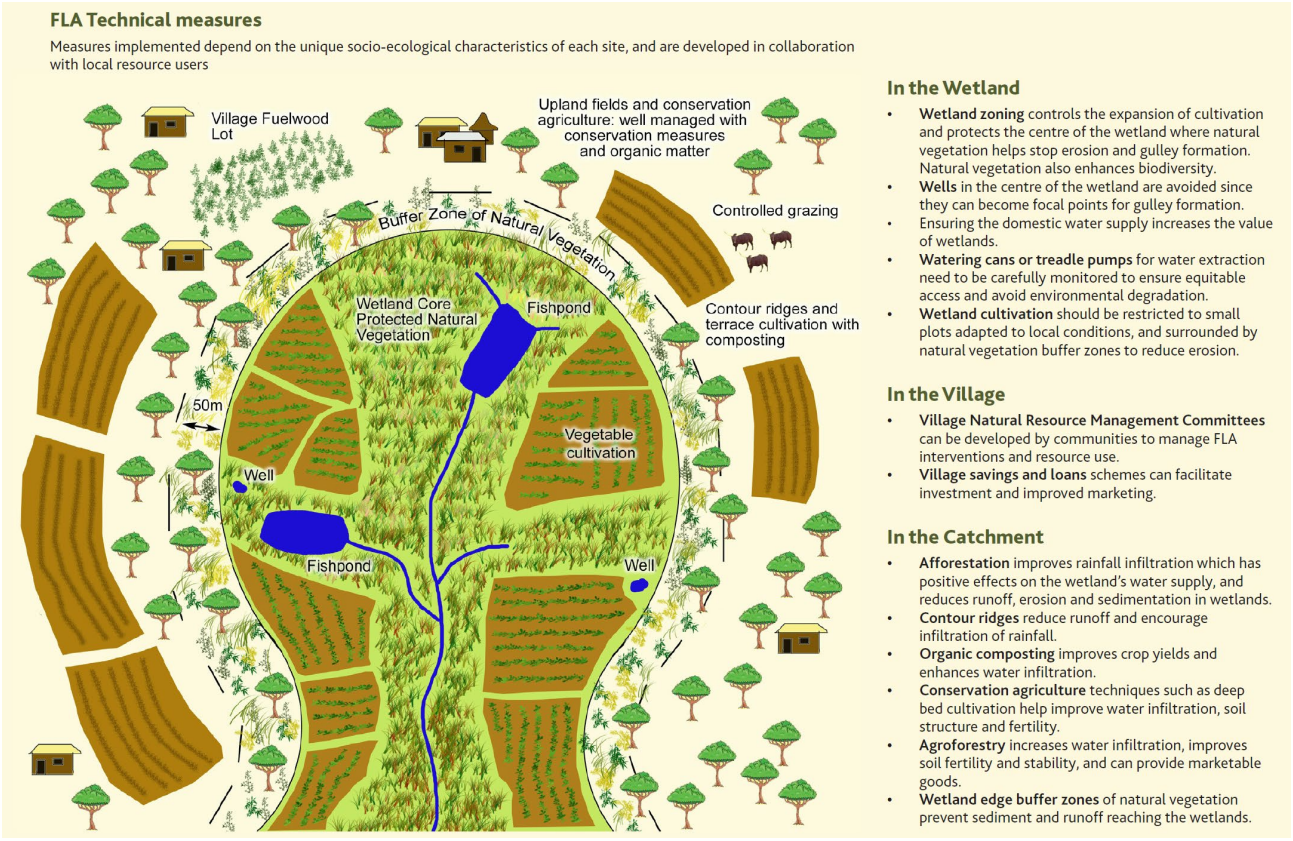
- Increase skills and knowledge of smallholders to adapt to a changing climate and benefit economically and nutritionally from the wetlands.
- Improve capacity of communities and local Natural Resource Management institutions in integrated wetland management.
- Enhance policy, research and learning for purposes of replication and scaling up.

Participants include the youth, women and households living with other vulnerable individuals (e.g. orphans, disabled, elderly, and chronically ill, among others). Other activities have focused on strengthening community structures through knowledge and skills transfer, enterprise development, and actions that promote conservation and restoration of natural resources. These activities are implemented in close

Box 1 – Wetland Action's Functional Landscape Approach.

Wetland Action's FLA draws upon a holistic, social-ecological systems view of the dynamic relationship between people and the environment. It applies this to the specific context of wetlands and their catchments, and recognises how different landscape units in both the uplands and valley bottoms are linked through environmental and social processes, and how specific interventions and management strategies can support and sustain these inter-related ecosystem services and livelihoods (Wood and Thawe 2013). It draws upon a range of ideas from various disciplines including integrated catchment management (Lenton and Muller 2009), social-ecological systems (Berkes et al. 2003) ecological networks and mosaics (Mimet et al. 2013) ecoagriculture (Scherr and McNeely 2007) and conservation agriculture (Knowler and Bradshaw 2007). The FLA is one of many integrated landscape approaches which have emerged in recent years as a means of conceptualising and reconciling the tensions between conservation and development at multiple scales and with multiple stakeholders. As a development approach, its goals include:

- Maintenance and enhancement of the natural resource base in a sustainable manner to support natural capital and ecosystem services.
- Building improved, resilient and sustainable livelihoods through increased income generation and food security through innovations in land management practices, especially managing water and nutrient flows, new crop opportunities and better marketing and processing of crops.
- Strengthening community action and building capacity to address livelihood and environmental challenges, through facilitating the creation of local institutions, clubs and social networks for knowledge exchange and self-reliance.
- Facilitating asset accumulation by farmers from their increased incomes, providing resilience against food insecurity and enabling income diversification through on-farm and off-farm activities to further spread risks.
- Encouraging the development of local monitoring systems so communities can monitor and manage their resources through a process of adaptive co-management.



partnership with government line ministries, Non-Governmental Organisations (NGOs), Community Based Organisations (CBOs), private sector actors and community leaders. Establishing effective partnerships with local structures was envisaged to result in a greater sense of community ownership and an improved uptake of services that seek to improve the wellbeing of the community.

1.2 Researching the FLA intervention

In order to understand different experiences of FLA interventions within different communities, a research project was undertaken in September and October 2021. The overall objective of the assignment was to undertake post-intervention research that explores different experiences of FLA interventions within different communities, with a particular focus on the project's institutional capacity building for wetland management through Village Natural Resources Management Committees (VNRMCs) or other structures that have been presented as a means of developing sustainable livelihoods, local environmental enhancements, and social-ecological resilience. The research was to evaluate the effectiveness of these new institutional arrangements in building resilience, and produce 'lessons learned', which could then inform current and future community-based activities (adaptive co-management) and wider policy debates.

Specific research objectives included:

1. To gain an overview of the key FLA interventions implemented in each community and to identify what is perceived to be their relative strengths and weaknesses.
2. To identify the functional dynamics of VNRMCs / institutional arrangements in their operations, decision-making, membership and linkages with other institutions and administrative structures.
3. To identify the contribution of these institutions to social and human capital.
4. To identify the ways in which these institutional arrangements have evolved over time.
5. To identify the impacts of these new institutional arrangements on natural capital in wetlands and catchments, and its associated management.
6. To identify the influence of different social-ecological contexts (communities) on the operations and effectiveness of the FLA institutional arrangements.
7. To identify the wider policy and institutional facilitators of, or barriers to, sustainable institutional arrangements at the community level that enhance (wetland-based) livelihood resilience.
8. Through the analysis of these scenarios, to examine the extent to which social-ecological resilience has been enhanced in the target communities as a result of institutional capacity building within the FLA.

2.0 The study areas

This research was undertaken in 6 wards out of 12 where the FLA has been implemented within the PRESERVE Kafue Project area in Southern Province. These included: Itebe and Munenga in Mazabuka, Malundu and Keemba in Monze and Baambwe and Nakamboma in Namwala (Figure 2.1). These communities were selected for their potentially different social-ecological contexts (e.g. their proximity to wetlands and Game Management Areas, population, natural resource availability, access to markets) as well as their implementation experiences (e.g. performance of VNRMCs, links with other organisations) and their field accessibility.

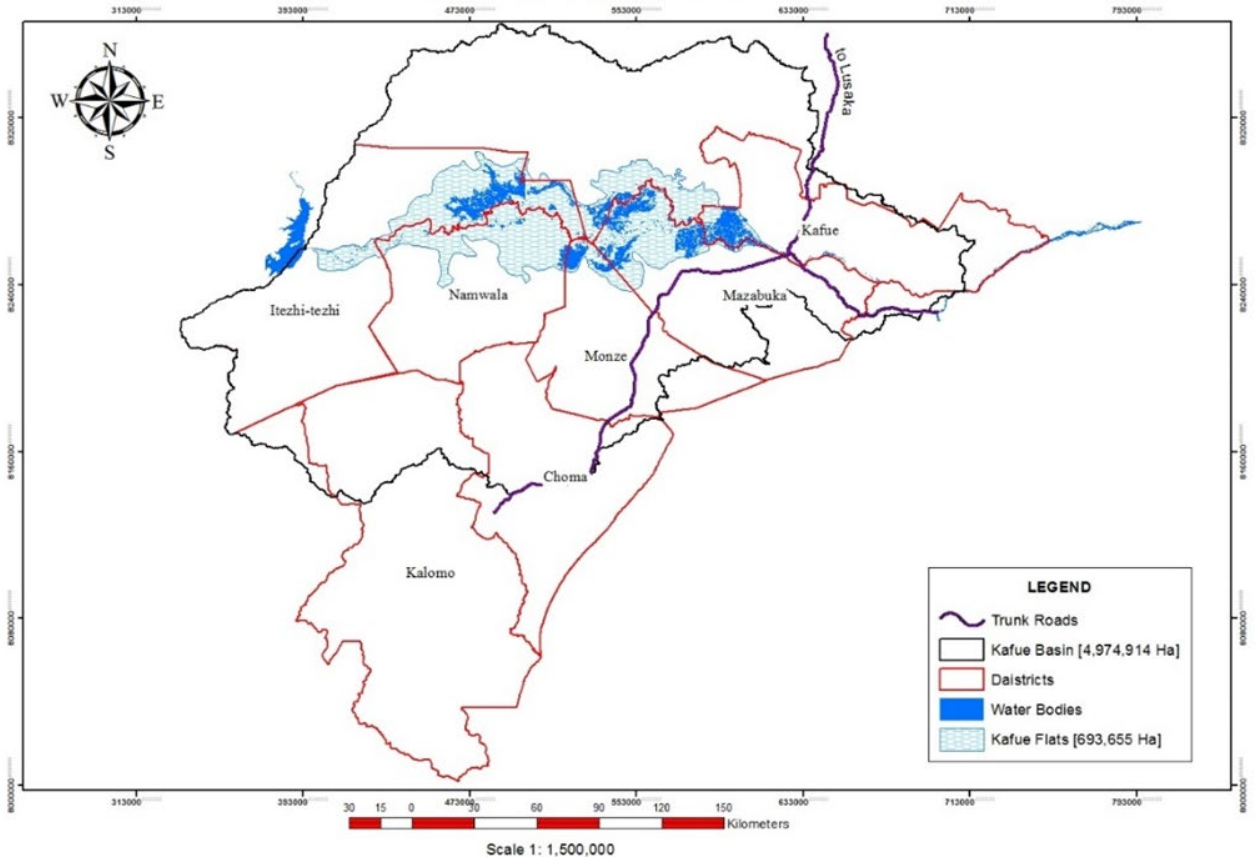


Figure 2.1 - The extent of the Kafue wetlands relative to the study communities. (Source: MoA-TSB, 2019).

2.1 Environmental characteristics

Zambia is divided into three major agro-ecological regions which categorized as region I, II and III. These are primarily based on rainfall amount but also incorporate soils and other climatic characteristics. Region I receives less than 800 mm of rainfall annually and constitutes 12% of Zambia's total land area. Region II receives between 800 mm and 1,000mm of annual rainfall and covers 42% of the country. This is subdivided into IIa and IIb. Region III receives between 1,000 mm and 1,500 mm of rainfall annually and constitutes 46% of the country's total land area. The three districts fall in two of these agro-ecological regions with Mazabuka and Monze districts falling within both agro-ecological Regions I and IIa, and Namwala in region IIa (Figure 2.2).

The soils are moderately to highly fertile sandy loam that are well drained and suitable for a wide range of crops. Other areas have clay soils as well. Land is mostly flat but slightly slants towards the Kafue River basin. The altitude of the districts is between 1,100 and 1,300 m above sea level. Temperatures are high between September and November, ranging from 30-35 degrees Celsius. The dry months of May to July are coldest, with average low temperatures of 16-17 degrees Celsius but can also be below that especially at night.

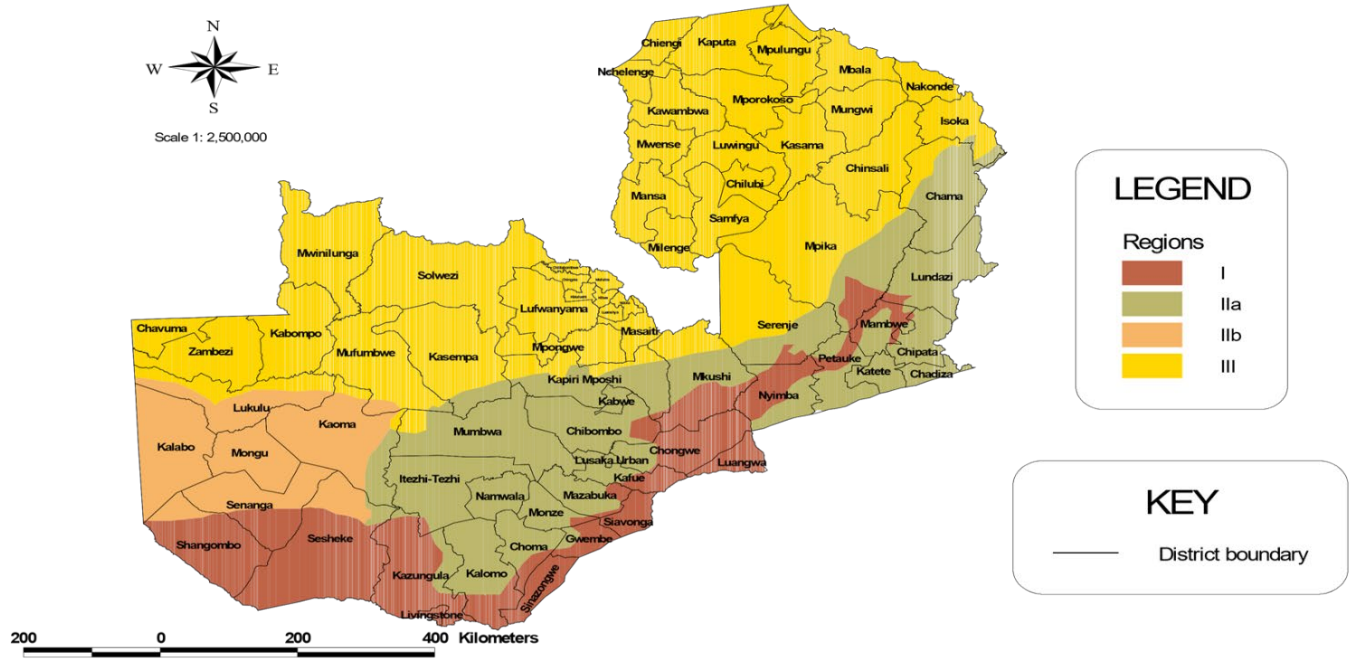


Figure 1.2 - Agro-ecological regions in Zambia (Source: Arslan et al, 2013).

Open Savanna grasslands and Miombo woodlands cover wetlands and most of the catchment. The land cover in the project areas is also predominantly characterized by grass, short to medium size trees and acacia species such as *Faidhebia albida* (Munga or Musangu) of the Fabaceae family as well as Dichrostachys cinerea mostly found near water bodies. Chrysopogon zizanioides is a common grass. Dispersal of *Faidhebia albida* to most areas has been largely due to effects of climate change. This plant is dispersed by cattle that now feed on its fruits due to lack of grass especially in the dry season. The tree has colonised new areas such as parts of Malundu Ward in Monze and Itebe and Munenga Wards in Mazabuka.

2.2 Livelihoods

Rainfed and irrigated agriculture cultivates maize, wheat, sunflower, soyabeans, cotton, groundnuts and vitamin A bio-fortified orange fleshed sweet potato vines. The growing season is medium to long, ranging from 100-140 days. Cattle are mostly kept for sale and used as draft power. Other livestock kept include goats, pigs, sheep and poultry which are kept for sale or household consumption. The three target districts have a total of 121,223 farmers, of which 107,085 (88.3% of all farmers) can be categorised as having small-scale land holdings of less than 5 hectares. Medium-scale farmers (with between 5-20 ha) total 13,675 (11.3%), while commercial farmers (>20 ha) total 463 (0.4%) (MoA, 2020). During the rainy season, cattle is moved from wetlands to upland dambos and grasslands for grazing as wetlands become waterlogged.

2.3 District characteristics

Table 2.1 - Demographic characteristics of each district.

	Mazabuka	Monze	Namwala
Area (ha)	383,064	483,600	1,000,000
Agricultural Camps	29	39	15
Agricultural Blocks	4	5	4
Population	182,205	191,872	101, 589
Small-scale Farmers	34 074	53,214	19,797
Medium-scale Farmers	3917	9758	..
Commercial farmers	45	418	..

Mazabuka District is located about 125 km south of Lusaka. The district is 3,831km^2 in size and has three main landscapes: wetlands, the plateau and the hills. Much of Mazabuka District is on the main plateau where the winter months are cool. In the Kafue valley undulating landscape and baobabs are a common feature, while the central plateau is characterised by isolated patches of natural vegetation and secondary bush. Annual rainfall ranges from 400 to 600 mm in the valley and from 700 to 1,000 mm on the plateau and river plains. The main river in the district is Kafue along which the 13 fishing camps are located. The other river is the Magoye and a number of seasonal streams and dambo areas act as a source of water for gardening and animals.

Monze District is situated along the Great North Road/Railway route, approximately 200 km from Lusaka in the North and 300 km from Livingstone in the South. Its neighbouring districts are Mazabuka in the north; Gwembe in the east; Choma in the south; and Namwala in the west. The district could be divided into three physiographic regions: the South-eastern part of the district with steep slopes borders Lake Kariba whose altitude is between 600 and 650 metres above sea level (masl), the Central High plateau area consisting of soft undulating old plains, which is ideal for maize growing, and the North West low flat plain where the Kafue Flats and Kafue National Park fall. The drainage pattern is from the south into the north where it drains into the Kafue River. The Kafue River is the largest river that crosses the district. The other notable river is the Magoye River.

Namwala District is located about 454 km south of Lusaka. The district is 10,000 km^2 in size. Over 70% of its land is arable and the district has two main water bodies namely Kafue and Namwala rivers. Annual rainfall ranges from 600 to 1,000 mm on the plateau and river plains.

3.0 Methodology

3.1 Study site selection and research approach

As highlighted above, each study area (district and ward) was purposively selected to represent a range of different social-ecological contexts and implementation scenarios. This was guided by the SHA office in collaboration with the local consultant, lead consultant and an independent researcher. The research adopted a mixed method approach to data collection, incorporating a range of quantitative and qualitative participatory assessment techniques. These facilitated the description, analysis and understanding of the relationship between livelihoods, wetland use and FLA interventions within the 3 districts. The research was also informed by a review of literature and secondary data to understand the context of the FLA implementation within the PRESERVE programme. This included:

- Maps (climatic, vegetation, topographic/physical, soils).
- The 2018 Wetland Policy.
- State of Environment Reports, Census reports.
- Ecological assessment reports and other related reports or publications.

Data collection process also identified key issues related to agricultural production, grazing and charcoal production in the wetlands and catchments. This was to ensure that gender-specific data is collected, because agricultural activities and other wetland activities may differ for women and men due to their roles, concerns, social, cultural beliefs, and norms. Women and men have different viewpoints and understanding their various uses of the environment and agricultural activity was to create a more complete understanding of positive and negative effects of these activities.

3.2 Methods

3.2.1 Focus Group Discussions

One Focus Group Discussion (FGD) was held in each of the six wards selected. All FGDs were held with mixed groups of women, men and youths, which also included representatives from different farmer producer groups as well as VNRMC representatives (there were two VNRMCs operating in each ward). Group size ranged from 20-46 participants (Table 3.1). To gather an in-depth understanding of wetland use, participants were encouraged to discuss and contribute their views on various elements of agricultural production (e.g. crop rotation, manure, rainwater harvesting, minimum tillage, crop diversification), animal grazing, agroforestry and forest management, hunting and fishing. Other topics covered included: a) their participation in training on group formation and the Accumulating Savings and Credit Associations (ASCAs), and b) the promotion of enterprise development, focusing on value chain analysis and targeting Seed Entrepreneurs and FPGs growing field crops, assorted vegetables and rearing livestock (goats and chickens).

Each FGD began with an introduction by the lead researcher who explained the purpose and procedure of the FGDs, including the COVID-19 guidelines by Ministry of Health on group meetings. The data collected consisted of notes and audio recordings of the discussions. A summary is provided in Annex 2.

Table 3.1 - Number of FGD participants.

District	Ward	Gender		Total Respondents
		Female	Male	
Monze	Malundu	34	12	46
	Keemba	23	11	34
Namwala	Baambwe	19	1	20
	Nakamboma	21	9	30
Mazabuka	Itebe	14	6	20
	Munenga	13	7	20
Total		**124**	**47**	**171**

Figure 3.1 - FGD participants in Malundu, Monze.

3.2.2 Key informant interviews

Key Informant Interviews (Table 3.2) were carried out with 86 individuals. These were semi-structured and flexible in nature, being guided by the research objectives highlighted in Section 1.2.

Table 3.2 Key Informants taking part in the research.

Ward	Interviewee Category								
	Headmen/ Chief's Representatives	Lead Farmers	Climate Smart Agriculture (CSA) Champions	Enterprise Champions	Accumulated Savings and Credit Associations (ASCAs) Champions	Nutrition/ WaSH Champions	Gender Champions	Seed Growers	Total
Malundu	3	6	2	2	1	1	1	2	18
Keemba	2	3	1	3	2	1	2	1	15
Baambwe	-	4	1	2	2	-	1	-	10
Nakamboma	2	4	1	2	2	1	1	2	15
Itebe	1	5	2	2	3	1	1	1	16
Munenga	-	4	1	2	2	1	1	1	12
Total	8	26	8	13	12	5	7	7	86

3.2.3 Transect walks and observations

Participatory transect walks were undertaken in each community in both wetlands and uplands, and involving those participating in the FGDs as well as others considered particularly knowledgeable on wetland use and changes over time. The transect walks allowed community members to draw attention to resource and livelihood issues, thereby facilitating an understanding among the research team of the environment, agriculture practices, culture, livelihood and the social-economic status of the residents in different districts. Photos of different sites and landmarks were also taken. Specific points of interest for discussion included, among others, the extent of wetlands and vegetation, land degradation features, soil erosion and compaction, cultivation and tillage practices, livestock practices, landscape 'units' within wetlands and uplands, wetland products, and features relating to water supply. A summary of observations is provided in Annex 1.

3.3 Data analysis

Narrative and thematic analysis was employed to analyse the qualitative data obtained during the study. Qualitative data gathered from the FGDs and KIIs was made up of audio recordings of participants' statements and written statements recorded as respondents gave feedback. To ensure that the findings from the narrative analysis were as accurate as possible, the following steps were taken:

1. Recording participants' statements in notebooks.
2. Reading all statements several times to get familiar with the data
3. Identified patterns and connections by looking for common responses to questions, and identifying data that answered the research objectives, as well as highlighting anomalies to be explored further.
4. Entering the identified key themes from each district according to the key questions and interests.
5. Selecting key themes to be discussed as findings based on the objectives of the study, rather than discussing findings of the complete account of everything that the participants conveyed.

4.0 Key findings

4.1 Wetland use

In all areas it was noted that the most important wetland use was cattle grazing, (which are mostly herded by men or boys), followed by fishing, which is also mostly done by men (Table 4.1). Communities near wetland have various uses such as domestic water collection, collection of grass and gardening. Gardening is done in Baambwe and Itebe due to their proximity to wetlands. They also tend to use them frequently. This has led to an increase to wetland disturbances in some places.

Table 4.1 - The perceived relative importance of different wetland uses in each community.

	Monze		Namwala		Mazabuka	
Rank	**Malundu**	**Keemba**	**Baambwe**	**Nakamboma**	**Itebe**	**Munenga**
1	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing
2	Fishing	Fishing	Fishing	Fishing	Fishing	Fishing
3	Pole collection	Hunting	Domestic water	Hunting	Gardening	Pole collection
4	Grass collection	Pole collection	Gardening	Edible plant collection	Pole collection	Grass collection
5	Hunting	Grass collection	Pole collection	Pole collection	Dung collection	Edible plant collection
6			Grass collection	Sand collection	Grass collection	
7			Dung collection		Clay collection	
8			Clay collection			

4.1.1 Household roles in wetland use

There are specific roles for the various members of households regarding wetland uses. Herding cattle is done by men or boys and fishing is done by mostly by men using nets of various mesh sizes and lengths. Women use locally made baskets and catch fish for home consumption. For drinking water the major persons directly involved are women and this is particularly for the communities living near wetlands such as in Itebe and Baambwe. Game hunting is mostly done by males. Collection of plants to eat is mostly done by women. Reed collection is mostly done by men while thatch grass collection is done by both men and women. Cultivation of crops is mostly done by both men and women Clay is done by women. Collection of edible plants is mainly done by women, except in Nakamboma and Baambwe, both in Namwala District, where it was indicated that men also collect edible plants.

Generally, all wealth categories were found to be involved in wetland use with those better off utilizing it mostly for animal grazing. Animals if not properly managed would graze and destroy crops for other wetland users. This would occasionally lead to conflicts between owners of animals and other wetland users particularly those who use it for gardens in Baambwe Ward of Namwala.

4.1.2 Access to wetlands

Grazing is undertaken on communal land and access is acquired through traditional rights. This is also true for other activities. Wetland (flats) access is more difficult in Malundu, Keemba and Mungenga. This is largely due to the long distances to wetlands. In these areas few people have access to wetlands and mostly use them for 'high value' activities like animal grazing, fishing and hunting.

4.1.3 Frequency and seasonality of wetland use

Almost all wetlands activities are undertaken during the dry season when grass upland is dry and flooding recedes. However, fishing activities in some areas continue to be done even during the rainy season, despite the activity being illegal. Some wetlands become impassable by motorized transport making it difficult for the Ministry of Fisheries and Livestock (MFL) personnel to enforce the fishing ban (closed season) when it is in effect. Most of the fishing activities are done in Namwala and Itebe in Mazabuka.

Figure 4.1 - Illegal fishing gear (traps).

4.1.4 Trends in wetland use

There has been an increase in recent years in the use of wetlands for grazing and other activities. This has been driven by poor rainfall over the years in the 3 districts. Water for domestic use is also difficult to find as most boreholes and wells are drying up, leading communities to make shallow wells near or within the wetlands. This is particularly so for those near wetlands. Other factors include an increase in human population and upland crop failures or low production over the years. The other reason for the increase in wetland use was the high poverty levels at household level in most communities:

> *"When I was growing up in the 70s and early 80s we use to have a lot of rain in this area. Grass was all over here and we would take animals for grazing around streams nearby. These channels you are seeing used to have water flowing so we never used to take our animals very far. But now things have changed. Water is challenge… It changed around 1991; UNIP went with the rain!''* (Malundu villager).
>
> *"Just look at that oxen drinking water at the hand pump, here we share drinking water with animals, and human population has increased so people travel long distances to fetch water"* (Malundu villager).
>
> *"There is no grazing land here in Keemba so our boys take cattle to the plain for grazing, We only bring them closer to the village during the rain season since at that time grass is plentiful, but one has to take care of his animals to avoid destroying crops. There are too many cattle in Swiilia (wetland). That wetland used to have zebras and lechwes but due to poaching the numbers have gone down. I last saw a zebra more than 20 years ago but now I just see cattle."* (Keemba Lead Farmer).
>
> *"We can't keep our animals nearby as you can see the area is dry. Even finding drinking water for humans is difficult. Most wells are dry, so animals cannot survive. So we are asking for boreholes to be sunk here to alleviates this challenge. This problem is not only here in Keemba but also in Malundu, Choongo and I can just say the entire district"* (Keemba villager).

For Monze, increasing wetland use was attributed to a shortage of grazing land in uplands and catchments due to low rainfall over the years. This has led to reduction of grassland in Malundu and Keemba, so cattle

owners now opt to take animals to wetlands near Kafue River which have grazing land in dry season. For Namwala, the increase was due to increase in cattle population in the area. This was particularly the case in Baambwe.

4.1.5 Challenges for wetland use

Long travelling distances to wetlands has contributed to reduced security for cattle. This has increased incidences of cattle theft and loss. Good animal husbandry is also a major challenge, resulting in high disease and pest occurrence:

> *"We are in Nakamboma but animals are in the plains (wetlands) with few herders so there is a lot of cattle rustling. Actually most cases at the magistrate court concerns theft of animals. Security is bad as few people are tending to a large population of animals"* (Nakamboma Villager).

> *"Additionally, those wetlands get flooded so we have to move animals upland, and just imagine the distance they cover. It's a tricky situation"* (VNRMC member Nakamboma).

> *"Our animals are very far and it's practically impossible to go there every day so we often receive cases of thefts and deaths due to diseases. As you know wild animals are not vaccinated so sometimes can transmit diseases"* (Keemba VNRMC member).

There is also a risky of transmission of diseases from wild animals to domestic ones especially in wetlands bordering the national park, thereby increasing chances of zoonoses. This risk is higher in Monze than other areas due to proximity to the national park. Seasonal flooding also means animals cannot continue grazing there and so new areas in uplands have to be found. It was indicated that this seasonal movement is stressful to animals as well as cattle herders as they usually trek long distances to suitable upland grazing areas, usually within the community or grazing grounds nearby.

4.2 Institutional arrangements

4.2.1 VNRMCs and bylaw development

Twenty four Village Natural Resources Management Committees (VNRMCs) have been trained by SHA and they promote activities aimed at enhancing sustainable utilisation of natural resources. These members were drawn from the community and consists of members who have an interest in conservation of natural resources. VNRMCs actively participated in community sensitisation and awareness meetings on the FLA which is a means of developing sustainable livelihoods, local environmental enhancements, and social-ecological resilience. These VNRMCs also work closely with the Ward Development Committees (WDCs) especially in Mazabuka and Namwala.

Furthermore, there were indications that the project's institutional capacity building for wetland management (through VNRMCs) was effective in building resilience:

> *"SHA has empowered us with skills like in nutrition and conservation farming. So most of us have stopped doing those activities that were a danger to the wetlands and our livelihoods. We don't catch fish using illegal methods, cut trees indiscriminately for charcoal production or poaching. We are now able to feed our families throughout the year due to the improved farming methods"* (Baambwe VNRMC member).

VNRMCs members have been key in sensitising the community about the importance of conserving the wetland and practising FLA as a way of striking a balance between livelihood derived from wetlands and their sustainable use:

> *"VNRMC members provide messages on the conservation natural resources. They are doing a good job in reducing charcoal production. Here in Munenga, the community has accepted wholeheartedly these conservation messages. However, the main challenge is charcoal production by people who come from town. These are given permission by some headmen in Munenga"* (Munenga Farmer).

Participants reported a significant reduction in tree cutting in all the wards with the exception of Munenga Ward in Mazabuka, where 'outsiders' from the Boma still indiscriminately cut trees for charcoal. Authority for them to cut trees is given by a few headmen who do not adhere to the laid down rules. With the high demand for charcoal especially in Lusaka and Mazabuka Boma, a lot of people who are workers and some businessmen and women but staying in the Boma are frequenting Munenga Ward to cut trees for charcoal production. This charcoal is later sold in Lusaka and Mazabuka Boma. Authority for them to do this activity is given by some headmen in the area who have decided to go against what the VNRMCs are sensitising on. Each VNRMC has 10 or 12 members as indicated on Table 4.2 and each ward visited has two committees.

Table 4.2 - VNRMC Executive Members.

District	Ward	No. Committee Members	Comments
Monze	Malundu	12	Consists of (i) Chairperson, (ii) Vice Chairperson, (iii) Secretary, (iv) Vice Secretary, (v) Treasurer and (vi) 7 committee members (including Chief's representative and representative from WDC)
	Keemba	12	Consists of (i) Chairperson, (ii) Vice Chairperson, (iii) Secretary, (iv) Vice Secretary, (v) Treasurer and (vi) 7 committee members (including Chief's representative and representative from WDC)
Namwala	Baambwe	12	Consists of (i) Chairperson, (ii) Vice Chairperson, (iii) Secretary, (iv) Vice Secretary, (v) Treasurer and (vi) 7 committee members (including Chief's representative and representative from WDC)
	Nakamboma	12	Consists of (i) Chairperson, (ii) Vice Chairperson, (iii) Secretary, (iv) Vice Secretary, (v) Treasurer and (vi) 7 committee members (including Chief's representative and representative from WDC)
Mazabuka	Itebe	10	Consists of (i) Chairperson, (ii) Vice Chairperson, (iii) Secretary, (iv) Vice Secretary, (v) Treasurer and (vi) 5 committee members **In this ward, there are no representatives from the chief and WDC**
	Munenga	10	Consists of (i) Chairperson, (ii) Vice Chairperson, (iii) Secretary, (iv) Vice Secretary, (v) Treasurer and (vi) 5 committee members. **In this ward, there are no representatives from the chief and WDC**

Each of these communities have developed a set of bylaws that outline a series of rules and regulations governing the use of natural resources (Box 2). These were facilitated by PRESERVE as part of the FLA, and build on existing rules and acts of parliament that include the annual fishing ban (1st December – 28th February) and preventing pollution in wetlands. Key partners in this process were the Forestry Department, The District Council (Community Development Office), and the Department of Chiefs and Traditional Affairs. The starting point was to identify the existing rules and regulations, thereafter additions were made to address protection and restoration based on Participatory Land Use Maps developed in 2020 by SHA. The partners were important because the community 'set of rules and regulations' needed to be aligned with the existing policies; the Forest Act, the Wetlands policy and other related policies. Ultimately, these community rules and regulations will be adopted as bylaws to ease enforcement and application of penalties.

There are some minor differences between communities in the wording of bylaws that appear to reflect local social-ecological differences, and it was observed that tensions remain in some areas in terms of adhering to bylaws. As highlighted above, charcoal production and its associated tree-cutting activity is a common problem in Munenga, while in Itebe and Baambwe there are issues with overgrazing. In Nakamboma people continue to cultivate areas adjacent to the river, and in Malundu both overgrazing and tree-cutting continue to be practiced. Evidently the enforcement of the bylaws remains a continuing challenge.

There was no evidence of any changes being made to the structure, membership and functioning of the FLA, which for the most part can be attributed to the relatively short time in which they have been operational. The only exception was in Munenga ward where the chairperson relocated to Chongwe district, and where the vice chair took over as chairperson. In Itebe and Munenga wards there is also an intention to increase membership from 10 to 12 members, to align with other wards. Elections are carried out every three years.

Box 2 - Example of bylaws agreed by each VNRMC.

Traditional Tenure of Forests

1. All forests in chiefdoms are managed by headmen on behalf of chiefs through VNRMCs at village level who shall be enforcing the bye laws.
2. Access to the forest is through headmen, who shall work in conjunction with the VNRMCs for assessment and resource utilization and record keeping.
3. No cutting of trees/collection of resources except with permission from headmen through VNRMCs.
4. Permission for charcoal production should be obtained from Forestry Department in consultation with chiefs, headmen and VNRMCs.
5. Natural Resources Management activities and sensitization to be done by VNRMCs.
6. Offenders to be adjudicated by headmen and the chief or Chief's Council.
7. The Chief's Council to come up with fees and punishments for would be offenders.

Fire Protection

1. No unnecessary burning in communities.
2. No burning of grazing areas or of thatching grass or in dambos or wetlands.
3. Burning period is from May to June, with permission from Forestry Department, Chief's Council, WDCs, CRB and VNRMCs.

Women's Rights

1. Women have equal rights to own, develop and utilize land.
2. Women have the right to make decisions on natural resources management and participate in decision making and to protect it.

Streams and Rivers

1. There shall be no cultivation near stream and river banks to reduce siltation
2. No one is allowed to block the stream or river. Every person should have access to the stream or river and also access by domestic animals.
3. No one should make bricks close to rivers or streams.
4. No cutting of trees near rivers or streams to reduce erosion and siltation.
5. No one is allowed to fish using illegal fishing gear like mosquito nets and traps or to use poison.

Dambos and Wetlands Management

1. No one should cultivate in dambos or wetlands so as to maintain percolation points and to help recharge wetlands.
2. No burning of dambos/wetlands as they serve as grazing areas and no burning of thatching grass.
3. No cutting of trees in wetlands to prevent soil erosion.
4. Fencing of dambos/wetlands is prohibited as these are communal lands,
5. No one should sell part or the entire wetlands. Anyone contravening this rule will be punished by the Chief or Chief's Council.
6. Brick making in wetlands is prohibited.

Fruit Tree Protection

1. No one should cut fruit trees as they provide fruits in their time for the community and are sold for income generation of households. Whoever does that contravenes this section and is liable to punishment by the Chief's Council.
2. Community members to plant indigenous fruit trees at their home steads.
3. Only ripe fruits should be plucked from trees and anyone contravening rule this will be punished by the Chief's Council.
4. Community members to participate in early burning exercise to enhance natural regeneration of trees and grass.
5. Everyone should protect forests for the benefit of the community.

Fish and Wildlife

1. Illegal fishing is prohibited
2. Use of illegal fishing gear is prohibited. Only nets of recommended mesh sizes must be used.
3. Everyone should adhere to the fishing ban (closed season) regulations.
4. No one should poison fish in streams and/or rivers
5. Poaching is prohibited
6. All community members to participate in the conservation and management of natural resources.

Shade Trees

1. No cutting of shade trees in the community as they serve as resting places for both humans and animals. Only debranching is allowed.
2. All community members should get involved in planting shade trees.

Integrated Wetland Management

1. Burning of wetlands is prohibited.
2. Grazing of cattle in wetlands should be monitored by the owner or any person assigned to herd them.
3. No area within wetlands should be fenced off. These are communal lands to be accessed by everyone.
4. No area in wetlands should be sold off to an individual or group of individuals or company.
5. No cultivation is allowed in wetlands.
6. Brick making is prohibited. Anyone contravening this rule will be punished by the Chief's Council.

4.2.2 Impacts of the VNRMCs and bylaws

The direct impacts of the VNRMCs and the bylaws proved difficult to identify since participants tended to conflate these with the wider benefits of the PRESERVE Programme (see Section 4.2.4). Nonetheless, there was a recognition of the important role played by the VNRMCs in coordinating and facilitating knowledge exchange on a range of activities, for example forest management, nutrition and cookery, sanitation and hygiene, and business plan development. Lead farmers, who have acquired training and knowledge via SHA, act as a vital link between the VNRMCs and community members (wider beneficiaries) who are usually mobilised in interest groups based on different enterprises such as livestock rearing, vegetable production and field crop farming. This ability of the communities to share knowledge and organize themselves (social capital) was seen to be more pronounced in Baambwe, Nakamboma, Itebe and Malundu.

4.2.3 Emerging challenges

Despite widespread appreciation and acknowledgement of the benefits that PRESERVE has brought, the research highlighted a range of issues linked to their equitable distribution within communities. For example:

> *"Sometimes VNRMCs committee members and lead farmers would select their relatives to benefit from empowerment programmes such as giving them chickens, goats, vegetable seeds and legume seeds. This discourages other members who do not have relatives in decision making positions"* (Munenga Farmer).

> *"Beneficiary selection criteria or guidelines are not properly spelt out, so you find that some individuals benefit more than others in terms of quantities given and variety".* (Baambwe VNRMC member).

The unequitable distribution of benefits, which is perhaps inevitable given the limited funds available within the programme, is regarded as key driver of continued tree-cutting and charcoal production; those who have not benefited have no alternative but to pursue their traditional livelihood opportunities. Furthermore, those excluded from the benefits also have little incentive to adhere to bylaws that were developed without their input, and hence this is an issue that will need to be addressed for the long-term efficacy of the VNRMCs. There was also some criticism of the way in which the programme was initialized within each ward:

> *"You know when this project started, we did not know about as headmen and the chief was also in the dark. We came to know about it when it had already started. But for any programme to succeed, the chief should be made aware first and he should be adequately sensitized so that he gives a go ahead for it to have his blessings. But this never happened initially and it hampered activity implementation at first" (Malundu Headman).*

> *"When such programmes are introduced in this area, the chief should be informed but this was never the case. This meant that initially people were not free to accept and embrace it as they feared consequences."* (Baambwe member).

Some participants suggested the need for the programme to supply a range of physical assets in order to enhance the efficacy of the VNRMCs:

> *"We as VNRMC members are finding it difficult to effectively disseminate sensitisations messages. We do not have rain coats and gum boots making it difficult to reach people when it rains. We also need T-shirts and IDs for easy identification and bicycles. A bicycle was only given to the chairperson but what about other members"* (Baambwe farmer).

> *"Why can't SHA buy us gumboots and raincoats or umbrellas as VNRMC executive members. Our friends the lead farmers have been bought bicycles but not us. Why?"* (Baambwe farmer).

> *"This works is involving and we need bicycles. rain coats, gum boots and identification cards for us to discharge our duties nicely unlike the way it currently"* (Munenga VNRMC secretary).

"This work requires one to have an ID so that when we approach offenders we identify ourselves to avoid being beaten by some people. This is crucial, SHA should also consider providing us with uniforms or T-shirts for easy identification" (Keemba VNRMC secretary).

"We have considerable transport challenges as our area of coverage is very big, so we need bicycles" (Nakamboma VNRMC member).

"We are here but other people are flouting rules at Swiilila but we can't control it due to distance. If only we had bicycles or motorbikes it would ease our movement" (Malundu VNRMC member).

"Itebe is a big area and to effectively sensitise people in all parts, we need means of transport. If SHA can provide bicycles it would be of help and will lessen our burdens" (Itebe VNRMC member).

Finally, it was noted that while the VNRMCs work closely with the WDCs and therefore this provides a good network for sharing experiences, the effectiveness of the VNRMCs may hinge on the level of support from the WDC and the councillors therein. Moreover, some councilors work very well with VNRMCs members whereas others do not. It is imperative, therefore, that an enabling environment is be created by sensitizing councilors on the importance of NRM and also by facilitating exchange visits between councilors and VNRMC members across project sites.

4.3 Wider benefits of PRESERVE linked to the FLA

In the context of discussions of the VNRMCs and their contribution to livelihood development and natural resource management, participants cited improvements in food security, nutrition, income levels, enterprise development, access to clean water, sanitation, hygiene, gender equity, savings and loans, ecosystem awareness and knowledge about climate smart agriculture. The programme identified, trained and supported seed entrepreneurs in the production of legume seeds (groundnuts, cowpeas and beans) and vitamin A bio-fortified orange-fleshed sweet potato vines. Training in business skills and value chain analysis assisted Farmer Producer Groups (FPGs) to develop business strategies and plans to benefit from their farm enterprises. The sale of assorted vegetables, beans, groundnuts, cowpeas and orange-fleshed sweet potato vines has improved income levels for beneficiaries:

"I am a groundnut seed grower, this has enabled me to sell it at higher prices and given me higher returns. It is a really good empowerment for me… I now have enough money to buy school requisites and buy household necessities like sugar, cooking oil and baking powder. I have diversified into selling scones and fritters. Previously this time of the year we would have just been languishing without doing anything profitable" (Baambwe farmer).

"I had a very good harvest of sweet potatoes in June. After selling them I realized a lot of money which I never used to have even after producing maize for sell. I have found a lot benefits in cultivating them. I have even reserved some vines to plant in the next season. Additionally, they taught us other cooking methods like mixing sweet potatoes with fish to maximize nutritional benefits. This has greatly improved nutritional levels at home and my kids are looking healthy" (Itebe farmer).

Among other things, the wider impacts of these activities has included improved financial literacy which has led to savings that are used to buy food, agricultural inputs, school requisites, and clothes for themselves and their children. Moreover, village banks have been established in which members contribute money and receive shares accordingly. Loans are granted with minimal interest, and at the end of each year money is put together and distributed according to members' shares. There have also been significant gains in nutrition, again linked to new crop varieties and climate smart agriculture. Lead farmers in particular, have facilitated training on nutrition and cooking methods that do not destroy nor compromise vitamins and other nutrients in foods. One health community worker reported that incidences of malnutrition have reduced due to these interventions:

"These days when babies are brought for under five clinic, we have observed that their weights are okay, Even those who were small and underweight are now becoming 'heavy duty' babies"

A reported increase in household incomes has also led farmers to replace their thatched roofs with iron roofs, thereby reducing pressure on wetlands (where thatch is sourced).

In terms of natural capital, positive impacts on the wetland were reported. Fish catches have improved and more grass is now available for grazing since wetland burning has been prohibited. In Malundu, Baambwe and Itebe, grass was directly observed to still be green, and in Baambwe and Itebe cattle herders also confirmed this. In addition, some fishing camps which were closed have been reopened. This was particularly noticed in Mazabuka in Nakambala ward where fishing activities have once again commenced after cessation due to low catches. Here, participants reported that in the previous year fish catches in the Kafue River had increased due to improved water levels and greater adherence to the fishing ban enforced by the Dept of Fisheries and the police:

> *"This area you are seeing* [fishing camp] *was closed for the past 3 to 4 seasons due to low catches but this season it is different. It rained heavily last year and so fishermen have again set up camp here. There is a lot of fish being caught as you can see"* Mazabuka SGA Chair.

As such, through the livelihood and natural resource management enhancements initiated through PRESERVE and facilitated by the VNRMCs, there is little doubt that social-ecological resilience within these areas has been enhanced (see summary in Box 3). As suggested in 4.2.3. however, the challenge going forward will be to ensure that the VNRMCs and bylaws which underpin this resilience, are inclusive and adaptive to the needs of different stakeholders within the communities.

Box 3 – Summary of the strengths and weaknesses of the FLA intervention

Key resilience-building achievements

- Capacity building for wetland and catchment management through VNRMC creation undertaken in all communities.
- Training/ promotion of Climate Smart Agriculture (CSAs) to households through use of improved and early maturing seed varieties and livestock breed, early land preparation, use of organic manure, crop rotation, post-harvest techniques, use of good irrigation practices (sunken beds, potholes and mulching), tree planting and integrated farming. Evidence of livelihood improvements as a result.
- Training in community/group saving and spearheaded the formation of Accumulating Savings and Credit Associations (ASCAs).
- Promotion of enterprise development, focusing on value chain analysis and targeting Seed Entrepreneurs and FPGs growing field crops, assorted vegetables and rearing livestock (goats and chickens).
- Income and livelihood diversification.
- Promotion of conservation and restoration of the natural resources and also drafting of bylaws.
- Improvements in nutrition and food security.
- Development of Participatory Land Use Maps in all the districts.
- Collaboration with government departments and other NGOs and other stakeholders in activity implementation and to create synergies.
- Involvement of the community in delivery of conservation messages and extension services.
- VNRMCs and lead farmers actively delivering FLA intervention messages to the community.
- Evidence of enhancements to social and human capital.
- Promotion of skills and imparting knowledge to the community to adapt to changing climate and benefit economically and nutritionally from the wetlands.

Potential issues

- Those not participating in PRESERVE ignore the bylaws and continue to cut trees, produce charcoal, practise unsustainable upland farming, over-fish, collect sand from riverbeds, and cultivate banks of streams.
- Need for greater 'buy-in' for VNRMCs and bylaws (for which the benefits must be clear and demonstrable).
- Bylaws and VNRMCs appear to have promoted a message of conservation based on prohibiting the use of some natural resources. This goes against the FLA which encourages sustainable utilisation and the consideration of trade-offs.
- Limited involvement of traditional leadership during initial stages of the project.
- Limited numbers of goats, chickens and fruit trees distributed per group.
- Use of one cockerel to service all hens.
- Low quantities of beans, groundnuts and cowpeas distributed per beneficiary.
- Lack of transport is a challenge for some VNRMC members for ease mobility and extension message delivery.

5.0 Conclusions and recommendations

5.1 Key conclusions

- The livelihoods of those living in and around the Kafue Flats, are inextricably linked to wetlands and the ecosystem services they provide. The wetlands provide water supplies, grazing and agricultural land, and a range of craft and construction materials. In recent years, however, the dependence on wetlands ecosystem services has increased. This has been driven by an increase in the human and livestock population, as well as the impacts of climate change on land degradation.
- Self Help Africa's PRESERVE Kafue programme aims to enhance the resilience, food, income and nutritional security of 3,000 households in Monze, Namwala and Mazabuka districts of Zambia through implementation of Wetland Action's Functional Landscape Approach. The FLA facilitates capacity-building to facilitate the sustainable use of natural resources, balancing livelihood needs with the maintenance of ecosystem services in both wetlands and catchments. A key component of the FLA is the development of local institutional arrangements for managing wetland and catchment social-ecological benefits, and the research highlighted in this report sought to explore the experiences of institutional development in six of the PRESERVE wards.
- 24 VNRMCs have been established across the six wards with the participation of local communities. Within each, bylaws have been successfully developed which set out the rules of engagement with wetlands to facilitate their sustainable use.
- On-going sensitization activities within the community are effectively enhancing people's knowledge base on wetlands and their associated livelihood activities, and broader catchment natural resource management issues.
- VNRMCs are being used to communicate and disseminate information on a wide range of activities, including good nutrition and cookery lessons, sanitation and hygiene, savings and loans and business plan development.
- The process of VNRMC formation and the development of bylaws has facilitated the wider exchange of knowledge and ideas among communities, thereby enhancing social and natural capital.
- Bylaws show minor (but unique) adaptations to the community in which they have been developed.
- Most people are supportive and abide by the VNRMC bylaws, although in some areas there are issues with community members declining to follow them. The reasons behind this are complex and require further research, but this situation is likely a function of: a) inclusivity and coverage issues during the project start-up phase, b) poor community understanding / sensitization to the potential benefits of participating in the FLA, and/or c) the promotion of a FLA message that prohibits wetland and catchment natural resource use, rather that encouraging sustainable utilisation.
- Nonetheless, the embedding of bylaws within the VNRMCs and their endorsement by the chiefs suggest that these institutional arrangements for sustainable management will likely be sustained after the cessation of the PRESERVE programme.
- Collectively, these suggest the significant enhancement of social capital and institutional arrangements for adaptive natural resource management.
- Overall, the research findings suggest that the institutional capacity building elements of PRESERVE have so far made a significant contribution to enhancing social-ecological resilience through the creation of functioning and adaptive VNRMCs and their respective bylaws. Furthermore, these have complemented and helped co-ordinate other elements of the PRESERVE FLA, not least the introduction of climate-smart agriculture that has brought gains in livelihood security that have offset the traditional demands for wetland and forest exploitation.
- The excellent network of institutional linkages (both formal and informal) in which the VNRMCs operate provides huge potential for the PRESERVE experiences (good practice) to be disseminated widely.

5.2 Specific recommendations

We acknowledge that it is very much 'early days' in terms of evaluating the programme's effectiveness. However, based on the initial exploration outlined in this report, key priorities, in terms of sustaining the important role VNRMCs and institutional arrangements play in managing wetland-catchment linkages, could include:

- Ensuring that VNRMCs and bylaws are developed with the full participation of all the community whenever possible, to ensure coverage, 'buy-in' and efficacy.
- Ensuring that the constitution, decision-making procedures and penalties for non-compliance within the VNRMCs should be transparent and mutually agreed upon by all stakeholders (i.e. all those for whom the rules of engagement exist). See for example Elinor Ostrom's principles of 'long-enduring common property resource management institutions' (Ostrom, 1990; Dixon and Carrie).
- Ensuring that the benefits of adhering to the bylaws and VNRMCs are clear. If there are no benefits or indeed no enforceable penalties for non-compliance, then there is little incentive for people to abide by them. It must be worth people's while to engage.
- Consider a shift from authoritarian and prohibitive bylaws to those which allow wetland use under some circumstances, providing there is no environmental degradation or that environmental degradation can be offset by environmental enhancement elsewhere.
- Where strict environmental protection must occur, again consider how the loss of livelihoods incurred can be offset by livelihood enhancement elsewhere, and whether such trade-offs can be institutionalised within the VNRMCs.
- Revisiting the ideas that inform the FLA itself, i.e. one of empowering and supporting communities to consider their current practices and to develop new ways of balancing wetland and catchment use (as opposed to enforcing strict conservation goals).
- Within the current PRESERVE areas, explore ways of facilitating a wider process of 'sensitisation' to the goals of VNRMCs among communities; this could include specific workshops or the incorporate of FLA 'thinking' into education programmes.
- Establishing mechanisms for monitoring the changes to VNRMCs and bylaws over time (as a means of monitoring adaptations and hence evaluating resilience). Ideally, this should be undertaken by VNRMCs themselves as a form of endogenous development, but monitoring these changes externally could provide important lessons for future interventions.
- As highlighted earlier, consider the ways in which extension messages and sensitisation activities can be enhanced by providing resources to lead farmers (e.g. raincoats, bicycles and gumboots).

Other potential areas for action (identified through conversations with respondents) include:

- To mitigate the impact of tree cutting for charcoal production on the environment, there is need to: a) link community members to institutions that promote sustainable charcoal production technologies such as use of charcoal briquettes and adoption of improved earth kilns and braziers, and b) encourage the community to use, wherever possible, dry tree branches for use as fuelwood in order to reduce deforestation.
- Ensuring the health of those involved in agricultural production activities through providing protective clothing and training on handling potentially hazardous agrochemical inputs.
- Consider increasing the number of goats and chickens given per group, since the allocation of 9 goats per group of 30 members was seen as having little impact in the short-term. This is also true for the legumes given; quantities can be increased to 8 or 10kg per individual.
- To reduce disease transmission and stress on animals, exchanging of cockerels and goats could be avoided. Each chicken beneficiary should be supported with a cockerel for effective production and control of diseases. Furthermore, each goat beneficiary should also have been given a buck.
- To mitigate negative impacts on vegetation and biodiversity, there is need to promote establishment of large woodlots in all areas. This could be achieved through:
  - Working with the Forest Department to encourage farmers to reserve areas of land for woodlot establishment. This will involve management of regenerating areas to enhance natural regeneration along streams and open areas.
  - Planting of indigenous trees in degraded areas at both household and community levels especially in Monze District and in Munenga Ward of Mazabuka. This can effectively be done by way of promoting the propagation of *Faidhebia albida* (Musangu or Munga) species which has proved to grow very fast and provide the needed fertility to the soils and shade to both humans and animals.
- There is need to increase farmers' access to markets for the various crops and livestock by:
  - Linking them to various market outlets, especially for crops such as cowpeas and beans.
  - Providing more training on value addition and processing techniques particularly for livestock.

- Participants suggested that the programme should ideally have been five years in duration (an extension of two years) which would have better enabled them to adapt and own the interventions put in place.
- In order to improve water availability and increase access in all districts, there is need to train communities in the project area in effective water storage and capture systems as well as other resilient water management strategies in the target districts by:
  - Introducing new water management and storage infrastructure, promotion of rainwater harvesting, construction of weirs and dams, and small-scale irrigation facilities in each target district.
  - Sinking boreholes. This is particularly so in drier areas like in Monze and Munenga and Nakamboma Wards in Mazabuka and Namwala respectively. These areas were found have critical water shortages, both for domestic use, animal use and agricultural production.

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Annexe 1: Transect walks and observations

Transect walks in wetlands were undertaken with selected communities. The selection was done with the view to having all wetland user categories represented. As such they included chief's representative, headmen, cattle owners, women (who do gardening in both flats and upper valley wetlands and also those who collect edible plants and clay), others were farmers with big upland gardens.

The following were the focus and field observations.

1. The extent of wetlands and vegetation.
2. Features of land degradation.
3. Soil erosion and compaction.
4. The approximate extent of cultivation and crops grown.
5. Type and level and level of intensity of tillage.
6. Presence of cattle and small ruminants.
7. Major landscapes within the wetland and catchments
8. Presence of wells for collection of domestic water
9. Utilisation of wetland for collection of edible plants, grass and poles
10. Land uniformity
11. Presence of trees and anthills
12. Any other key features

A1.1 Wetlands

Observations from transect walks in wetlands revealed different levels of impact on their ecological pattern and integrity as result of anthropogenic activities. These activities change the ecological balance of the Kafue sub basin. Some of the anthropogenic activities include cattle grazing, fishing, farming, collection of water for domestic use (for those near wetlands), tree cutting, trading, constructions, sand mining. High impacts were observed in areas with high human habitations or those close to such areas. These included wetlands used by communities in Malundu and Keemba Wards of Monze. This section of the wetland has big settlements of fishing camps, which impact negatively on the wetlands. Wetlands close to Baambwe and Itebe communities in Namwala and Mazabuka respectively were highly pristine with minimal evidence of human disturbances. This can be attributed to their vast sizes and measures put in place by the VNRMCs and the traditional leadership. However, large numbers of cattle grazing in wetlands in Namwala will have huge negative impact on them if appropriate measures put across like rotational grazing are not followed. Open grasslands characterise the wetland as you draw closer to Kafue River. Grazing land is communal and no burning or permanent settlement or cultivation is allowed. Rotational grazing was largely practised in Namwala to allow regeneration of grass.

Figure A1.1 - Dry wetlands in Monze, near Lochnivar National Park

Figure A1.2 - Part of the wetland in Itebe, Mazabuka

A1.2 Uplands

Munga (Musangu), and Miombo woodlands cover some drier parts of the uplands. Generally, the land cover of the other surveyed landscape in the area was predominantly characterized by dry grass, short to medium sized trees and acacia species such as *Faidhebia albida* of the Fabaceae family and Dichrostachys cinerea mostly found near water bodies. Chrysopogon zizanioides is a common grass. Dispersal of *Faidhebia albida* to most areas was found to be largely due to effects of climate change. This plant is dispersed by cattle that now feed on it due to lack of grass especially in the dry season. The tree has now colonised areas where it previously never used to occur, like in some parts of Malundu Ward in Monze and Itebe and Munenga Wards in Mazabuka. Furthermore, most of the fruit trees given to beneficiaries in Monze dried due to lack of water for irrigation or were eaten by domestic animals.

Figure A1.3 - Acacia species *Faidhebia albida* in Monze

Figure A1.4 - Cattle feeding on Faidhebia albida fruits (left) and cattle resting under *F. albida* trees (right).

It was also observed that Malundu, Keemba, Munenga and most parts of Nakamboma were very dry, with accompanying challenges like water problems and lack of grazing land for cattle. It was also noted that generally land in Malundu, Keemba and Munenga had deteriorated over the years due to low rainfall and unsustainable farming practices. This has greatly affected vegetation in the areas due to compaction of soils by cattle when grazing immediately after the rainy season. These areas were characterized by vast areas of dry trees and shrubs.

Figure A1.5 - Dry and compacted wetland soils in Monze

Most rivers and streams in the PRESERVE Kafue Project area were dry with only the Magoye River having pools of water in few places. This has increased collection of sand from the river and stream beds by the local leading to an increase in erosion due to disturbance at the banks and unstable riverbed.

Figure A1.6 - Dry Magoye River

Low rainfall over the years has negatively affected vegetation growth as regenerated plants are comparatively smaller in size when compared to the trees that were in the area before cutting of trees for agriculture and charcoal production became rampant.

Figure A1.7 - Upland vegetation in Keemba ward

Figure A1.8 - Acacia plants in Swiilila, Monze

A1.3 Cropland distribution

A1.3.1 Mazabuka District

Mazabuka is one of the districts with a large expanse of the Kafue Flats as shown below. Nearly half of the landmass for the District is the Kafue Flats. The District has the highest number of irrigated croplands of 37 570 ha out of the 299 236-ha cropland for the District. This is largely to the huge number of sugarcane estates and farms spread throughout the District. Figure A1.9 shows the distribution of cropland in the District. Mazabuka District has 37 074 smallholder farmers and 74 commercial farmers. 17 commercial farmers are cane growers and a number of them are contracted and bound to Zambia Sugar as the water from the Kafue River is supplied to them through the Zambia Sugar irrigation canals and holding dams (Kasubika et al., 2019).

A1.3.2 Monze District

Monze District has the highest percentage of cropland at 293 618 ha out of the 404 353-ha total land; translating into 72.6%. The District is home to 66 293 smallholder farmers and 53 commercial farmers who utilise the 293 618-ha cropland. Although the District has only 348 ha under irrigation, it has potential to add 335 ha of irrigated cropland. Figure A1.10 shows that the extent of the Kafue wetlands is not so extensive. Anthropogenic activities within the District also affect the Kafue wetlands including the riverine, headwaters and drainage systems.

A1.3.3 Namwala District

Namwala District has a huge expanse of the Kafue Flats similar to Mazabuka. Cropland in the District is less than half of the total land and it is fairly distributed as shown in Figure 29. Cropland area is 295,000 ha out of the total of 1,000,000 ha. Nearly the entire cropland is under rainfed and very insignificant land (homestead/backyard gardens) is under irrigation, mostly using buckets. The District has 1 500 ha potentially suitable for irrigation. The majority of the farmers in the District are livestock farmers rearing cattle for beef. Anthropogenic activities in the District are highly and directly impacting on the ecosystem of the Kafue Flats. Construction of the Itezhi-Tezhi dam upstream, the Namwala-Itezhi Tezhi road, disturbance of recharge zones and drainage channels, and wetland drainage has altered the wetland ecosystems in this area.

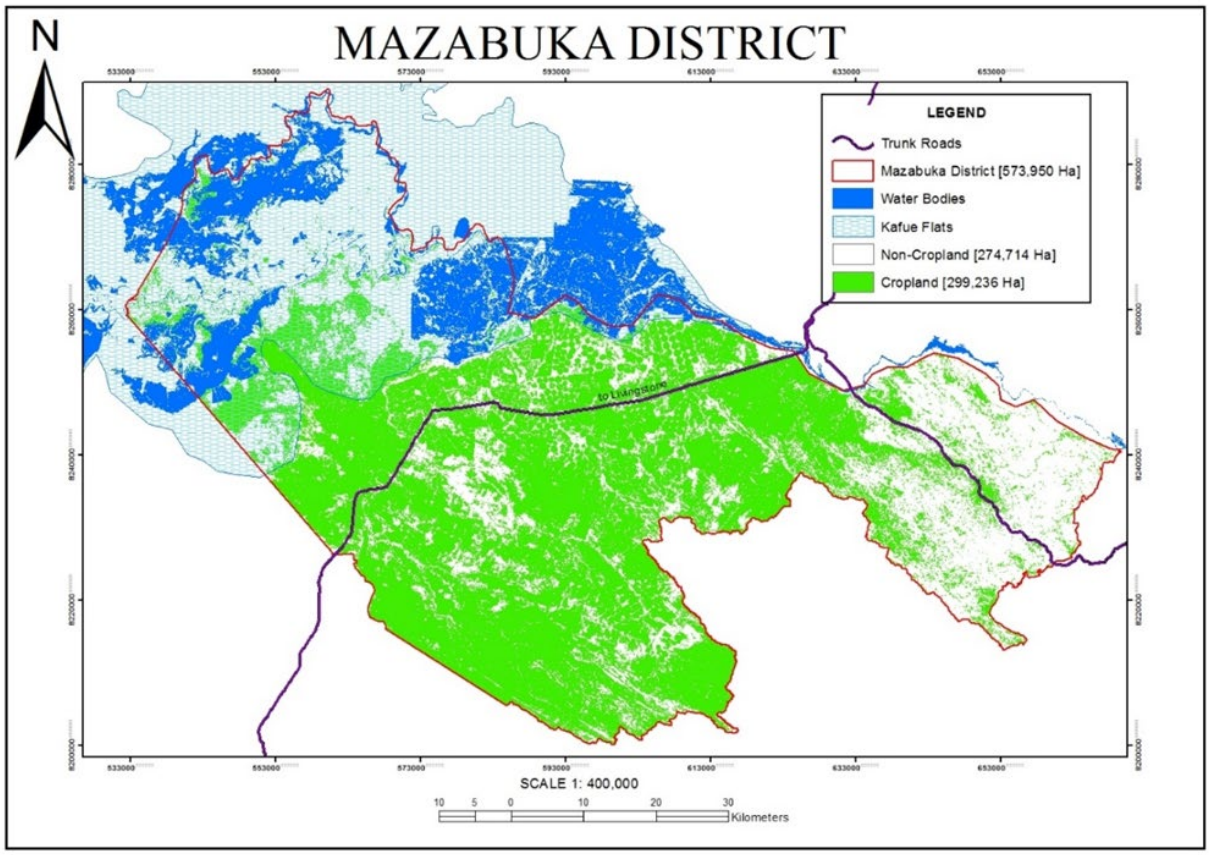

Figure A1.9 - Cropland distribution in Mazabuka District. (Source: MoA-TSB).

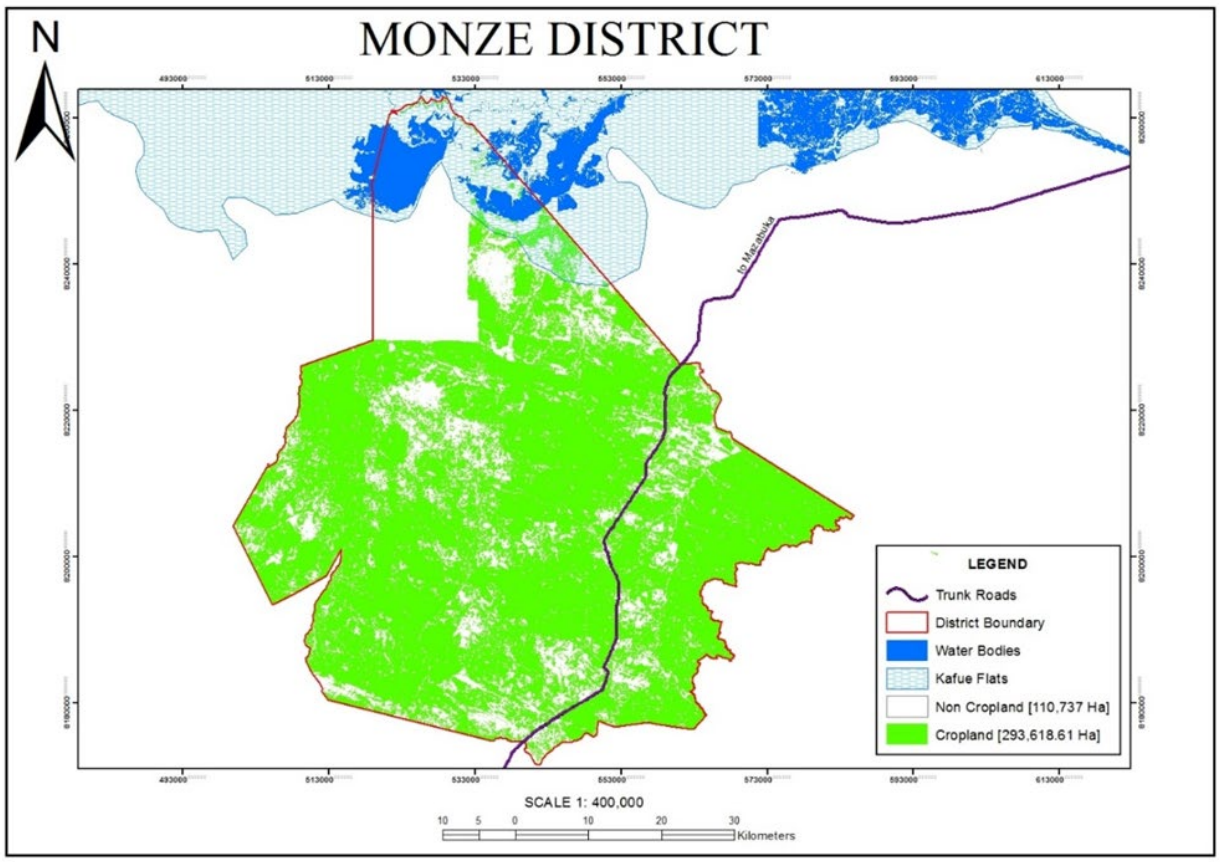

Figure A1.10 Cropland distribution in Monze District. (Source: MoA-TSB)

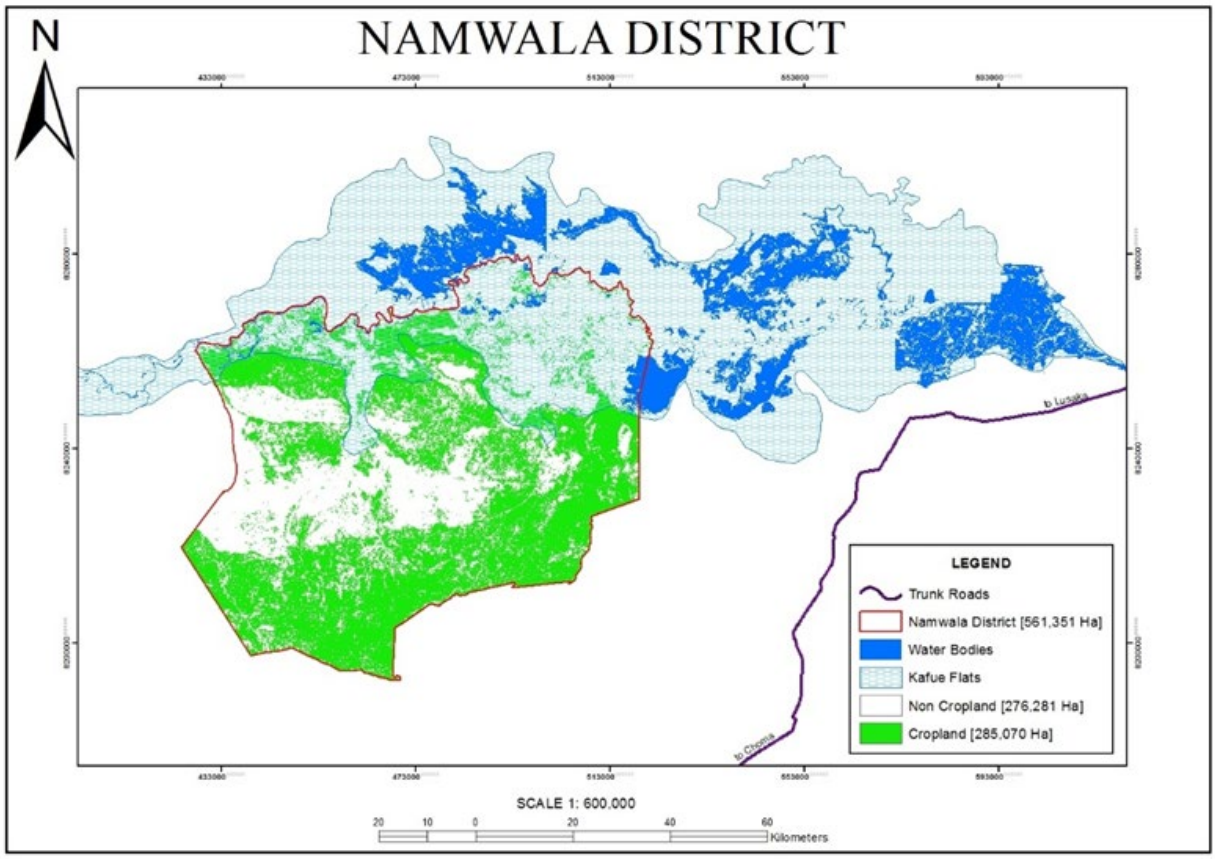

Figure A1.11 - Cropland distribution in Namwala District. (Source: MoA-TSB).

A1.4 Settlements

Some houses are made of brick wall, with iron roofing. However, other houses were made of brick wall but with grass thatched roofs. There are variations within and amongst the selected communities, representing different wealth categories. Better off families owned bigger houses and have bigger kraals, indicating possession of a lot of cattle. Water was a major challenge as most families have to travel to distant places to fetch waster for domestic use.

Figure A1.12 - A house for a headman in Itebe

A1.5 Sand mining

Sand mining (collection of sand) was found to be common along the bed of Magoye River. The sand is used for construction. This has led to high impact on the river as the base and banks of the river have been disturbed by this activity.

Figure A1.13 - Sand mining (collection) on Magoye River in Nakamboma, Namwala

A1.6 Fishing camps

The Kafue River in the project area is divided into four strata. Stratum I is in Mazabuka/Chikankata and Kafue and has 32 fishing camps. Stratum II is shared between Mazabuka and Monze, and has 83 fishing camps. Strata III and IV are in Namwala and have 43 and 40 fishing camps respectively. In total there are 198 fishing camps in the wetlands of the PRESERVE Kafue Project area (Source: MFL).

Annexe 2: Key informant interviews

A total of 72 key informants were interviewed in the six wards, drawn from all the category of beneficiaries. These were purposely selected to include better off, medium and poor farmers. The other criterion was to have representation from all FPGs, youths and lead farmers. Chief's representatives and headmen were also part of the group. Interviews with some officials from government whose ministries or departments are partners in project implementation were also done. These include Ministry of Agriculture (MoA), Ministry of Fisheries and Livestock (MFL), Department of Forestry (DoF), Department of National Parks and Wildlife (DNPW) and councils. Consolidated responses from Key Informant Interviews are presented in the following sections.

Figure A2.1 - Key Informant Interview in Malundu, Monze.

A2.1 Malundu Ward

S/N	QUERY	RESPONSES
1	How VNRMCs / institutional arrangements are functioning.	VNRMCs are actively participating in community sensitisation and awareness meetings on the Functional Landscape Approach which is a means of developing sustainable livelihoods. Tree cutting has reduced due to their work.
2	The extent to which VNRMCs are contributing to, and enhancing, social capital and adaptive co-management arrangements.	They develop land use plans for effective utilization of wetlands and catchments. They formulate rules and regulations (bye-laws) for the purpose of protecting the ecosystem. They develop sensitisation messages concerning natural resource management and FLA. They promote projects aimed at protecting and restoring the environment within the wetland zone and catchment such as tree planting and controlled grazing.
3	The changes over time (how they are evolving).	VNRMCs have not changed over time. This could be attributed to short period in which they have been established. All office bearers are the same and a lot of messages being put across are still the same.
4	The perceived impacts of these institutions on natural capital.	Wetlands in this area have improved due largely to the measures have been put in place like no cutting of grass, trees and no burning in wetlands. Planting of indigenous trees will also improve the

		ecosystem and lead to restoration the wetlands in Baambwe and surrounding areas.
5	How different villages / communities have different experiences of the FLA and its associated institutions.	FLA has improved livelihoods and income levels at households. This has come about due to increased food production at household level, where some farmers have sold surplus food to have income to use on other needs like school and medical fees and buying clothes and fertiliser for upland crop cultivation.
6	The wider barriers and facilitators of effecting local institutional arrangements (VNRMCs).	When the project was initially introduced, traditional leaders were not adequately involved. This resulted in slow project implementation in the ward. This has now been rectified and implementation is on course. Other people are still on observing bye laws and this has continued to put a strain on parts of the wetland.
7	The extent to which social-ecological resilience has been enhanced in the target communities.	Social-ecological resilience has been enhanced greatly due to various interventions. The project identified, trained and supported seed entrepreneurs in the production of legume seeds (groundnuts, cowpeas and beans) and orange fleshed sweet potato vines. Training in business skills and value chain analysis assisted Farmer Producer Groups (FPGs) to develop business strategies and plans to benefit from their farm enterprises. The sale of assorted vegetables, beans, groundnuts, cowpeas and orange fleshed vitamin A bio-fortified orange fleshed sweet potato vines. improved income levels for beneficiaries. Beneficiaries were also trained in savings, loans and business information.
8	Identify the functional dynamics of VNRMCs / institutional arrangements with regards their operations and decision-making.	Identified and interested community members were chosen to be members of the committee. This process was open to all who were willing, these committees work closely with the WDCs and Community Resource Boards (CRBs). Each VNRMC has 12 executive members who spearhead activity implementation related to wetland use. These operate by sensitizing the community about conservation of wetlands and sustainable use of resources. This is done by visiting households to sensitise them or by calling for a meeting where all community is invited. Conservation messages (FLA) are then delivered to the group. All 12 members are involved in delivery of these conservation messages. VNRMCs have a good relation with members of the community.
9	Identify the contribution of these institutions to social capital.	The VNRMC through FLA has formed various groups for effective activity implementation. The groups are in different categories namely lead farmers, Gender Champions, Nutrition/WaSH Champions, Enterprise Champions, Climate Smart Agriculture (CSA) Champions, Accumulated Savings and Credit Associations (ASCAs) Champions and seed growers. The message which is delivered is the FLA of the activity implementation and focus to empower the community and thereby reduce their dependence on wetlands while promoting sustainable utilization of resources in both flats and upper valley wetlands. VNRMC share knowledge and information acquired through extension approach. This is done through Lead Farmers who offer extension services to follower farmers. Some people have also benefited by being given goats, chickens, groundnuts, cowpeas, beans, vitamin A bio-fortified orange fleshed sweet potato vines. The only challenge is that the number of people who have benefited is small compared to the population in community.
10	Identify the ways in which these institutional arrangements have evolved over time.	Largely, there are no changes in membership or rules and coordination. All the structures are intact and working the same since inception.
11	Identify the impacts of these new institutional arrangements on	Conservation messages are regularly being disseminated by the VNRMC members leading to positive impacts on the wetland.

	natural capital and its associated management (environmental sustainability).	However, individuals who have not benefited from PRESERVE Kafue project have continued cutting down trees for charcoal production and other negatives vices, insisting that they have no alternative livelihood. However, lack of water in the area has made other activities not to be properly done, particularly planting of fruit trees.
12	Identify the influence of different social-ecological contexts on the operations and effectiveness of institutional arrangements.	VNRMCs members give out messages that conserve water as compared to other areas. This resulted in increase in food production of beneficiaries this year. Due to this improvement. A lot more people want to join the project but numbers needed have been reached.
13	Identify the wider policy and institutional facilitators of, or barriers to, sustainable institutional arrangements at the community level that enhance (wetland-based) livelihood resilience.	The VNRMCs work closely with the WDCs who fall under district councils. They also work with traditional leadership and schools to disseminate the information.
14	Identify the extent to which social-ecological resilience has been enhanced in the target communities as a result of institutional capacity building within the FLA.	The social-ecological resilience has been greatly enhanced as people have been trained in various FLA like conservation farming-CSA (practising crop rotation and rain water harvest). This has improved production and productivity of upland crops. Training in nutrition has also led to improved nutrition at household level, thereby reducing opportunistic diseases. Provision of legume seeds (groundnuts, cowpeas and beans) and vitamin A bio-fortified orange fleshed sweet potato vines have also added to improved food security and income levels. The additional income has made it possible for most families to send their children to school.

A2.2 Keemba Ward

S/N	QUERY	RESPONSES
1	How VNRMCs / institutional arrangements are functioning.	VNRMCs have committee members totaling 12 who spearhead community sensitisation messages on wetland and upland conservation. They call people together and disseminate such information. They also enforce rules and regulations that have been formulated to conserve the environment.
2	The extent to which VNRMCs are contributing to, and enhancing, social capital and adaptive co-management arrangements.	They promote projects aimed at protecting and restoring the environment within the wetland zone and catchment such as tree planting and promotion of CSA. Most people are now adhering to these guidelines.
3	The changes over time (how they are evolving).	VNRMCs have not changed over time. This could be attributed to short period in which they have been established. However, other messages other than those to do with direct wetland conservation have been done. This includes promotion of CSA.
4	The perceived impacts of these institutions on natural capital.	Various FLA messages promoted by these institutions have led to progress in restoration of some parts of wetlands. With time and continued adherence, the wetlands will be restored and upland also restored.
5	How different villages / communities have different experiences of the FLA and its associated institutions.	Keemba community has benefited a lot in the interventions aimed at restoring the wetland. There is now a big reduction in charcoal production. However, most respondents indicated that number of the distributed fruit trees was small to make any impact and reverse any impacts of deforestation.
6	The wider barriers and facilitators of effecting local institutional arrangements (VNRMCs).	Some community members are not adhering to the rules and regulations as some insist they get their livelihoods from resources found in wetlands. Demand for charcoal in the Boma and beyond is fueling tree cutting for charcoal production in the area.
7	The extent to which social-ecological resilience has been enhanced in the target communities.	This has been done through training and support of seed entrepreneurs in the production of legume seeds (groundnuts, cowpeas and beans) and orange fleshed sweet potato vines. Training in business skills and value chain analysis assisted Farmer Producer Groups (FPGs) to develop business strategies and plans to benefit from their farm enterprises.
8	Identify the functional dynamics of VNRMCs / institutional arrangements with regards their operations and decision-making.	Community members were chosen to be members of the executive committee. This process was open to all who were willing, these committees work closely with the government departments, WDCs and SHA. These operate by sensitizing the community about conservation of wetlands and sustainable use of resources. This is done by visiting households to sensitise them or by calling for a meeting where all community is invited. Conservation messages (FLA) are then delivered to the group. All 12 members are involved in delivery of these conservation messages. VNRMCs have a good relation with members of the community.
9	Identify the contribution of these institutions to social capital.	VNRMC share knowledge and information acquired through extension approach. This is done on a one-to-one basis or through group sensitization. The VNRMC through FLA has formed various groups for effective activity implementation. The groups are in different categories namely lead farmers, Gender Champions, Nutrition/WaSH Champions, Enterprise Champions, Climate Smart Agriculture (CSA) Champions, Accumulated Savings and Credit Associations (ASCAs) Champions and seed growers. The message which is delivered is the FLA of the activity implementation and focus to empower the community and thereby reduce their dependence on wetlands while promoting sustainable utilization of resources in both flats and upper valley wetlands.

10	Identify the ways in which these institutional arrangements have evolved over time.	There are no changes in membership or rules and coordination. Institutional structures are still the same.
11	Identify the impacts of these new institutional arrangements on natural capital and its associated management (environmental sustainability).	Grazing land is being restored as there is controlled grazing being encouraged now. Additionally, burning of grass in wetlands has now been prohibited, making regeneration fast.
12	Identify the influence of different social-ecological contexts on the operations and effectiveness of institutional arrangements.	The wetland that the community in Keemba use is very far and so some people in the area do not appreciate them very well. This has led to some reluctance in adhering to the messages especially by people engaged in fishing and cutting trees for charcoal production.
13	Identify the wider policy and institutional facilitators of, or barriers to, sustainable institutional arrangements at the community level that enhance (wetland-based) livelihood resilience.	The VNRMCs work closely with government departments, SHA and WDCs who fall under district councils. There work is thus reported, recorded and adopted for use in other wards. CSA and FLA (sustainable utilization of the environment) messages are still best practices that were indicated to be carried forward
14	Identify the extent to which social-ecological resilience has been enhanced in the target communities as a result of institutional capacity building within the FLA.	Awareness on sustainable utilisation of natural resources has led to an appreciation of the environment resulting in reduced cutting of trees for charcoaling and increased food production in the area. This was attributed to FLA and conservation farming messages that are being promoted in the area. Malnutrition levels have also gone done due to increased knowledge on balanced diet and effective cooking methods and promote retention of vitamins in foods.

A2.3 Baambwe Ward

S/N	QUERY	RESPONSES
1	How VNRMCs / institutional arrangements are functioning.	VNRMCs members are the ones promoting conservation of wetlands. This is done mostly through group meetings, but sometimes they also do it on a one-to-one basis. They also enforce regulations pertaining to conservation. However, it was indicated that they would need identity cards and transport (bicycles) for effective activity implementation. Actively.
2	The extent to which VNRMCs are contributing to, and enhancing, social capital and adaptive co-management arrangements.	They develop land use plans for effective utilization of wetlands and catchments. They formulate rules and regulations (by-laws) for the purpose of protecting the ecosystem. They develop sensitisation messages concerning natural resource management and FLA
3	The changes over time (how they are evolving).	VNRMCs have not changed over time. This could be attributed to short period in which they have been established. The number for executive members is 12, led by a chairperson of the group. In this ward, there two groups implying that the total number of executive members is 24.
4	The perceived impacts of these institutions on natural capital.	Sensitization messages have led to remarkable improvement in wetlands. Since the Project started pasture has improved due to rotational grazing and the "no burning of grass in wetlands" rule that is being advocated. This has led to improvement in the health of cattle and increased population.
5	How different villages / communities have different experiences of the FLA and its associated institutions.	All communities visited appreciated various aspects of FLA and the work of being promoted through VNRMCs and other collaborating agencies like government departments. This has led to improved food security in the area, improved nutrition, improved income levels, enterprise development, access to clean water, sanitation, hygiene, gender issues, savings and ecosystem awareness and knowledge about CSA.
6	The wider barriers and facilitators of effecting local institutional arrangements (VNRMCs)	When the project was initially introduced, traditional leaders were not adequately involved. This resulted in slow project implementation some areas particularly in Baambwe.
7	The extent to which social-ecological resilience has been enhanced in the target communities.	Social-ecological resilience has been enhanced greatly due to various interventions. The project identified, trained and supported seed entrepreneurs in the production of legume seeds (groundnuts, cowpeas and beans) and vitamin A bio-fortified orange fleshed sweet potato vines. Furthermore, knowledge on tree planting enhanced the community understanding and appreciation of the environment and the importance of preserving it. To this effect Mango, Guava, oranges, lemons, pawpaw. Moringa and some indigenous tress trees were given to selected farmers to plant so as to improve environmental protection.
8	Identify the functional dynamics of VNRMCs / institutional arrangements with regards their operations and decision-making.	Identified and interested community members were chosen to be members of the committee in an open process was open to all who were willing, these committees work closely with the WDCs and Community Resource Boards (CRBs). Initially, most people were not interested until after project commencement. Most people now want to join the group. These operate by sensitizing the community about conservation of wetlands and sustainable use of resources. This is done by visiting households to sensitise them or by calling for a meeting where all community is invited. Conservation messages (FLA) are then delivered to the group. All 12 members are involved in delivery of these conservation messages. VNRMCs have a good relation with members of the community.

9	Identify the contribution of these institutions to social capital.	The VNRMC through FLA has formed various groups for effective activity implementation. The groups are in different categories namely lead farmers, Gender Champions, Nutrition/WaSH Champions, Enterprise Champions, Climate Smart Agriculture (CSA) Champions, Accumulated Savings and Credit Associations (ASCAs) Champions and seed growers. The message which is delivered is the FLA of the activity implementation and focus to empower the community and thereby reduce their dependence on wetlands while promoting sustainable utilization of resources in both flats and upper valley wetlands. VNRMC share knowledge and information acquired through extension approach. This is done through 'peer to peer' extension services to followers. For effective delivery of extension messages beneficiaries are have been mobilised in interest groups based on different enterprises such as livestock rearing, vegetable production and field crop farming.
10	Identify the ways in which these institutional arrangements have evolved over time.	There are no changes in membership or rules and coordination. All the structures have remained the same.
11	Identify the impacts of these new institutional arrangements on natural capital and its associated management (environmental sustainability).	It was established that positive impacts on the wetland have been observed. Fish catches are steadily improving improved and a lot of grass is now available for grazing since burning of grass in the wetland has been prohibited. Regeneration of grass in also fast due to the rule prohibiting burning in wetlands.
12	Identify the influence of different social-ecological contexts on the operations and effectiveness of institutional arrangements.	VNRMCs are very active in sensitizing members about fish conservation and the use of appropriate fishing methods. They also promote rotational grazing and prohibition of using chemicals in wetlands
13	Identify the wider policy and institutional facilitators of, or barriers to, sustainable institutional arrangements at the community level that enhance (wetland-based) livelihood resilience.	The VNRMCs work closely with the WDCs who fall under district councils. There work is thus reported, recorded and adopted for use in other wards. They also work closely with other government departments to foster development in communities. CSA and FLA (sustainable utilization of the environment) messages are best practices that were indicated to be carried forward
14	Identify the extent to which social-ecological resilience has been enhanced in the target communities as a result of institutional capacity building within the FLA.	The social-ecological resilience has been greatly enhanced as people have been capacity built in various FLA like conservation farming-CSA (practising crop rotation and rainwater harvest). Provision of legume seeds (groundnuts, cowpeas and beans) and vitamin A bio-fortified orange fleshed sweet potato vines have also added to improved food security and income levels. The additional income has made it possible for most families to send their children to school.

A2.4 Nakamboma Ward

S/N	QUERY	RESPONSES
1	How VNRMCs / institutional arrangements are functioning.	VNRMCs are actively participating in community sensitisation and awareness meetings on the Functional Landscape Approach which is a means of developing sustainable livelihoods, local environmental enhancements, and social-ecological resilience. They also drafted rules and regulations (Bye laws) but are yet to be formalized.
2	The extent to which VNRMCs are contributing to, and enhancing, social capital and adaptive co-management arrangements.	They develop land use plans for effective utilization of wetlands and catchments.They promote projects aimed at protecting and restoring the environment within the wetland zone and catchment such as tree planting and controlled grazing.
3	The changes over time (how they are evolving).	VNRMCs have not changed over time.
4	The perceived impacts of these institutions on natural capital.	The community members have been capacity built to have resilience, food, income and nutrition security at household level. Conservation farming (Climate Smart Agriculture) is also being promoted.
5	How different villages / communities have different experiences of the FLA and its associated institutions.	The community has appreciated various aspects of FLA and the work of being promoted through VNRMCs and other collaborating agencies like government departments, which has improved food security, nutrition and income in the area.
6	The wider barriers and facilitators of effecting local institutional arrangements (VNRMCs).	Some people have continued flouting the set rules aimed at improving the ecosystem. Prosecution of these individual is difficult due to the long process involved and also due to the fact that the chief is the one with the authority to mete out punishment.
7	The extent to which social-ecological resilience has been enhanced in the target communities.	Social-ecological resilience has been enhanced greatly due to various interventions. Furthermore, knowledge on tree planting enhanced the community understanding and appreciation of the environment and the importance of preserving it. To this effect Mango, Guava, oranges, lemons, pawpaw.
8	Identify the functional dynamics of VNRMCs / institutional arrangements with regards their operations and decision-making.	Identified and interested community members were chosen to be members of the committee. This process was open to all who were willing. These operate by sensitizing the community about conservation of wetlands and sustainable use of resources. This is done by visiting households to sensitise them or by calling for a meeting where all community is invited. Conservation messages (FLA) are then delivered to the group. All 12 members are involved in delivery of these conservation messages. VNRMCs have a good relation with members of the community.
9	Identify the contribution of these institutions to social capital.	The VNRMC through FLA has formed various groups for effective activity implementation. The groups are in different categories namely lead farmers, Gender Champions, Nutrition/WaSH Champions, Enterprise Champions, Climate Smart Agriculture (CSA) Champions, Accumulated Savings and Credit Associations (ASCAs) Champions and seed growers. The message which is delivered is the FLA of the activity implementation and focus to empower the community and thereby reduce their dependence on wetlands while promoting sustainable utilization of resources in both flats and upper valley wetlands. VNRMC share knowledge and information acquired through extension approach. This is done through group discussion and delivery.
10	Identify the ways in which these institutional arrangements have evolved over time.	There are no changes in membership or rules and coordination. Adaptive management was noted in all the groups due to the practices that have been done in upland cultivation as well as various wetland conservation interventions like prohibiting tree cutting, burning and use of illegal fishing nets and methods.

11	Identify the impacts of these new institutional arrangements on natural capital and its associated management (environmental sustainability).	Positive impacts on the wetland have been observed. Fish catches have improved and a lot of grass is now available for grazing since in the wetland burning of grass has been prohibited.
12	Identify the influence of different social-ecological contexts on the operations and effectiveness of institutional arrangements.	Cutting of trees has reduced greatly due to sensitization messages being done. People are now aware of its negative effect. Fishing is also largely being done in a sustainable way and cultivation near the river has been prohibited. However, a good number of people are still collecting sand from the river bed, posing a very critical environmental challenge.
13	Identify the wider policy and institutional facilitators of, or barriers to, sustainable institutional arrangements at the community level that enhance (wetland-based) livelihood resilience.	The VNRMCs work closely with the WDCs, other government departments and SHA to foster development in communities. Other community members who are not part of VNRMCs have also joined in sensitizing members.
14	Identify the extent to which social-ecological resilience has been enhanced in the target communities as a result of institutional capacity building within the FLA.	Awareness on sustainable utilisation of natural resources has led to an appreciation of the environment resulting in reduced cutting of trees for charcoaling and reduced cutting of poles and grass.

A2.5 Itebe Ward

S/N	QUERY	RESPONSES
1	How VNRMCs / institutional arrangements are functioning.	VNRMCs are actively participating in community sensitisation and awareness meetings on the Functional Landscape Approach which is a means of developing sustainable livelihoods, local environmental enhancements, and social-ecological resilience. They also drafted rules and regulations (Bye laws) but are yet to be formalized.
2	The extent to which VNRMCs are contributing to, and enhancing, social capital and adaptive co-management arrangements.	They formulate rules and regulations (bye-laws) for the purpose of protecting the ecosystem. They development sensitisation messages concerning natural resource management and FLA They promote projects aimed at protecting and restoring the environment within the wetland zone and catchment such as tree planting and controlled grazing.
3	The changes over time (how they are evolving).	VNRMCs have not changed over time except this year where two additional members are proposed to be included in each committee. These are the chief's representative and a representative from the WDC
4	The perceived impacts of these institutions on natural capital.	The community members have developed resilience, food, income and nutrition security at household level. There is also remarkable reduction in cutting down of trees in the project area. Additionally, they were also trained on the importance of tree planting and practicing conservation farming (Climate Smart Agriculture).
5	How different villages / communities have different experiences of the FLA and its associated institutions.	The community has appreciated various aspects of FLA and the work of being promoted through VNRMCs. This has improved environmental awareness issues to the community and has also led to improved food security due to promotion of conservation farming unit.
6	The wider barriers and facilitators of effecting local institutional arrangements (VNRMCs)	Some people do not what to appreciate conservation extension message being promoted and have continued cutting down trees for charcoal production due to high demand in Mazabuka and Lusaka.
7	The extent to which social-ecological resilience has been enhanced in the target communities.	Social-ecological resilience has been enhanced greatly due to various interventions like tree planting and other measure being promoted. These include training seed entrepreneurs in the production of legume seeds (groundnuts, cowpeas and beans) and vitamin A bio-fortified orange fleshed sweet potato vines. Training in business skills and value chain analysis assisted Farmer Producer Groups (FPGs) to develop business strategies and plans to benefit from their farm enterprises.
8	Identify the functional dynamics of VNRMCs / institutional arrangements with regards their operations and decision-making.	Community members were chosen to be members of the committee from amongst themselves. This process was open to all who were willing. These operate by sensitizing the community about conservation of wetlands and sustainable use of resources. This is done by visiting households to sensitise them or by calling for a meeting where all community is invited. Conservation messages (FLA) are then delivered to the group. All 10 members are involved in delivery of these conservation messages. VNRMCs have a good relation with members of the community.
9	Identify the contribution of these institutions to social capital.	The VNRMC through FLA has formed various groups for effective activity implementation. The groups are in different categories namely lead farmers, Gender Champions, Nutrition/WaSH Champions, Enterprise Champions, Climate Smart Agriculture (CSA) Champions, Accumulated Savings and Credit Associations (ASCAs) Champions and seed growers. The message which is delivered is the FLA of the activity implementation and focus to empower the community and thereby reduce their dependence on wetlands while promoting sustainable utilization of resources in both flats and upper valley wetlands.

		VNRMC share knowledge and information acquired through extension approach. They also enforce all the bye laws which were formulated. However, enforcement is hindered by lack of identity cards, transport and cooperation from a section of the community.
10	Identify the ways in which these institutional arrangements have evolved over time.	There are no changes in membership or rules and coordination.
11	Identify the impacts of these new institutional arrangements on natural capital and its associated management (environmental sustainability).	It was established that positive impacts on the wetland have been observed. Fish catches have improved and animal population is steadily increasing.
12	Identify the influence of different social-ecological contexts on the operations and effectiveness of institutional arrangements.	VNRMCs here are very active in sensitizing members about fish conservation and the use of appropriate fishing methods as compared to other areas that are further away and whose community members are not involved very much in fishing. Burning of grass and tree cutting are also discouraged
13	Identify the wider policy and institutional facilitators of, or barriers to, sustainable institutional arrangements at the community level that enhance (wetland-based) livelihood resilience.	The VNRMCs work closely with the WDCs who fall under district councils and also work closely with other government departments and SHA to foster development in communities.
14	Identify the extent to which social-ecological resilience has been enhanced in the target communities as a result of institutional capacity building within the FLA.	The social-ecological resilience has been greatly enhanced as people have been capacity built in various FLA like conservation farming-CSA (practising crop rotation and rain water harvest). This has improved production and productivity of upland crops like maize, beans, groundnuts and other crops, resulting in food security and improved nutrition. Incidences of pests have also reduced Training in nutrition has also led to improved nutrition at household level, thereby reducing opportunistic diseases.

A2.6 Munenga Ward

S/N	QUERY	RESPONSES
1	How VNRMCs / institutional arrangements are functioning.	VNRMCs were trained and are now promoting sustainable utilisation of natural resources. They are also participating in community sensitisation and awareness meetings and developed land use maps.
2	The extent to which VNRMCs are contributing to, and enhancing, social capital and adaptive co-management arrangements.	They promote projects aimed at protecting and restoring the environment within the wetland zone and catchment such as controlled grazing, tree planting and discouraging burning and indiscriminate cutting of poles in wetlands and in catchments.
3	The changes over time (how they are evolving).	VNRMCs have not changed over time, they have essentially remained the same, except now two members have been added. These are the chief's representative and WDC representative.
4	The perceived impacts of these institutions on natural capital.	The impact has been huge as evidenced by improved pasture and water storage in wetlands
5	How different villages / communities have different experiences of the FLA and its associated institutions.	There is improved food security in the community, improved nutrition, improved income levels and ecosystem awareness and knowledge about CSA.
6	The wider barriers and facilitators of effecting local institutional arrangements (VNRMCs)	Some headmen are not adhering to the provided guidelines for ecosystem improvement. They have continued to authorize people from Mazabuka Boma to cut trees for charcoal production.
7	The extent to which social-ecological resilience has been enhanced in the target communities.	Social-ecological resilience has been enhanced greatly due to increased knowledge about conservation. Charcoal production by locals has gone down.
8	Identify the functional dynamics of VNRMCs / institutional arrangements with regards their operations and decision-making.	VNRMCs are dynamic in that they are used to sensitise the community about other interventions like good nutrition and cookery lessons; sanitation and hygiene; and the need to save and plan. Other activities include business plan formulation. These operate by sensitizing the community about conservation of wetlands and sustainable use of resources. This is done by visiting households to sensitise them or by calling for a meeting where all community is invited. Conservation messages (FLA) are then delivered to the group. All 10 members are involved in delivery of these conservation messages. VNRMCs have a good relation with members of the community.
9	Identify the contribution of these institutions to social capital.	The VNRMC through FLA has formed various groups for effective activity implementation. The groups are in different categories namely lead farmers, Gender Champions, Nutrition/WaSH Champions, Enterprise Champions, Climate Smart Agriculture (CSA) Champions, Accumulated Savings and Credit Associations (ASCAs) Champions and seed growers. The message which is delivered is the FLA of the activity implementation and focus to empower the community and thereby reduce their dependence on wetlands while promoting sustainable utilization of resources in both flats and upper valley wetlands. VNRMC share knowledge and information acquired through extension approach. These messages are primarily about striking a balance between resource conservation and sustainable use.
10	Identify the ways in which these institutional arrangements have evolved over time.	Institutional arrangements have not changed much.
11	Identify the impacts of these new institutional arrangements on natural capital and its associated management (environmental sustainability).	It was established that positive impacts on the wetland have been observed. Fish catches have improved and a lot of grass is now available for grazing since in the wetland has been prohibited. However, individuals who have not benefited from PRESERVE Kafue project have continued cutting down trees for charcoal production. Continued cutting of trees by people from the Mazabuka Boma if left

		unchecked will have devastating effect on the community since it increase soil erosion and reduced rainfall.
12	Identify the influence of different social-ecological contexts on the operations and effectiveness of institutional arrangements	Some headmen have continued allowing people from the Boma to cut trees for charcoal production. This is being driven by high charcoal demand in the Boma and Lusaka. While most residents in area do not produce charcoal, other people have moved in to do that thereby defeating the whole process. This has the potential of spreading in that locals can also join the vice. Punishment for offenders is not meted out as the bye laws pertaining to operational guidelines have not formally being endorsed.
13	Identify the wider policy and institutional facilitators of, or barriers to, sustainable institutional arrangements at the community level that enhance (wetland-based) livelihood resilience	The VNRMCs work closely with the WDCs who fall under district councils. There work is thus reported, recorded and adopted for use in other wards. They also work closely with other government departments to foster development in communities. Interference was observed in some areas where headmen have continued allowing people to cut trees for charcoal production and also to cut poles indiscriminately. CSA and FLA (sustainable utilization of the environment) messages are best practices that were indicated to be carried forward
14	Identify the extent to which social-ecological resilience has been enhanced in the target communities as a result of institutional capacity building within the FLA.	The social-ecological resilience has been greatly enhanced as it is a channel through which some important FLA messages have delivered to people using VNRMCs. This has led to an improvement in living standards of people in the community. Beneficiaries now have food security, improved income, knowledge on effective methods of cooking vegetables, sanitation understanding and knowledge on saving and entrepreneurship.

Annexe 3: List of regulations and documents

(i) The Land Act, Cap 184

The Lands Act Cap 184 provides for the continuation of leaseholds and leasehold tenure; to provide for the continued vesting of land in the President and alienation of land by the President; to provide for the statutory recognition and continuation of customary tenure; to provide for the conversion of customary tenure into leasehold tenure; to establish a Land Development Fund and a Lands Tribunal.

Relevance: *The relevance of this act lies in the fact that it empowers the general public to acquire land and property with a leasehold tenure in a prescribed area.*

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(ii) The Agricultural Lands Act, Cap 187 of the laws of Zambia

The Act provides for the establishment of the Agricultural Lands Board; to prescribe the composition and membership thereof; to prescribe its powers and functions; to provide for tenant farming schemes; and to provide for matters incidental to or connected with the foregoing.

Relevance: *The Act empowers the general public to form agricultural lands board and farming schemes.*

(iii) The Agriculture (Fertilisers and Feed) Act, Cap 226 of the laws of Zambia

The Act provides for the regulation and control of the manufacture, processing, importation and sale of agricultural fertilisers and farm feed; to provide for minimum standards of effectiveness and purity of such fertilisers and feed; and to provide for matters incidental to or connected with the foregoing.

Relevance: *This Act prescribes that fertilisers to be used in crop production meet the minimum standards of effectiveness and purity.*

(iv) Environmental Management Act No.12 of 2011

Repealed Environmental Protection and Pollution Control Act of 1990 (EPPCA). The Act provides for amongst other matters, principals governing environmental management. It also provides for integrated environmental management and environmental protection and pollution control as well as specific aspects of environmental management i.e. pollution control, water, air, waste management, pesticides, and toxic substances, noise, ionizing radiation and natural resource management. The environmental management act further provides for the making of regulations by the relevant Minister.

(v) Hazardous Waste Management Regulations (SI No. 125)

These Regulations provide rules for the control and management of hazardous waste, i.e. waste, including objects, articles or substances, which is poisonous, corrosive, irritant, explosive, inflammable, toxic or harmful to man, animal, plant or the environment. The Regulations apply to the control and monitoring of generation, collection, storage, transportation, pre-treatment, treatment, disposal, export, import and transboundary movement of hazardous waste.

(vi) Fisheries Act No. 22 0f 2011

The Act promotes the sustainable development of fisheries and a precautionary approach in fisheries management, conservation, utilisation and development; establish fisheries management areas and fisheries management committees; provide for the regulation of commercial fishing

Relevance: *The Act provides for the sustainable utilisation of fishery resources.*

(vii) Local Government Act no. 2 of 2019

The Act provides for an integrated local government system; give effect to the decentralisation of functions, responsibilities and services at all levels of local government; ensure democratic participation in, and control of, decision making by the people at the local level; revise the functions of local authorities; provide for the review of tariffs, charges and fees within the area of a local authority; provide for the proceedings of the council and committees; provide for the role of traditional leadership in democratic governance; repeal and replace the Local Government Act, 1991; and provide for matters connected with, or incidental to, the foregoing.

Relevance: *The Act also provides for local government systems pertaining to issues to do with protection of the environment and pollution control.*

(viii) Plant Pests and Diseases Act, Cap 233

The Act provides for the eradication and prevention of the spread of plant pests and diseases in Zambia, for the prevention of the introduction into Zambia of plant pests and diseases, and for matters incidental thereto.
Relevance: *The relevance of this act lies in the fact that it empowers the general public to eradicate and prevent the spreading of plant pests and diseases farming communities and farming schemes.*

(ix) Noxious Weeds Act, Cap 231

The act provides for the eradication of noxious weeds; and to provide for matters incidental thereto.
Relevance: *The Act empowers the general public to be protected against noxious weeds and provides for total eradication of weeds.*

(x) Water Resources Management Act no. 27 of 2011

An Act to establish the Water Resource Management Authority and define its functions and powers; provide for the management, development, conservation, protection and preservation of the water resource and its ecosystems; provide for the equitable, reasonable and sustainable utilisation of the water resource; ensure the right to draw or take water for domestic and non-commercial purposes. It allows equitable and sustainable utilisation of, shared water resources; provide for domestication and implementation of the basic principles and rules of the international law relating to the environment and shared water resources as specified in the treaties, conventions and agreements to which Zambia is a State Party.
Relevance: *This act provides for sustainable and efficient use of water and shared water resources in line with the law.*

(xi) The Co-operative Societies Act, Cap 397 of the laws of Zambia

An Act to provide for the registration, inspection, examination and supervision of co-operative societies which belong to the people who use their services, the control of which rests equally with all their members, and the gains from which are distributed among the members in proportion to the use they make of these services or their interest in their society; to repeal the Co-operative Societies Ordinance; to provide that co-operative societies registered under the Act repealed by this Act shall continue in existence and in operation as if registered under this Act; to encourage co-operative development by the provision of services to assist the organization and operation of various kinds of co-operative societies to meet the economic and social needs of their members on a self-help basis; and to provide for all matters incidental to the fore going.
Relevance: *The relevance of this act lies in the fact that it empowers the general public to register and operate as cooperative at community level.*

(xii) The Tourism and Hospitality Act, 2015

An Act to provide for the sustainable development of the tourism industry through effective tourism planning, management, promotion and coordination to ensure sustainable tourism; provide for an enabling and facilitating environment for the growth of the tourism industry by ensuring that Zambia responds to changing tourism trends in the macro and competitive tourism market environment; provide effective mechanisms for coordination amongst the Government, private sector and local communities for the sustainable development of tourism through public-private partnerships and community participation; provide for integration of tourism into national development planning, budgeting and decision-making processes related to infrastructure development, environmental management and protection and empowerment of local communities; strengthen linkages and co-ordination between tourism development and key subsectors such as arts and culture, heritage, transport, education, energy, forestry, fisheries, wildlife and water resource management by using a whole of Government approach; ensure that the tourism value chain is enhanced by positive linkages between tourism and supporting services and sectors, including police, immigration, customs, health and safety; establish the Zambia Tourism Agency and constitute the Board of the Agency and provide for their functions; regulate tourism enterprises and tourism-related services and enforce standards of operation and service; establish the Tourism Development Fund and provide for its administration; repeal the Tourism and Hospitality Act, 2007, and the Zambia Tourism Board Act, 2007; and provide for matters connected with, or incidental to, the foregoing.

Relevance: *This Act provides for strengthening linkages and co-ordination between tourism development and key subsectors such as arts and culture, heritage, transport, education, energy, forestry, fisheries, wildlife and water resource management.*

(xiii) The Plant Variety and Seeds Act, Cap 236 of the laws of Zambia

An Act to provide for the regulation and control of the production, sale and import of seed for sowing and of the export of seed, and to provide for the testing and for minimum standards of germination and purity thereof, and further to provide for the certification of seed and for matters incidental to or connected with the foregoing.

Relevance: *This Act provides for regulation and control of the production, sale and importation of seed and ensure the seed is tested to the minimum standards of germination and purity.*

(xiv) The Forest Act, 2015

The act provides for the establishment and declaration of National forests, Local Forests, joint forest management areas, botanical reserves, private forests and community forests; provides for the participation of local communities, local authorities, traditional institutions, non-governmental organizations and other stakeholders in sustainable forest management; provide for the conservation and use of forests and trees for the sustainable management of forest ecosystems and biological diversity; establish the Forest Development Fund; provide for the implementation of the United nations Framework Convention on Climate Change, Convention on International trade in Endangered Species of Wild Flora and Fauna, the Convention on Biological Diversity, the Convention to Combat Desertification in those Countries Experiencing Serious Drought/or Desertification, particularly in Africa and any other relevant international agreement to which Zambia is a party; repeal and replace the Forest Act,1999.

Relevance: *This Act provides for the participation of local communities, local authorities, traditional institutions, non-governmental organizations and other stakeholders in sustainable forest management; provide for the conservation and use of forests and trees for the sustainable management of forest ecosystems and biological diversity; establish the Forest Development Fund; provide for the implementation of the United Nations Framework Convention on Climate Change.*

(xv) The National Heritage Conservation Commission Act, 1989

This Act provides for the establishment of the National Heritage Conservation Commission together with its functions and powers. In particular, the law provides for the conservation of ancient, cultural and natural heritage, relics and other aesthetic, historical, pre-historical, archaeological and scientific interest.

Relevance: *This Act provides for the conservation of ancient, cultural and natural heritage, relics and other aesthetic, historical, pre-historical, archaeological and scientific interest.*

(xvi) Relevant International Agreements and Conventions

Zambia has signed and ratified a number of international and regional conventions and protocols aimed at addressing environmental concerns. Conventions of significance are as follows:

a) 2018 National Policy on Wetlands

This provides for the good management of wetlands and demonstrates the importance of wetlands as well as existing threats to wetlands in Zambia. It also seeks to promote the conservation of wetlands and their sustainable management

b) Convention on Biological Diversity

This Convention entered into force in 1993 and aims at encouraging and enabling all countries to conserve biodiversity and use its components sustainably in support of the national development. The convention encourages contracting parties to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt existing strategies, plans, programmes which shall reflect, among other things, the measures set out in the Convention on Biology Diversity.

Article 14 (1.b) requires each contracting party to introduce appropriate arrangements to ensure that the environmental consequences of its programmes and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account.

Relevance: *The relevance of this convention is that it promotes the conservation and sustainable use of biological diversity.*

c) Rotterdam Convention

The Rotterdam Convention in a multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals. The Convention promotes open exchange of information and call on exporters of hazardous chemicals to use proper labeling, including direction on safe handling, and inform purchasers of any known restrictions or ban. Signatory nations can decide whether to allow or ban the importation of chemicals listed in the treaty, and exporting countries are obliged to make sure that producers within their jurisdiction comply.

Relevance: *The relevance of this convention is that it stipulates on how to use and manage hazardous chemical including proper label to provide adequate information to the public.*

d) Convention concerning the Protection of World Cultural and Natural Heritage

The Convention aims at ensuring the identification, protection, conservation, presentation of the cultural and natural heritage. Specifically, Article 5 (d) states that " to ensure that effective and active measures are taken for the protection, conservation and presentation of the cultural and natural heritage situated on its territory, each state party to this Convention shall endeavor, in so far as possible, and as appropriate for each country to take the appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation of this heritage".

Relevance: *The relevance of this convention lies in the fact that it provides for the conservation of ancient, cultural and natural heritage, relics and other aesthetic, historical, pre-historical, archaeological and scientific interest.*