

# **FINAL: FEASIBILITY STUDY REPORT**

**“Market Research on Alternative/Sustainable Livelihood Options  
in Mazabuka District.”**

**Service Contract No. CUTS/27-06/2022**

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(VCA).**

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## **EXECUTIVE SUMMARY**

The document presented below comprises the Report of a project “Market Research on Alternative Livelihood Options in Mazabuka District”, under the Voices for Just Climate Action (VCA). The VCA is a 5-year programme (2021-2025) supported by the Dutch government and World Wildlife Fund (WWF) Zambia. It has a primary objective of scaling up Zambia’s climate action response while targeting vulnerable communities.

Alternative/sustainable livelihood options have widely been regarded as one of the elements of a low-carbon economy and an initiative to build a climate-resilient adaptation system for Mazabuka District. Such ambitions have been enshrined in several policy documents that seek to address the concerns of deforestation, and land degradation, and improve the social wellbeing of the people by providing universal access to modern clean forms of energy, through climate change adaptation and mitigation.

Strategies to promote and adopt sustainable livelihood activities have been barred due to the higher capital requirements. Further, the focus has been left to stand on the supply side and not on the demand side. However, on the supply side, there has not been a formal strategy to support the wider adoption of alternative livelihood activities or improve the current ones to enhance sustainability. Consequently, the traditional practice of production and consumption continues to thrive over alternatives despite the well-documented and known risks associated with such activities.

Considerable challenges still exist to building a local industry that will support a viable alternative livelihood sector. This challenge is partly exacerbated by the informal and unregulated production industry. The informal nature of the business entails that players in the sector cannot have access to financing, and no deliberate policies to support the undertaking thereby limiting the growth of the enterprise that should gradually facilitate the adoption of alternative and sustainable livelihood activities.

Since charcoal production, Kachasu brewing and sand mining is the mainstay economic activities of the local people, the adoption of alternative livelihood activities will take some time to complete. It will require coordinated efforts to strengthen the capacity of implementing agencies, supporting the establishment of cooperatives or associations that will be supporting and empowering the transition to alternative livelihoods. Stakeholder collaboration amongst the different actors in the market chain is still a challenge as some stakeholders still collect levies from these unsustainable practices.

The study has shown that alternative/ sustainable livelihood activities such as fish farming/aquaculture, poultry farming, livestock rearing and vegetable gardening can be deployed in Itebe, Kaleya and Mwanachingwala wards, under some incentivised schemes. Data from the three wards show that there is a substantial potential and capacity for these people to undertake these livelihood activities. And further, there is an already established functioning market system that can accommodate these alternative livelihood activities.

In addition, there is a relatively vast amount of waste sludge and molasses to support biogas production as an alternative fuel for brewing *Kachasu*. Specifically, biogas production will favour households with at least three production cycles a month to produce the daily feedstock for the digester. Moreover, the slurry from the digester is rich in nutrients suitable for use as organic fertiliser in gardens.

## **ACKNOWLEDGMENT**

A range of stakeholders and experts were engaged during the preparation of the feasibility study report, via interviews and meetings in the three wards. The multi-stakeholder engagement was also done with experts from selected institutions in Lusaka and Mazabuka. The author would like to acknowledge the support and input from the local stakeholders from the Civic Leaders and the traditional leadership. Further, the author would like to acknowledge the input from the Voice for Climate Action in Mazabuka on key policy issues and the material that facilitated the data analysis. Special thanks to CUTs provided the funding and assisting in facilitating various stakeholder engagements in the project area.

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## 1. INTRODUCTION

Transforming the most vulnerable to climate change impacts into climate-smart leaders in Zambia” in Mazabuka is a project implemented by CUTS International Zambia. This project is under the Voices for Just Climate Action (VCA). The VCA is a 5-year programme running from 2021-2025, supported by the Dutch government and World Wildlife Fund (WWF) Zambia. It has a primary objective of scaling up Zambia’s climate action response while targeting vulnerable communities. VCA recognizes that climate change is not just an environmental issue but also a societal challenge that brings in ethical and human rights issues. Climate change affects the enjoyment of indivisible, interdependent and interrelated human rights, hitting the most vulnerable the hardest and threatening to increase existing inequalities between the rich and poor, ethnicities, gender, generations and communities. It is indisputable that the brunt of the burden falls on those already in poverty and on underrepresented groups such as indigenous peoples, the rural and urban poor, women and youth, although they are the least responsible for climate change.

Mazabuka just like other districts in Zambia has not been spared from the impact of climate change. In the district, which is heavily dependent on crop and livestock farming, one can see how climate change has impacted these major livelihood activities. The impacts of climate change are highly visible in this district.

For instance, several communities have reported droughts and flash floods which impacted both livelihood activity and the dwellers in these communities. Those living in the proximity of the Kafue river, have been forced to abandon their normal daily income-generating activities and forced into other income-generating activities which have been marginalized due to the stress they cause on the environment.

Understanding the impact on the environment of these livelihood activities is very important for both mitigation and adaptation to climate change. For Instance, charcoal production is known for the unsustainable harvesting of trees which form the main carbon sink and also protect the soil from erosion. Sand mining is been done right at the river banks and river beds which causes a lot of siltation and erosion which affects the breeding ground for fish in the Kafue river. Meanwhile, illicit beer brewing of *Kachasu* demands a lot of firewood and at the same time, the sludge from the activity is been dumped into the Kaleya river thus contaminating the river bodies causing eutrophication and releasing a lot of methane gas into the air.

Against this background, the Mazabuka district has for a long time been trending in terms of climate change incidences, unsustainable livelihood activities etc. Mazabuka is a prosperous

town because of the sugarcane plantation which is the main economic activity of the district. Therefore, it can be concluded that socio-economic activities are driven by the cultivation of sugarcane by small cooperatives and the selling of the cane for sugar refining. Similarly, the district, although not popular, is well known for the coffee plantation known as Munali Coffee. These two economic activities have employed much of the population in the district, and at the same time, most of the people in the district heavily depend on other economic activities such as livestock, agriculture, sand mining, brewing *kachasu* and charcoal production for survival. However, the way these activities have been conducted over the years can be described as unsustainable. This has resulted in the landscape of Mazabuka remaining degraded thus reducing its resilience to the impact of climate change. For instance, the soil fertility and rainfall have dramatically reduced making households heavily dependent on agriculture and other livelihood activities for supplementing household budgets.

### **1.1. Objectives of the Assignment**

Based on the above background, we see a situation where a few people are receiving short-lived benefits from these unsustainable activities and at the same time hampering the long-term co-benefits for other livelihood activities. There is a need to reverse land degradation from sand mining, deforestation and bad farming practices in the three wards.

The transformation of the most vulnerable to climate change is expected to identify alternative livelihoods or economic activities that could thrive in Mazabuka with a special focus on Kaleya, Mwanachingwala and Itebe Wards where impacts of climate change are highly visible. The project will, therefore, identify viable alternative livelihoods that have the potential to thrive in Mazabuka with a special focus on the three stated wards and at the same time identify current intervention models and the possibility of developing sustainable business models for the existing unsustainable practices among other objectives.

The TORs specify the primary objective to identify viable alternative livelihoods that have the potential to thrive in Mazabuka with a special focus on the three stated wards- Kaleya, Mwanachingwala and Itebe by identifying markets for those livelihood options. These have been grouped into five specific objectives:

- **Immediate Objective 1:** Identify existing unsustainable livelihood practices and provide evidence for the key drivers.
- **Immediate Objective 2:** Identification of viable alternative livelihood options for the three target wards e.g. Beekeeping, livestock rearing etc.

- **Immediate Objective 3:** Identify current intervention models and the possibility of the development of sustainable business models for the existing unsustainable practices.
- **Immediate Objective 4:** Identification of practical linkages, business support services and capacities, and recommendations to strengthen linkages of alternative livelihood options to viable markets at both domestic and external.
- **Immediate Objective 5:** Identification of policy and regulation gaps that could help in strengthening interventions.

## 1.2. Legal and Policy Framework

The great district of Mazabuka as termed by the majority is not different from other districts which are governed under Zambian statutory instruments. Based on the understanding of the TORs, we frame the legal and policy framework on the following instruments namely: The Environmental Management Act of 2011, the Forest Act of 2015 and the Traditional Beer Act, of 1930 (Chapter 168). These are been highlighted to provide an understanding of how certain livelihoods have been described as unsustainable according to the law.

According to Zambia Environmental Management Agency (ZEMA), there have been rising concerns regarding environmental pollution in Mazabuka in terms of waste Molasses disposal by local beer brewers. In this regard ZEMA is using the *Environmental Management Act of 2011* which provides for integrated environmental management and for the conduct of strategic environmental assessments of proposed policies, plans and programmes likely to have an impact on environmental management, further providing for the prevention and control of pollution and environmental degradation.

Similarly, the Forestry Department looks at the environmental impact resulting from unsustainable wood extraction to meet the energy demand of the livelihood activities of the three wards. The Department is enforcing the *Forest Act of 2015* which provides for the establishment and declaration of joint forest management areas; provides for the participation of local communities, local authorities, traditional institutions, non-governmental organisations and other stakeholders in sustainable forest management. Further calls for the conservation and use of forests and trees for the sustainable management of forest ecosystems and biological diversity. Lastly taking into consideration that the three wards and livelihood activities impact the main wetlands in the Kafue flats, the Act further provides for the implementation of the United Nations Framework Convention on Climate Change, the Convention on Wetlands of International Importance, especially as Water Fowl Habitat, the Convention on Biological

Diversity, the Convention to Combat Desertification in those Countries experiencing Serious Drought and/or Desertification, particularly in Africa and any other relevant international agreement to which Zambia is a party. These repeals and replaces the Forests Act, 1999; and provide for matters connected with, or incidental to, the foregoing.

Further, the Mazabuka Municipal Council with their efforts to combat illicit brewing of beer in Kaleya Ward due to the availability of excess molasses uses the *Traditional Beer Act, 1930 (Chapter 168)* which states that It shall be unlawful for any person to prepare, use, possess, dispense, sell or expose for sale, the intoxicating liquor, by whatever name called, which is obtained through a process of distillation and is commonly known as *kachipembe, kachasu, kapuli or lutuku*. Despite this law being actively enforced by the local authority, there have been calls to repeal and amend it as it is a colonial law. The revised *Act, Section 34 of the Liquor Licensing Act No. 20 of 2011*, states that a person shall not manufacture or produce any alcoholic drink, brew or concoction employing the process of the fermentation of sugar, treacle, malt or other substances, or by the distillation of fermented or distilled produce, to sell or supply the drink, brew or concoction to any person. Taking note of section II of the Act on licensing requirements, the business as usual in Kaleya ward cannot qualify for licensing under this Act as there are a lot of considerations that need to be adjusted collectively.

### 1.3. Project Location and Study Sites

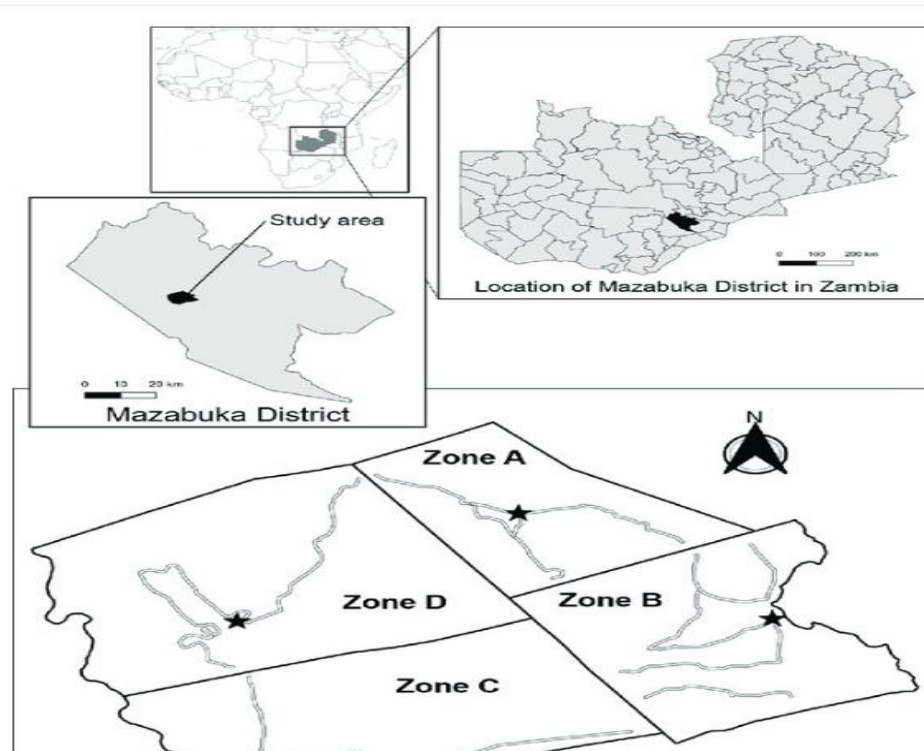
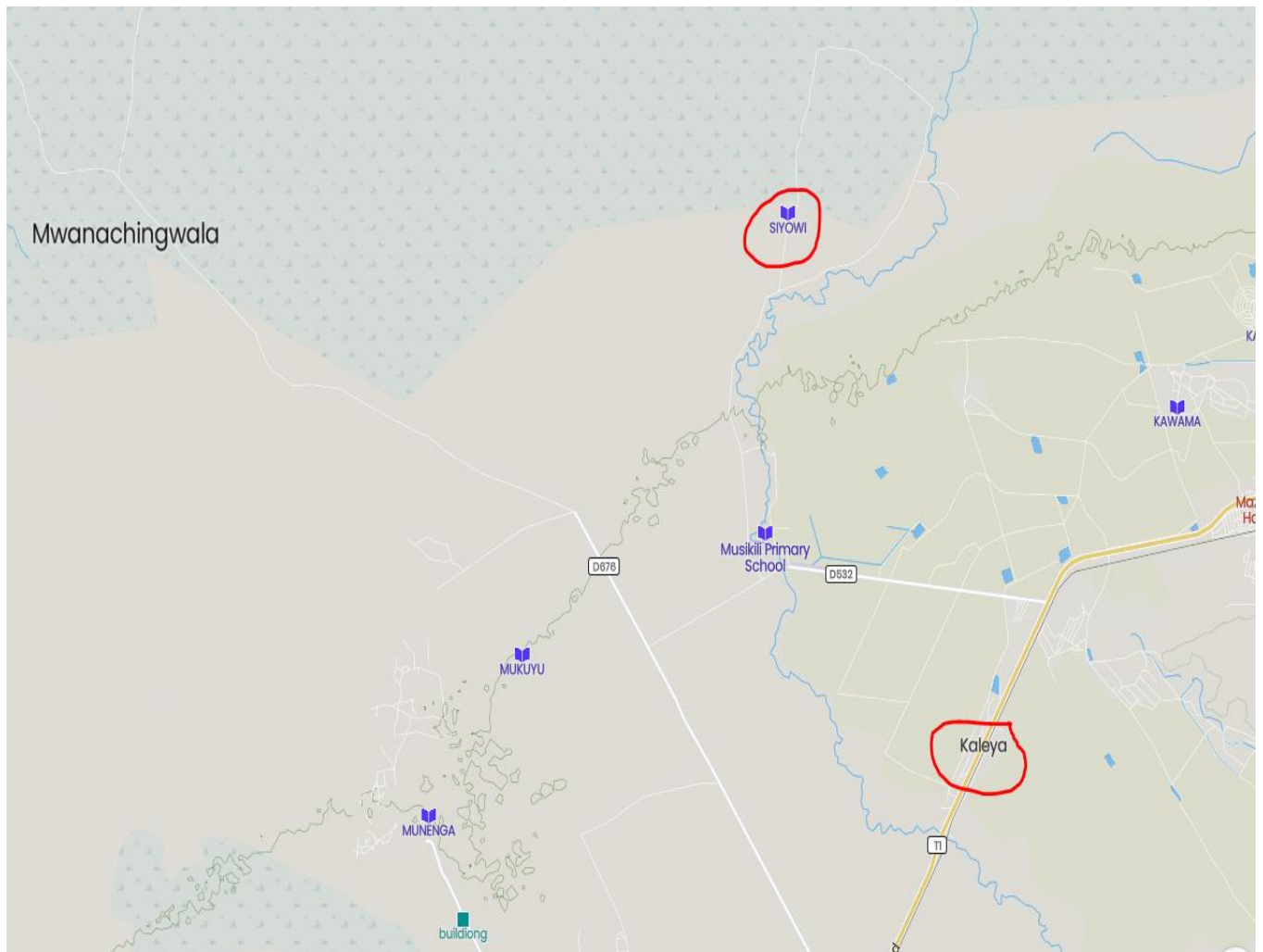


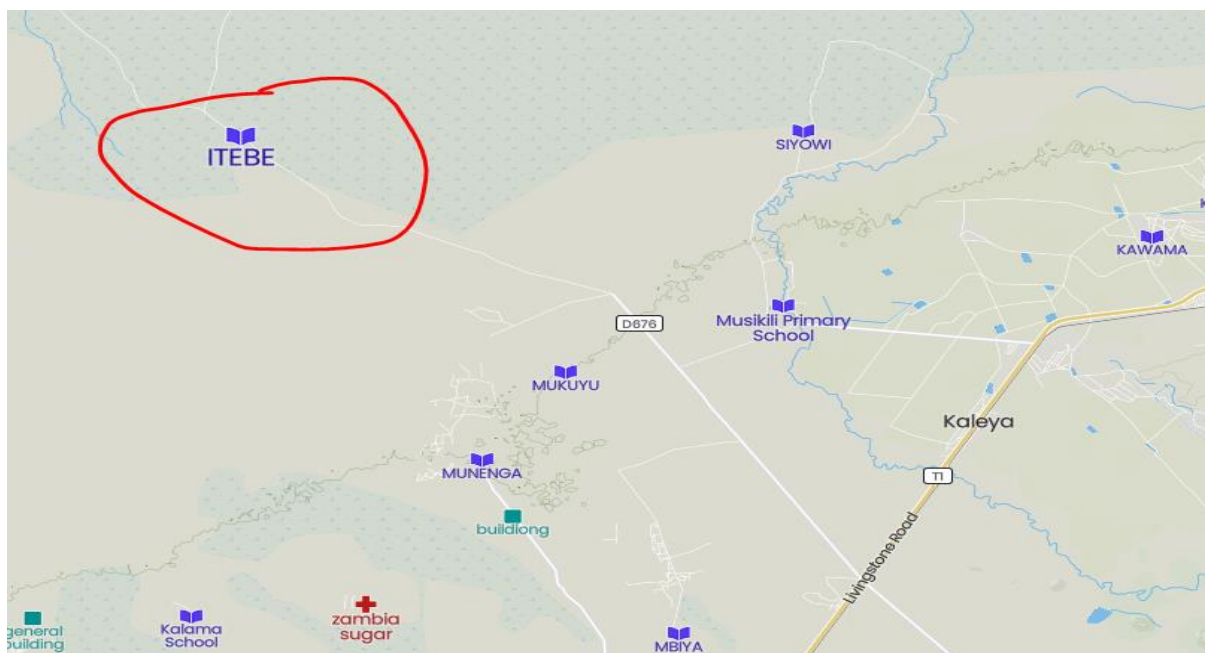
Figure 1.1. Map showing the location of the study site



*Figure 1.2. Map showing the selected wards' distribution*

The three selected wards in Mazabuka District namely Kaleya, Itebe and Mwanachingwala have historical evidence of unsustainable livelihood practices. For instance, there has been intensified illegal sand mining in the Magoye River causing its gradual drying. This occurrence was exacerbated by adverse climate change effects on agriculture, resulting in most people upstream abandoning farming for illegal mining of sand in the river. Magoye River provides water resources to more than 300,000 people not only in Mazabuka but also in Monze, and Pemba districts. Further, the river is under threat from deforestation which results from Charcoal production and land clearing for small-scale agriculture. The impact on this river has severe and long-term effects on other livelihood activities such as livestock grazing, and this has resulted in shifted dependence on the Kafue River which was also facing serious environmental challenges. It is worth noting that, among the Kafue river's tributaries are Kaleya and Magoye rivers, this implies that the Kafue river is under threat due to siltation and chemical pollution from the activities along these two rivers. For instance, the Kaleya River is under threat due to intense agricultural activities in the upper zone where farmers use fertilizers

and pesticides. And this is compounded by the occurrence of torrential rainfall responsible for the heavy runoff on degraded land (due to other unsustainable livelihood activities such as Kachasu whose waste is disposed of off into the river) thus contributing to pollution of the river. These activities have resulted in heavy fermentation causing eutrophication in the river and at the same time, this is a major concern as methane is one of the greenhouse gas that is under the bird's watch eye of the COP series. On the same note, the local brewing has a high energy demand, and of which is heavily reliant on firewood from the local forests sadly, the same forests are exploited to feed Lusaka Province's charcoal needs rendering Mazubuka District a hotspot for illegal charcoal production. This is evidenced by a study by Solidaridad which reported that the Itebe community in the Mazabuka district of Zambia relies on livestock as their primary source of income. However, the district experienced a decline in livestock numbers due to poor husbandry, which led to poor sales and lower revenue. This resulted in a high rate of early marriages and increased unemployment among women and youth, forcing them to rely on tree cutting and charcoal production as a livelihood activity.



*Figure 1.3: Map showing the location of Itebe ward*

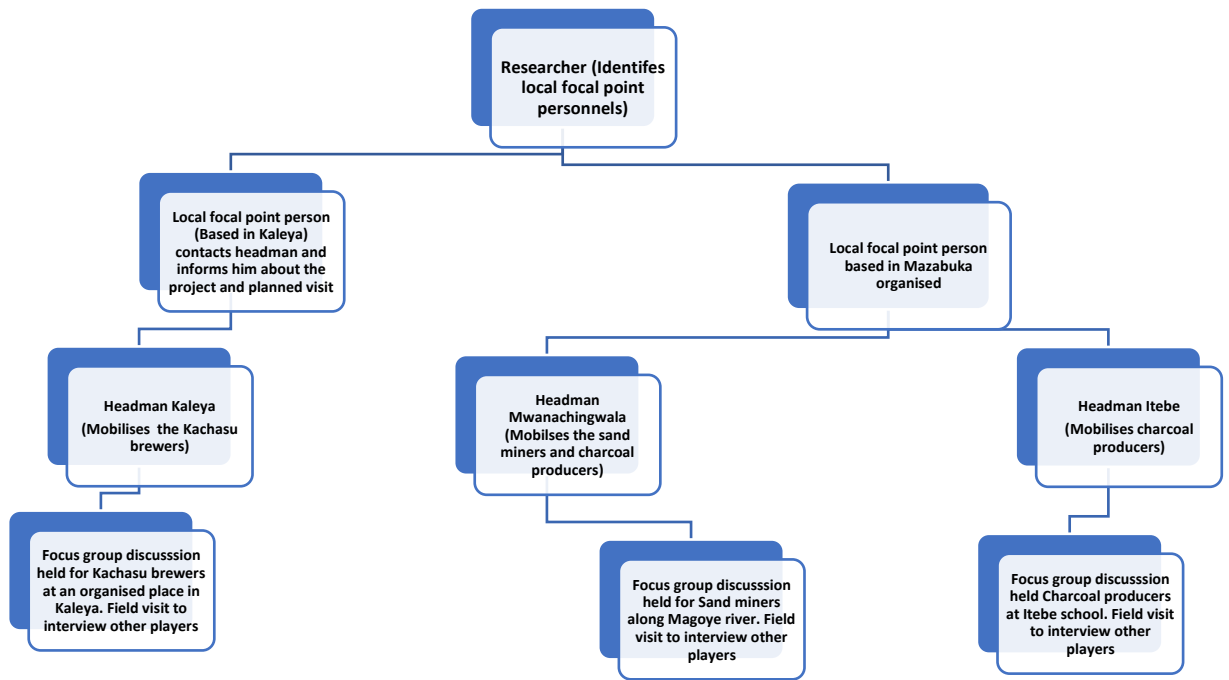
Mazabuka District has an area size of 4,003 km<sup>2</sup> and a population density of around 42.73/km<sup>2</sup> according to the 2010 census. The respective wards have a population density of 77.27/km<sup>2</sup>, Itebe, 3.278 /km<sup>2</sup> and Kaleya under Mazabuka central 58.944/km<sup>2</sup>.

## **2. METHODOLOGY**

Three wards were selected according to the specification in the TORs and client requirements. The criteria for identifying the study sites were based on the economic activities which are prominent in these selected wards. For instance, the Kaleya ward was selected because it is well known for *Kachasu* brewing using molasses from the sugar plantation. Mwanachingwala ward is well known for illegal sand mining along the Magoye river and Itebe ward is well known for charcoal production which has depleted its forest. Therefore, the three wards in Mazabuka district were identified namely: Kaleya, Mwanachingwala and Itebe. The study employed a bottom-up approach with the producers being the key participant in the survey and the stakeholders being the key participant during the validation workshop.

### **2.1. Sample Population**

The study employed a stratified random sampling of the known dealers of *Kachasu*, charcoal and sand, due to the non-availability of data in the three wards. This methodology required the study population to be divided into segments (in this case wards), and then randomly sampled (the ‘respondents’) from the segment based on who was available at the time we visited the three wards. Based on information gathered from the administration of structured interviews through questionnaires, the study was focused on areas with people primarily involved in charcoal, *kachasu* and sand production. The identification of these areas was done in consultation and recommendation from the local stakeholder who included the traditional leadership and government officials. This stratification strategy was used to obtain a representative sample of the study areas.



The research was conducted in two stages, the first stage involved interviewing the producers in the three wards and the stakeholders in those wards. The second stage involved a validation workshop to review the outcome of the findings and get contributions from the VCA stakeholders.

*Table 2.1 Presents the distribution of sampled respondents in the three wards covered by the study*

Ward	Charcoal Producer	Sand Miners	Kachasu Brewers	Burnt brick makers	Firewood harvesters	Total
Mwanachingwala	4	14	1	3	6	28
Itebe	13	0	1	1	2	17
Kaleya	1	0	40	5	11	57
<b>Total</b>	<b>18</b>	<b>14</b>	<b>42</b>	<b>9</b>	<b>19</b>	

The statistics shown in Table 2.1 represent a total sampled population of 102 respondents where Kaleya accounted for 56%, Mwanachingwala 27% and Itebe 17% respectively.

## 2.2. Stakeholder Engagement

Multi-level stakeholder engagements were used and found vital in capturing and triangulating data in the three wards. Hence, different stakeholders were engaged to have a thorough understanding of the situation in the three wards on unsustainable livelihood activities. On the production side, stakeholder engagement was targeted at understanding drivers, returns, alternative livelihood options and willingness to adopt another sustainable livelihood option.

Then on the stakeholder side, the engagement was done to understand the current intervention and review the proposed business models. Also, Refer to Appendix II for a complete list.

Name of Stakeholder		Role/Interest
<b>At Local Level</b>		
1	Village Headmen	Provided information regarding the livelihood activities and socio-economic status of the people.
2	Ward Councilors	Provided information at the ward level regarding govt programmes, and access to CDF.
3	Ward Development Committees (WDCs)	Provided information on development activities, and plans at the ward level to improve the standards of the people.
4	Ordinary Community Members <sup>1</sup>	Very useful in providing information regarding the actual socio-economic activities, returns and other alternative livelihood options.
<b>Middle Tier</b>		
5	Forestry Department (FD)	Provided information regarding the Forest Act
6	Local Authorities (LAs)	Provided information regarding the Beer Licensing Act.

Some of the stakeholders engaged included:

- 1) Traditional leadership are the custodians of the customary land and who ensure that order prevails in the villages;
- 2) The Forestry Department – primarily responsible for ensuring sustainable utilization of forests and forest products; and
- 3) Ministry of Local govt – coordinating the licensing of the liquor license which is the economic mainstay of the local people;
- 4) Community members included charcoal producers, Sand Miner and Kachasu Brewers.
- 5) VCA committee members – Coordinating the VCA activities for women, youths and the disabled in Mazabuka.
- 6) Nakambala WDC – Responsible for ward development activities including Kaleya ward.
- 7) Kaleya Cooperative Society – responsible for the socio-economic activities of the people of Kaleya through cooperative farming etc.

<sup>1</sup> who may be farmers, livestock owners, charcoal burners or sand miners, *Kachasu Brewers?*

### 3. DATA ANALYSIS

This section presents the five main approaches that were employed to meet the objectives of the study. First, Identification and provision of evidence for the key drivers for the existing unsustainable livelihood practices. Secondly, Identification of viable alternative livelihood options for the three target wards e.g. Beekeeping, livestock rearing etc. Thirdly, Identification of current intervention models and the possibility of the development of sustainable business models for the existing unsustainable practices. Fourthly, identification of practical linkages, business support services and capacities, and recommendations to strengthen linkages of alternative livelihood options to viable markets at both domestic and external. And lastly, identification of policy and regulation gaps that could help in strengthening interventions. Through this approach, the proposed alternative sustainable livelihood options were assessed as to whether they are viable for the target communities for the sand miner, charcoal producers and Kachasu brewers particularly.

The feasibility study first identified the unsustainable livelihood activities in the three wards. Then the key drivers for these unsustainable livelihood activities in the three wards.

#### 3.1. Evidence for key drivers of the unsustainable livelihoods

The study identified five main unsustainable livelihood activities in the three wards of Mazabuka District. In this study, unsustainable means something that cannot continue at the same rate or cause damage to the environment by using more of something than can be replaced naturally. Evaluation of unsustainable livelihood activities was wholly based on evaluating the entire life cycle of the activity. For instance, where the activities were conducted, does the process require energy, what are the end products, and does it generate waste?

For instance, using both a social, environmental and economic analysis of the livelihood option, we assessed the issues of child labour, environmental pollution and tax evasion in the entire process.

**Table 3.2: Shows the unsustainable livelihood options in the three wards**

<b>Activity</b>	<b>Process</b>	<b>Impact</b>
Charcoal production	Wood harvesting	Forest Degradation
Pan Brick making	Wood harvest, termite mound removal	Forest Degradation, Land degradation
Sand Mining	Sand harvesting	River bed erosion
Kachasu Brewing	Wood harvesting	Pollution, forest degradation
Firewood harvesting	Wood harvesting	Forest Degradation, Loss of forest Cover

From the sample population in the three wards of Mazabuka District, the study reviews that Kaleya had the highest representation of Kachasu brewers which dominates other livelihood activities representing more than 80% concentration. Meanwhile, in Itebe ward despite the higher population density, 60% of the people surveyed depend on charcoal production as a source of income. And lastly, in the Mwanachingwala ward, there is a greater distribution of involvement in almost all the unsustainable livelihood activities which were identified in the survey. More than 40% of the surveyed people were actively and on a full-time basis involved in sand mining along the Magoye river, the other 20% were involved in charcoal production and others in firewood harvesting, burnt brick making and partly in Kachasu brewing as shown in figure 1.4 below:

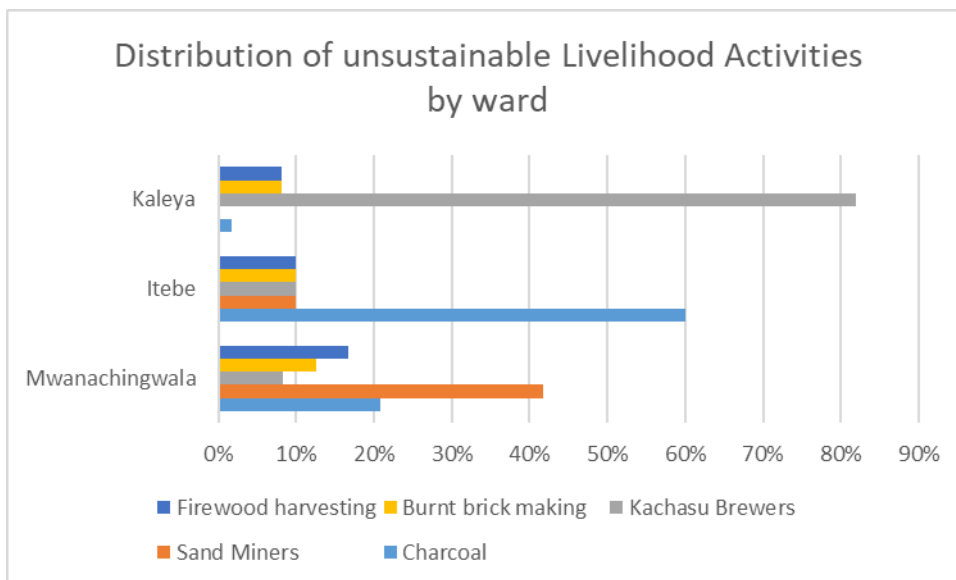


Figure 3.4. Distribution of unsustainable Livelihood Activities in the three wards

### 3.1.1. Charcoal production

Charcoal is a key energy source for both peri and urban households in Mazabuka district and charcoal production itself is the main cause of forest degradation across the district. This coupled with low access to electricity in the district, most peri and urban households in the district are using charcoal mainly for cooking and heating. Similarly, the demand for charcoal in the district was triggered by other livelihood activities which used charcoal a lot such as *Shoka Nyama (meat braii)* for instance at Magoye and Nega Nega most popular places for goat meat. Similarly, charcoal was also sold along the Livingstone road or highways where cross-border truckers and other commuters from major cities like Lusaka etc would stop by and buy a few bags of charcoal. In short, there is a strong value chain for charcoal in the district which

has attracted a lot of charcoal producers. Mainly the charcoal producers were coming from places like Itebe ward which is a hot spot for charcoal production in Mwanachingwala chiefdom.

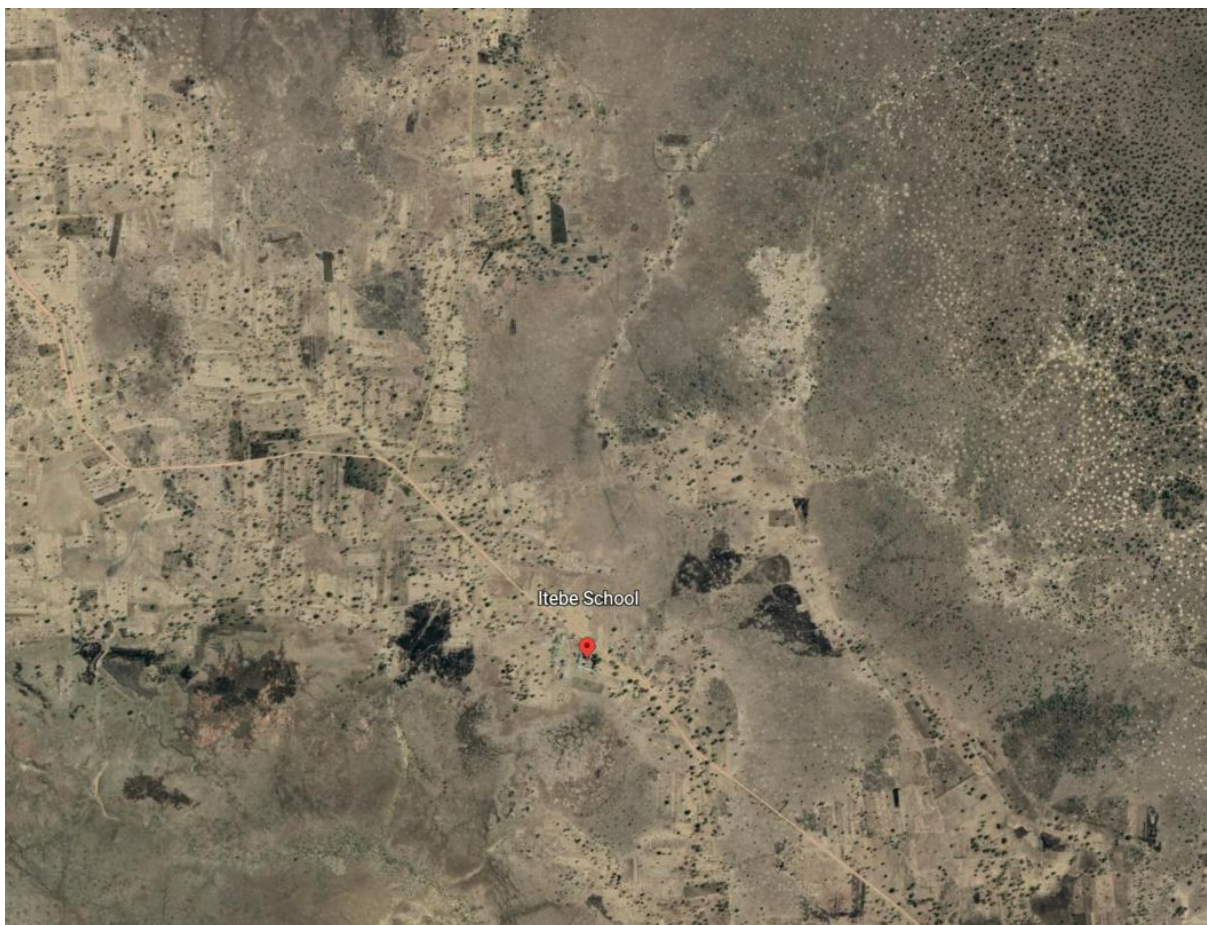
From the interviews with the charcoal producers in both wards of Mwanachingwala and Itebe, using indigenous earth mound kilns, which were estimated to be using almost all the available tree species in Itebe ward mainly mopane, acacia, combretum and in some instances fruit trees in the area. It was also found that due to the demand for charcoal in the two wards, almost all tree diameters used (mainly ranging between 2.4 and 68.6 cm dbh) were felled for charcoal. In most cases in the mopane woodlands on the western side of Itebe ward, charcoal producers were using paraffin to fel large trees of mopane to produce charcoal from them.

**Table 3.3: Shows the cost and revenue breakdown of the charcoal business**

<b>Month conducted</b>	<b>Capital requirement</b>	<b>Quantity sold (per month)</b>	<b>Profit per unit (ZMW)</b>	<b>Profit (How much do you make) ZMW</b>	<b>Main market</b>
April	ZMW 1000	10 Bags	45	450	Riverside
April	ZMW 1500	10 bags	40	400	Riverside
May	Manual labour	15 bags	70	1050	Home
June	ZMW 500	40/50 Kg bags	160	1600	roadside
June	No capital	20 bags	150	3000	Roadside
Yearly	ZMW 100 For labour	10 bags	80	800	Roadside

The results of the survey in the table above show the apparent profit in charcoal production is attributable to very low capital outlays, "free" own labour, "free raw material", lack of concern about associated external costs, and high demand for charcoal and lack of alternative income-generating activities. Cutting trees for charcoal implies an opportunity cost as the trees may have been used for other purposes such as timber, construction, medicine, firewood and food. The woodlands in Itebe and Mwanachingwala wards play a vital role in ecosystem services such as carbon sequestration, nutrient cycling and watershed protection of the Kafue and Magoye rivers. Charcoal production is not a sole environmental degrading activity, in these

wards' agriculture expansion due to the demand for cash crops such as soya beans and cotton complementing the efforts of charcoal production is depleting the remaining woodland. Charcoal is considered worse because it involves selective cutting of tree species thus reducing the ecosystem services in the wards. The picture below shows that although the commercialization of wood resources provides tangible monetary benefits to rural communities, it also contributes to environmental degradation that will ultimately threaten their long-term survival. Further, we see scattered vegetation that cannot protect the soil from erosion and also provide nutrient retention to the soil.



*Figure 3.5: Shows an aerial picture of part of Itebe ward and vegetation*

In this research, we used multitemporal low-resolution imagery from google earth to show the extent and intensity of forest degradation associated with charcoal production and its impact on forest carbon stocks for the main supplying area of Mazabuka district which is Itebe ward.

Similarly, due to the loss of forest in the ward, the size of the wood available is another factor that determines the kiln size. According to the findings of the study on charcoal production in Itebe and Mwanachingwala ward, a kiln with dimensions 6.7 m\*2.8 m\*1.5 m produced 33 bags

of charcoal (30 bags in 50 kg and 3 bags in 90 kg). The average weight of fifty kilograms bag was 41.8 kg and for the 90kg bag average weight was 53.8 kg.

According to the findings the table below has summaries of the amount of wood utilized and the actual amount of charcoal produced from specific kilns which were commonly used in the two charcoal-producing wards.

Kiln number	Size of the kiln (m)	Amount of wood utilized (kg)	Amount of wood waste (kg)	Amount of charcoal produced (kg)
1	3.1*1.93*1.5	3,151.542	508.4	1,025.4
2	6.3*2.5*1.6	5,267.633	425.7	1,301.6

#### PICTURE OF CHARCOAL KILN



#### 3.1.2. Pan Brick making

Although there is less literature on this activity, this is a livelihood activity that is silently and rapidly spreading like wildfire in most parts of the country. For instance, the quest to build modern houses has come at an environmental cost as most people in rural and peri-urban areas of Zambia cannot afford to buy modern cement blocks. In this regard, most of them have resolved to use clay bricks. These clay bricks are moulded by hand and burnt in a kiln to increase their strength. This activity has put pressure on the termite mounds which are been used as a source of clay soil for moulding the blocks and the amount of wood that is been used in the kiln.

Brick making is also a major cause of health-related problems, and the prime cause of pollution.

Informal sector activities such as brick making have significant effects on the environment. Such activities cause environmental degradation and result in land degradation through soil erosion, flooding and pollution.

This is because improved sector activities are not registered by the government and their impact on the environment cannot easily be identified and mitigated by environmental officers.



***Figure 3.6: Shows the termite mound which has been destroyed to construct a brick kiln on the upper left***

Regarding the ecological impact of destroying termite mounds for brick making process, the survey could not establish any facts or evidence on the ground. Even though termites play a significant role in nutrient recycling by breaking down organic matter, destroying the termite mounds for this process means destroying the soil nutrients.

Similarly, the usage of firewood in these traditional brick kilns as burning fuel has been assumed to be energy-inefficient and polluting and may have a negative influence on global warming and environmental sustainability. The traditional brick-making industry in Mazabuka district has a positive influence in supporting construction development and a source of income for the people of Kaleya and Mwanachingwala as it creates employment for uneducated and unskilled labour and is also a secondary source of income for many households.

Demand for brick is increasing following the development of construction activities in the district. The use of firewood in traditional brick is a serious threat to the environment. The firewood kilns use large quantities of wood and lodge which could lead to deforestation. The survey found that approximately 3 m<sup>3</sup> of firewood was needed to fire 1000 bricks which were

sold at ZMW 1.50 per block. The picture below is for illustrative purposes only and was not obtained at the study site.



*Figure 3.7: Shows brick kiln and firewood usage*

Consequently, much firewood is needed in producing burnt bricks. The traditional brick-making process around Kaleya and Mwanchingwala used firewood which mainly comes from around the Magoye river. The picture below shows an acacia tree which has been destroyed to aid firewood for the nearby brick kiln near the Magoye river.



*Figure 3.8: Shows an acacia tree cut for firewood for the brick kiln*

Although no research has been done to study the relationship between brick making and firewood usage and activity of tree cutting around in Mazabuka district. If more than 10000

bricks are made every day, so around 30 m<sup>3</sup> of wood are needed a day which means many trees are to be cut.



Figure 3.9: Shows a brick kiln in Kaleya along the Livingstone highway

<i>Activity</i>	<i>Raw material quantity</i>	<i>Charcoal or firewood</i>	<i>Quantity used</i>	<i>Quantity Produced</i>	<i>Production pattern</i>	<i>Capital ZMW</i>	<i>Price per unit ZMW</i>	<i>Revenue ZMW</i>
Brick making	Clay	Firewood	3 m <sup>3</sup>	1000 bricks	Monthly	150 for wood	1.50	1500

### 3.1.3. Sand Mining

This is a common economic activity in the Mwanachingwala ward along the Magoye river. Due to the impact of climate change on the major livelihood activities and coupled with a lack of employment opportunities, the people of Mwanachingwala ward have abandoned their struggling livelihood activities and engaged in illegal sand mining to sustain their livelihood activities.

From the results of the survey, it was found that sand mining was not a lucrative livelihood activity based on the amount of labour involved and returns. Most of the sand miners along the Magoye river are selling the mined sand at desperate prices which in most cases the buyer will determine the price at a discounted amount. For instance, it was found that some sand miners just right on the western side of Magoye bridge were selling the sand to make some money for

<sup>2</sup> The producer mentioned that they use about 3 full ox carts of wood. 1 ox cart was equivalent to about 0.9 m<sup>3</sup>. Each ox cart full of wood was costing around ZMW 50.

buying alcohol. Simply, these miners would take any amount because of desperation. And another group of sand miners on the eastern side of the Magoye river were working as a group and they would share the returns from the business. Table 2.4 below shows the costs and returns from the sand mining business.

*Table 3.4: Shows the cost and revenue breakdown of the sand mining business*

<b>Month conducted</b>	<b>Capital requirement</b>	<b>Quantity sold (per month)</b>	<b>Price per unit (ZMW)</b>	<b>Revenue (How much do you make) ZMW</b>	<b>Main market</b>
Throughout the year	No capital	2 tonnes per day	20 per tonne	120 per week	Buyers from Mazabuka town

Further, interviews held with sand sellers in Mazabuka town found that a tonne of sand was selling for around ZMW 100 by the roadside.

Sand mining even though not a lucrative business, is causing more damage to the environment mainly the Magoye river. Below the picture shows how sand mining activities have widened the river.



*Figure 3.10: Shows an aerial photo of sand mining activities along the Magoye river*

Similarly, it was also observed that sand mining was leading to the drying of the Magoye river as large portions of the river were cut off due to siltation of the river bed. Further, the vegetation along the Magoye river was been destroyed due to sand mining activities which were clearing

trees or trees roots were left exposed and thus causing the death of the trees. For instance, the Magoye river was found to be drying up faster due to excessive evaporation which was a result removal of trees to accommodate sand mining activities. Other, environmental impacts can be seen in the picture, showing large open pits with unstable edges which keep collapsing. Worse during the rainy season, there is excessive soil erosion in the mining area. Similarly, the neighbouring communities have been left vulnerable to floods as the river has been widened and making the banks weak to flooding.



*Figure 3.11: Picture shows sand mining pit along Magoye river*

It was further noted that there has been a decrease in fish stock in the Magoye river, especially in the Itebe area where most fishermen expressed concern about the impact of sand mining. On a similar note, due to the nature of the mining activities, there have been a lot of injuries and deaths have been reported where miners have been buried alive.

The Magoye river is servicing a lot of people situated in a remote area of the district and is drying up, but due to increased sand mining activities, it is drying up which was causing siltation and blockage upstream.

The drying up of the river has resulted in people and livestock lacking drinking water, and the disappearance of fishing and farming activities. Due to this, most livestock farmers and fishermen in Mwanachingwala's chiefdom have seen a decrease in their production and thus been forced to engage in other activities such as charcoal production.

### 3.1.4. Kachasu Brewing

Kachasu brewing has the potential to make a significant contribution toward transforming marginalized people who are living in poverty due to a lack of employment and unstable sources of household income. Compared to the other two wards, the people of the Kaleya ward seem to have their livelihoods improved largely due to the Kachasu trade business. Compared to 20 years ago, there has been tremendous development as people used to live in small grass thatched houses, with no electricity and a poor living environment. But due to the Kachasu business people have managed to build houses with electricity, a good market and generally healthy-looking people.

The survey found that most people are engaged in this business because they are now able to afford to take their children to school and this has reduced school dropouts. Further, this has also contributed to the reduction in the crime levels in the ward as people can afford an improved standard of living. Similarly, the business has contributed to the reduction in early marriages which was a result of poverty forcing people to marry off their children.

*Table 3.5: Shows the cost and revenue breakdown of the Kachasu brewing business*

Month conducted	Capital requirement ZMW	Quantity sold	Price per unit (ZMW)	Revenue (How much do you make) ZMW	Main market
Weekly	1300 for first-time production.	200 Litres	180 per 20-litre containers	1800 per week	Buyers as far as DRC, and some big companies from Lusaka

With capital as small as ZMW 1300 one can start a Kachasu business in the Kaleya ward. This is the only business that has a strict capital requirement. There are more and more people entering the business and most of them come from outside the district. For instance, one would need two 200 litres of metallic drums costing around ZMW 100 each, 5 heaps of Firewood costing ZMW 200, Yeast for ZMW 20, and a 200 litres drum of molasses costing between ZMW 500 to ZMW 700. The molasses is diluted to double the output of the production, meaning at the end of the production cycle which can take almost a week, about 200 litres of Kachasu would be produced. This is then wholesaled at ZMW 180 per 20 litre container to different buyers who sometimes make a down payment and others pay cash upon collection.

The survey also noted that the demand for *kachasu* is very high, with bulk buyers coming from as far as Namibia, Lusaka, Livingstone and Ndola. The Kachasu distilled in Kaleya was highly

preferred because of the molasses used as an ingredient for catalyzing fermentation instead of yeast which improved on the grade.”



*Figure 3.12: Shows the Kachasu processing site in the Kaleya ward*

Despite this, Kachasu brewing has several environmental and social impacts not only in the Kaleya ward but the entire Mazabuka district. For instance, most of the active players are women who spend long hours exposed to wood smoke which irritates the lungs, causes inflammation, affects the immune system, and makes them prone to lung infections, likely including SARS-CoV-2, the virus that causes COVID-19. Similarly, the survey also observed the pollution both water and land on both water and land coming from the sludge which is been dumped by the brewers.



*Figure 3.13: Shows pollution in Kaleya stream due to sludge dumping*

However, the problem of environmental pollution due to its sludge or wastewater disposal without any proper treatment is a growing concern for the Mazubuka district. This has polluted

both the groundwater and water bodies such as the Kafue river. However, there is little information regarding the ecological impact of this pollution on the water bodies. Even though the findings from the stakeholder interviews pointed at the *Eutrophication* of the Kaleya stream and Part of the Kafue river which has negatively affected the breeding grounds for fisheries. Further, this Kachasu sludge is been referred to be providing nutrients aiding the spread of the Kafue weed an invasive plant that is causing massive ecological problems in the Kafue river.



*Figure 3.14: Left shows discolouration of the discharge point of the Kaleya stream. Right shows a large pond created due to waste from Kachasu brewing*

In all, driving through Kaleya one could pick the massive smell of the molasses and wastes from Kachasu brewing as a result of fermentation. This fermentation process releases a lot of CO<sub>2</sub> and Methane which are the main concern as Zambia is trying to combat greenhouse gases emission. This when coupled with the higher energy demand which is coming from firewood, Kachasu brewing is considered to have a massive carbon footprint. In short, the entire activity generates greenhouse gases and at the same time, it also destroys the carbon sink.

Lastly, the study noted serious Health and safety issues concerning Kachasu brewing. Most of the brewers were exposed to high temperatures and didn't have safety attires to protect themselves. The areas were not secured and easily accessible by children who were at risk of getting injured in the process. Similarly, child labour was observed in this activity, most children were used to fetch and provide cold water or to change the water from the distillery which was a continuous process and involved standing long hours near the fireplace.

### 3.1.5. Firewood Collection

The survey also identified firewood collection from the natural woodlands as an unsustainable practice. There is a very strong value chain for firewood collectors in almost all the three wards of Mazabuka district which is posing a threat to the environment. The major demand for firewood is Kachasu brewing and Burnt brick making mainly in Kaleya and Mwanachingwala. Large trees are mainly cut down and left to dry before they are chopped into sizable pieces which can be traded. Below is a picture of firewood stuck which is used for brewing Kachasu in the Kaleya ward.



Figure 3.15: Shows firewood stuck which will be used for Kachasu brewing

<i>Activity</i>	<i>Raw material quantity</i>	<i>Charcoal or firewood</i>	<i>Quantity used</i>	<i>Quantity Produced</i>	<i>Is production daily, weekly, monthly</i>	<i>Capital ZMW</i>	<i>Price per unit ZMW</i>	<i>Revenue ZMW</i>
Firewood	Trees	Firewood	3 m3	3 m3	Daily	Nil	50 per heap (m3)	150

Most firewood collectors were from the Mwanachingwala area and found it lucrative to sell the dry wood to the Kachasu brewers in the Kaleya ward. Under normal circumstances, they would make about 2 to 3 trips every day to deliver firewood to Kaleya. Firewood was mainly transported on bicycles and ox carts and sometimes in light trucks such as canters depending on the quantity. The firewood collected in such areas is green (wood with high moisture content) or dry (wood with low moisture content) and collected directly from native vegetation. This leads to changes in the conservation status of the remaining vegetation by reducing the population size of the species used and posing a threat to local biodiversity.

### 3.2. Key drivers for the existing unsustainable livelihood practices

Having identified the types of unsustainable livelihood activities in the three wards of Mazabuka district. The consultancy also went further to identify the key drivers for unsustainable livelihood practices.

From the sample population in the three wards of Mazabuka district, the study reviews that there were more men (60%) involved in unsustainable livelihood activities due to a lack of employment (62%). Women who are known to be good at managing small businesses (40%) were also found to be engaged in unsustainable livelihood activities this is because in the three wards most people lacked the capital to start a small business which could sustain their livelihoods.

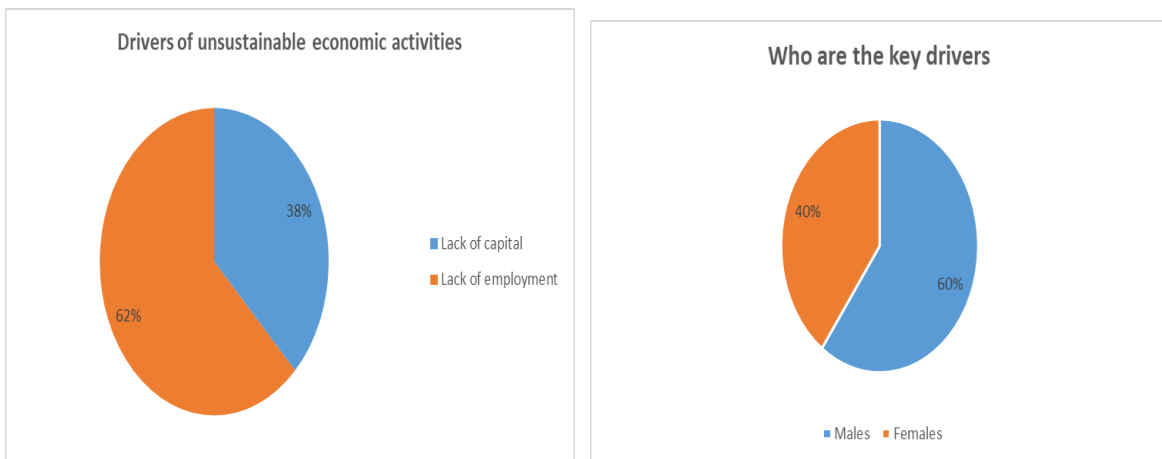


Figure 3.16: Shows the key drivers and those responsible for unsustainable livelihood activities in the three wards

In the same vein, lack of employment was forcing people to be engaged in such unsustainable livelihood activities. Most people in the three wards had to find means of supporting their children and supporting their families. Similarly, because these activities required less capital, they proved to be the only business opportunities that could support their daily needs.

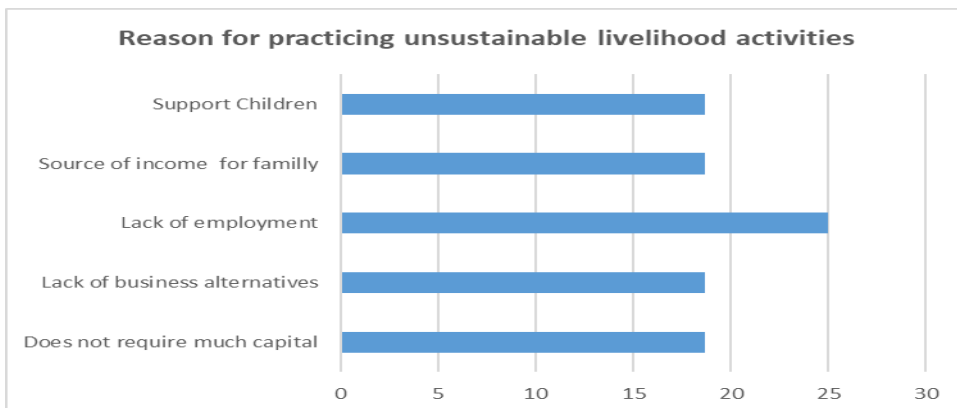


Figure 3.17: shows the reasons for practising unsustainable livelihood activities.

For instance, other alternative business activities required intensive capital which was not possible for the local communities to raise. Further, the market for the products from these unsustainable livelihood activities was readily available. The survey also reviewed that, there were no market structures to support other alternative or other business activities without intervention. Intervention from either the government or NGOs either in form of business support activities or capital provision was lacking.

Similarly, men and youths were more involved in these unsustainable livelihood activities in the three wards either on the extraction/production side or the trade side. Despite this, women who were involved in these activities were channelling the money towards meeting the family needs and at the same time also looking after their husbands. Further, the survey reviewed that the three wards had a very strong agricultural background. Most of the households (56%) were involved in crop production of maize, cotton, sunflower and groundnuts. Similarly, 62% of the people survey stated that their maize, cotton and sweet potatoes were heavily affected by climate change as these crops were heavily dependent on rainfall as the main source of water. Despite, the above, at least 56% of the surveyed households were rearing livestock mainly cattle, goats and poultry. The majority 38% of these were keeping only goats and poultry as these were easy to manage in terms of diseases and feeding.

### **3.3. Identification of viable alternative/sustainable livelihood options for the three target wards**

The consultancy employed a Sustainable Livelihoods Framework (SLF) as a conceptual framework to structure viable alternative/sustainable livelihood options. The SLF is adopted due to its holistic and multidimensional approach that acknowledges the complexities entrenched in rural livelihoods, especially in the three wards of Mazabuka.

A livelihood can be considered sustainable when it “can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long-term. “Alternative livelihood project is a widely used term for interventions that aim to reduce the prevalence of activities deemed to be environmentally damaging by substituting them with lower impact livelihood activities that provide at least equivalent benefits. For this research alternative livelihoods were chosen based on the SLF.

To determine, viable alternative/sustainable livelihood options for the three wards, the consultancy took a household survey in the three wards and conducted individual interviews

with the producers. The purpose was to conduct an asset evaluation in the three wards and see the potential of other livelihood options such as livestock rearing and beekeeping etc.

**Table 3.6: Shows the number of people rearing which type of livestock**

	Livestock	Frequency	Percent
	Cattle	8	6.2
	Goats	11	18.8
	Poultry	11	18.8
	Total	30	100.0

From the survey, it has been established that the people of Mwanachingwala and Itebe rely on Livestock as their primary source of income. However, it was also found that there has been a decline in the number of livestock due to outbreaks of diseases which almost wiped out the entire cattle population. Therefore, most of the people in these two wards only rear goats and poultry. It has been a challenge for people to restock their cattle population because of the required capital. And this has left people depressed as the other livestock being reared do not fetch as much income as the cattle would do. In this regard, other interviewees stated that they have been engaged in these unsustainable livelihoods in the vain to raise capital to buy cattle.

**Table 3.7: Shows the number of sources of water for agriculture in the three wards**

	Source of water	Frequency	Percent	Valid Percent
	Borehole	5	17	17
	Rain	18	60.0	60.0
	Pipe	2	7	7
	Well	5	17	17
	Total	30	100.0	100.0

Similarly, the survey took into consideration the availability of water for agriculture for the people in the three wards. The majority of the people (60%) heavily depend on rainfed agriculture to grow their crops. Due to the impact of climate change which has been witnessed through changing rainfall patterns and dry spells, these people have not been able to depend on agriculture as a main source of income. The other group of people had access to wells and boreholes which provided water for growing vegetables such as rape, tomatoes, eggplants and okra. At least this group was able to substitute their income by growing other crops throughout the year. A few people mainly from the Kaleya ward had access to pipe water which was used to grow crops on a smaller scale.

Further, to this, discussion with the headmen especially in Mwanachingwala and Itebe, most livestock farmers in these two wards also depend on the Magoye river as a source of water for their animals. Unfortunately, the river is drying up at a fast rate making it impossible for

livestock farmers to access water for drinking. In this regard, those with cows must take the animals to the Kafue flats for grazing and water. This whole process has affected livestock production in the two wards. As for the Kaleywa ward, groundwater has been heavily polluted by waste from the Kachasu brewing and waste molasses. Therefore, climate change has affected the availability and quality of water for livestock and farming. Similarly, fisheries have been affected either breeding grounds have been destroyed especially in Itebe ward.

### **3.3.1. Livelihood assets**

From the asset evaluation in the three wards of Mazabuka district, we summarize the livelihoods assets focus group discussions from all three-case study wards and highlight details of individuals' experiences collected from the semi-structured interviews.

#### Financial assets

In all three wards, income from unsustainable livelihood activities namely charcoal production, *Kachasu* brewing and sand mining improved participants' access to village savings and loans groups and their ability to invest in other activities. Participants were able to purchase farm inputs such as fertilizer, tools and seeds with income from these unsustainable livelihood activities.

Unsustainable livelihood-based financial assets were found to be vulnerable to fines and confiscations from the regulating authorities. For instance, *Kachasu* brewers from the Kaleywa ward faced the most persecution from the regulating authorities. The impact on individuals and households varied depending on the severity of the enforcement activity. Nevertheless, participants linked income loss from enforcement activities with vulnerability to increased food insecurity, debt, financial insecurity, stress and reduced access to goods and services.

### **3.3.2. Natural assets**

All focus groups perceived that localized forest depletion due to the complete removal of trees from unsustainable charcoal production, and higher demand for wood fuel during *Kachasu* brewing and pan brick making, these practises (e.g. not replanting cut trees) had degraded the natural assets. All focus groups perceived that localised forest loss (due to charcoal production) was linked to a change in rainfall pattern and increased frequency and intensity of run-off from the forest reserves. Focus groups from all wards perceived that forest loss was leading to lower agricultural yields due to increased prevalence of flooding and reduced soil quality in agrarian lands. They additionally stated that tree loss was responsible for the heavy siltation and subsequent drying of smaller streams in the dryer months, resulting in reduced potential for irrigated agricultural systems.

### 3.3.3. Social assets

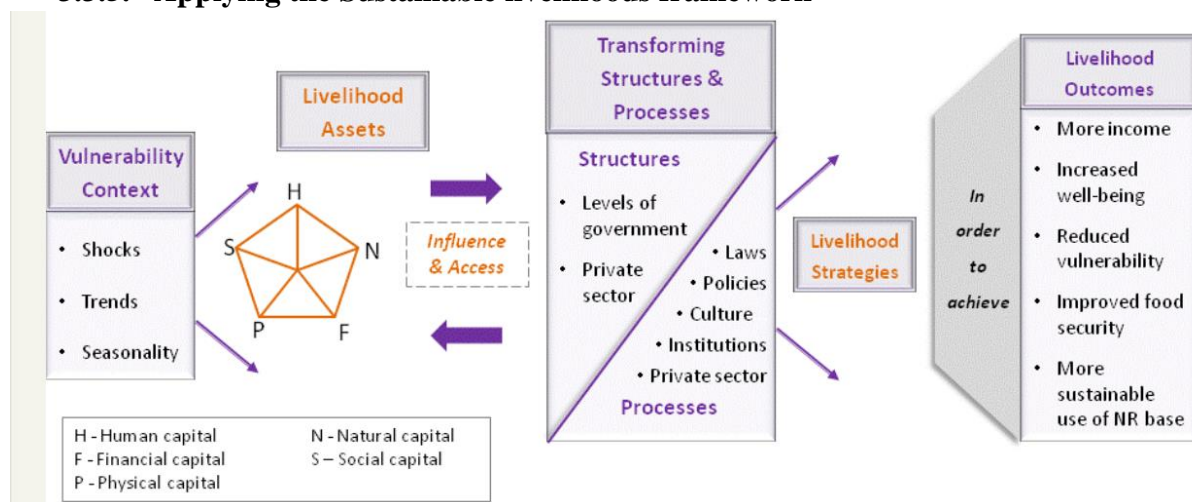
Participation in the five stated unsustainable livelihood activities strengthened social assets, through improved ability to support others. All focus groups described notions of camaraderie amongst producers, assisting each other to avoid enforcement activities, lending each other tools and exchanging labour. They expressed their ability to financially support family members with income from these activities, for example by paying school fees or giving financial support to elderly or infirm relatives.

The illegality and informality of these sectors weakened producers' social assets through increased risk of conflict with authorities including the Forestry and Public Health Departments, and traditional leaders. In the Kaleya ward, focus groups reported conflicts with other community members, as non-producers would threaten to report producers to the authorities. Additionally, female focus groups in the three wards perceived a stigma associated with their involvement in the trade, as non-producer women in the community were known to deride female producers for participating in a 'dirty' job.

### 3.3.4. Human assets

All focus groups made observations of feeling exhausted after work, which affected their abilities to pursue alternate livelihood strategies and socialize. Producing charcoal and *Kachasu* brewing was also associated with an increased risk of respiratory illnesses from exposure to smoke and dust. All group participants perceived it to be a dangerous activity, as constructing charcoal kilns and also sand mining in unstable, mountainous and rocky terrains or mining sand by the river banks increased producers' risk of accidents and serious injury.

### 3.3.5. Applying the Sustainable livelihoods framework



The SLF describes livelihoods as comprising a diverse combination of subsistence and income-generating activities and strategies for the three wards. These depend on assets (human,

physical, natural, social and financial), which are deployed within a context of vulnerability (e.g. seasonality, shocks and trends). Transforming structures and processes are important external factors that shape people's livelihood strategies. In the case of charcoal production, particularly important transforming structures are local bodies such as the Department of Forestry, Council and village committees charged with forest protection, while key processes include government policies on charcoal and resource access.

When applied to the three wards, the SLF allows assessment of the socioeconomic and underlying vulnerability context in which producers' livelihoods operate. It incorporates their livelihood assets and outcomes, including how involvement in the trade and the governance structures affect livelihood outcomes and assists in exploring factors that influence power and access to these resources and markets. Sustainability aspects relate to how governance of the sector affects the environmental sustainability of the resource management and extraction practices and thus the overall sustainability of producer-based livelihood outcomes.

### 3.3.6. Identified alternative/sustainable livelihood options

To evaluate and identify alternative livelihood options for the three target wards, the consultant used a mixed approach to identify alternative livelihoods and evaluate their suitability for the three wards. The producers were asked what business or livelihood option they would opt for if they were to stop the current livelihood activity. The following were the responses:

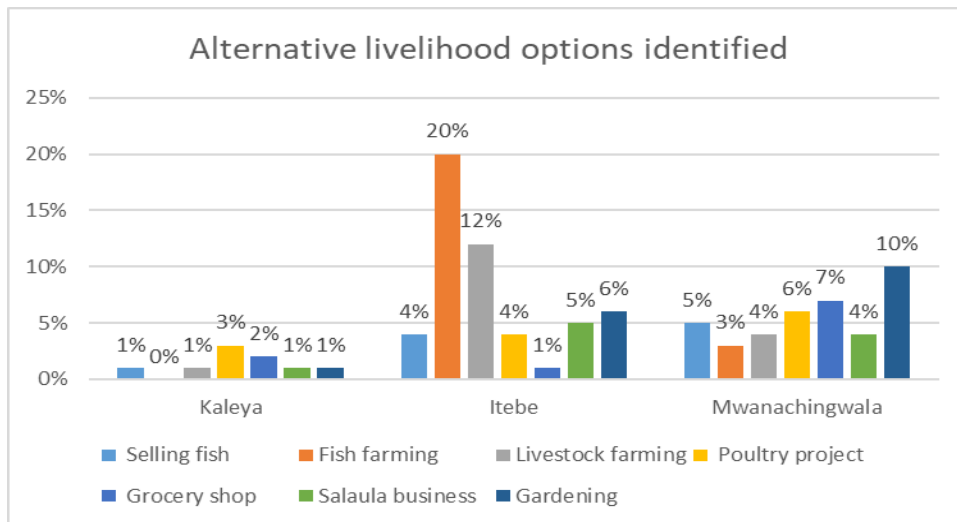


Figure 3.18: Shows the alternative livelihood options identified

The above figure also shows the willingness of people to switch to other livelihood options and this was based on the livelihood options which were identified by the participants. These livelihood options were based on the five pillars of product, place, promotion, price and people.

The following section provides background and insight into some of the identified alternative livelihood options. The analysis is based on the information provided by the experts or existing projects in other parts of the country that have proved to be working. The profitability analysis of the Identified alternative Livelihood options was evaluated using return on investment (ROI).

### **i. Kaleya Ward**

The findings show that the Kaleya ward was scoring low in terms of the willingness of people to opt for other alternative livelihood options. Based on the earlier findings, most people in the Kaleya ward found Kachasu brewing to be a very lucrative business. When analyzed based on the 5 Ps, Kaleya ward the identified products or livelihood options could not perform were because the place was densely populated to support farming and livestock rearing. The Kaleya stream and groundwater were heavily polluted to support fish farming. Despite this because of the large population, the demand for poultry products was identified to be good, thus broiler chicken rearing was identified to be another livelihood option that could help people away from unsustainable livelihood. Below a breakdown of two types of poultry production has been analyzed.

#### ***Broiler Chickens***

<b>Alternative Livelihood</b>	<b>Requirements</b>	<b>Capital ZMW</b>	<b>O&amp;M ZMW</b>	<b>Duration</b>	<b>Yields</b>	<b>Price per unit ZMW</b>	<b>Revenue</b>
Chicks	- 5,000	- 90,000		6 weeks	5000 Broiler chickens	90	450,000
	- Vaccines		- 5,000				
	- Feed		- 150,000		20,000 quails	25	500,000 (355,000)
	- Others	- 50,000					
	- Training		- 50,000				
<b>Totals</b>		<b>100,000</b>	<b>250,000</b>				<b>595,000</b>

The above analysis is specifically for the poultry business for people to venture into rearing free-broiler chickens and quails. The poultry business appears to be more lucrative compared to any other business. Kaleya ward provides a competitive advantage to supply poultry meat to the entire district of Mazabuka due to its locality. The analysis shows, that both broiler chickens and quails distributed to members of a cooperative could be a game changer for *Kachasu* brewers.

## ii. Value addition

Kaleya has access to a lot of molasses, sugarcane and bagasse which value addition provides an opportunity to generate income. For instance, *Kachasu* can be repackaged and sold as low-content alcohol. Molasses is an important product that can be processed or repackaged and sold as a sweetener. There is a need to explore value addition for molasses apart from using it for *Kachasu* brewing. Similarly, sugarcane can be processed into sugar juicy and sold to the roadside market, this could be a lucrative business for the people of Kaleya. Manual Sugar cane pressing machine costs around ZMW 5000 imported into the country. For instance, 20 of these machines could transform the lives of many youths, women and men who are really on *Kachasu* brewing. These are portable machines which could be used by the highway to sell cane juice. Kaleya is suitable for this business as it has market potential from long-distance travellers.

*The picture below shows a sugar cane juicer*



## iii. Itebe Ward

Itebe ward, well known for both livestock and fisheries showed strong potential to revive the livestock business for most people in the ward. Most of the people in Itebe expressed interest in livestock farming such as cattle rearing (12%) and fish farming (20%). This is because most people in this ward were from livestock farms that lost most of their animals due to the previous outbreak of corridor disease. Thus, they resolved on charcoal production which is not a lucrative business. Similarly, Itebe ward was near the confluence of the Magoye and Kafue

rivers, and most people in the ward depended heavily on fishing as a business. Unfortunately, due to many factors one of the siltation of the Magoye river due to sand mining, the fish stock has reduced and so is the income. In this case, people identified fish farming as a viable alternative livelihood option. Fish farming or aquaculture has the potential to benefit more than 27,000 people in the ward if taken seriously. For instance, Steve has been in the lower Kafue basin and plenty of water for fish farming have the potential to produce close to four tons of fish per day.

Similarly, a few farmers who had boreholes were involved in vegetable gardening and *salaula* or second-hand clothes business was also identified as being a viable business option that could help people out of the current situation.

### *Fish farming/Aquaculture*

<b>Alternative Livelihood</b>	<b>Requirements</b>	<b>Capital ZMW</b>	<b>O&amp;M ZMW</b>	<b>Duration</b>	<b>Production Capacity</b>	<b>Price per kg ZMW/KG</b>	<b>Revenue Per cycle</b>
Fish farming	30 by 20-meter fish pond.  5000 fingerings  50-meter borehole drilling	65,000  5000  30, 000	20,000 For feed per cycle  Other 10,000	6 months for 1 cycle	2500 kg (est 500g per fish).	50	125,000
<b>Total</b>		<b>100,000</b>	<b>30,000</b>				

The table above shows the profitability of fish farming in Itebe ward. Fish farming was identified as one of the promising livelihood activities that could transform the lives of the charcoal producers in this ward. Starting with one unit of a 30 by 20-meter fish pond, while working as a cooperative could create employment for a lot of charcoal producers. The above dimension has the potential to produce about 2500 kg of fish which could bring revenues of around ZMW 250, 000 per year to the local people.

*Pictures below show the fish ponds construction and operation*



#### iv. Mwanachingwala Ward

The results presented in figure 2.18 show that the Mwanachingwala ward near the highway has the potential for opening fish markets and hosting vegetable production units which could supply to Mazabuka town and other neighbouring towns. Similarly, most people in the ward expressed interest to venture into the poultry business because it was easy to manage compared to the livestock business which has failed in the ward due to disease outbreaks.

##### *Vegetable gardening*

Alternative Livelihood	Requirements	Capital ZMW	O&M ZMW	Duration	Yields	Price per unit ZMW	Revenue
Gardening	1 Ha land - 20,000 cabbage seedlings - Irrigation kit - Borehole solar pump (1hp) - Tank (5000l) and stand	- 10,000 - 15,000 - 15,000 - 10,000 - 6000 - 9000	Pesticides  Labor  etc	4 Months	20,000 heads	5	100,000
<b>Totals</b>		<b>65,000</b>	<b>10,000</b>				<b>100,000</b>

The table above demonstrates the profitability of vegetable gardening as a cooperative on a 1 ha piece of land. The analysis is based on a fast-moving vegetable known as cabbage, and this analysis could also be applied to vegetables like Onions and tomatoes. From this analysis, we see higher capital requirements as an impediment to why the local people in both

Mwanachingwala and Itebe have not been able to venture into such livelihood options. Therefore, based on the above analysis the cooperative in both wards if ventured into vegetable gardening they can be making at least not less than ZMW 200,000 every year.



Alternative Livelihood	Requirements	Capital ZMW	O&M ZMW	Duration	Yields	Price per unit ZMW	Revenue
Poultry	- Egg Incubator with solar system (5000 egg capacity)	- 42,000	Vaccines 10,000	6 Months	5000 free-range chickens	100	500,000
	- Brooder	- 8000	Feed		10,000 quails	25	250,000
	- Fertilized eggs (150 trays)	- 8500	50,000				
		- 24,000					
<b>Totals</b>		<b>82500</b>	<b>60,000</b>				<b>750,000</b>

The above analysis is specifically for poultry businesses for people to venture into rearing free-range chickens and quails. The poultry business appears to be more lucrative compared to any other business. For instance, an egg incubator and brooder would be purchased with trays of fertilized eggs. Once they hatch the chicks can be distributed to the members of the cooperative. When the chicks develop into chickens, each member of the cooperative would sell part of the chickens at a determined price and money would be used to buy more fertilized eggs etc. to keep the poultry project active. Using this model, the local people will have a quick source of income to meet their daily needs.

### 3.4. Business support services and capacities

To understand the business mode required for alternative livelihood, the consultancy took to understand how trade is conducted, the current market took into consideration to assess the

mode of trade that was been used by, practical market linkages and lastly the business support services that are needed.

**Table 3.8: Shows the mode of trade used by the producers**

Type of trade					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cash	53	68.8	68.8	68.8
	Barter system	24	31.2	31.2	100.0
	<b>Total</b>	<b>77</b>	<b>100.0</b>	<b>100.0</b>	

The survey took into consideration to assess the mode of trade that was been used by the producers in the three wards. The findings of the survey show that cash and barter systems were used. For instance, most of the traders in Kaleya preferred cash-based payment for their products over than barter system. As for the producers in Mwanachingwala and Itebe ward, it was found that most of them used the barter system as a mode of trade. For instance, the people would exchange fish for maize and then later sell the maize for cash. The most common items which were used during the barter trade were second-hand clothes, shoes and mobile phones. The survey also found that the pricing mechanism for the product was not enough to yield benefits. For instance, the sand miners were unable to set up stable prices for the sand that was mined because there were a lot of players and each player on the site would sell the sand at their price. So, this was the same for the charcoal producers who would take the charcoal to Mazabuka town and also along the highway, the prices were not fixed and thus bargained to make a sell. Further, the study also found that most buyers from outside the wards eg. Mainly from Lusaka were in the tendency of exploiting the producers using the barter system. For instance, some of the goods which were used during the barter system were below value eg. Some buyers would exchange mobile phones which bags of charcoal and at times livestock.

#### **3.4.1. Current Market for the livelihood activities**

To understand the capacities required for alternative livelihood, the consultancy took to understand the current or existing market structures for the livelihood activities. The research found that the target customers for the livelihood activities in the three wards are mainly buyers from outside the Mazabuka district. These buyers come as far as the Kasumbalesa border post to source Kachasu, fish, chickens, and charcoal.

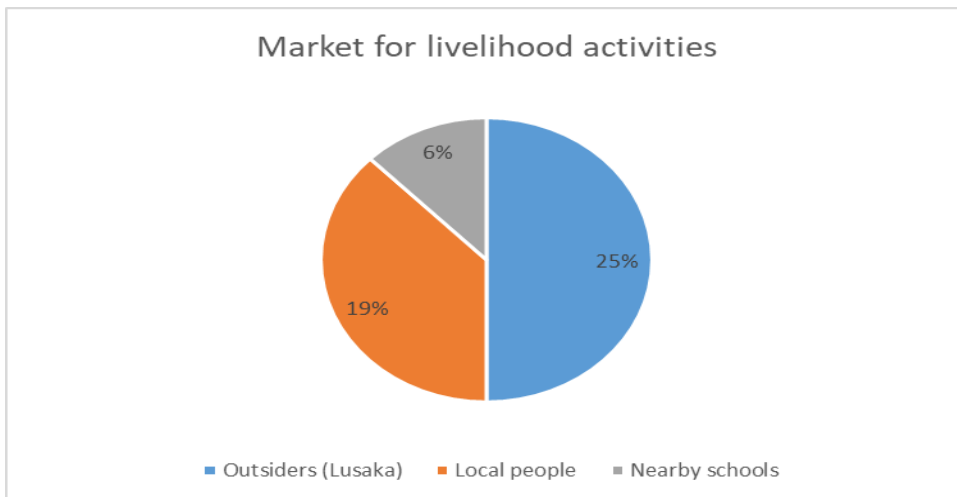


Figure 3.19: Shows the market distribution for livelihood activities in the three wards

Further, considered in this study are the local people within the communities including the nearby boarding schools. According to the results of the survey, 25% of the producers sell their products to suppliers who in turn supply them to the urban market (mostly in Lusaka) while 19% sell them to end-users within the community Figure 2.19. The situation in the Kaleya ward is a bit unique– all the products in the ward is supplied to the middle people and already have buyers who have some informal arrangement with the producers. In this ward, some producers also act as agents who sell produce on behalf of other producers. This is mainly seen with Kachasu brewers who have some form of power to control other producers.

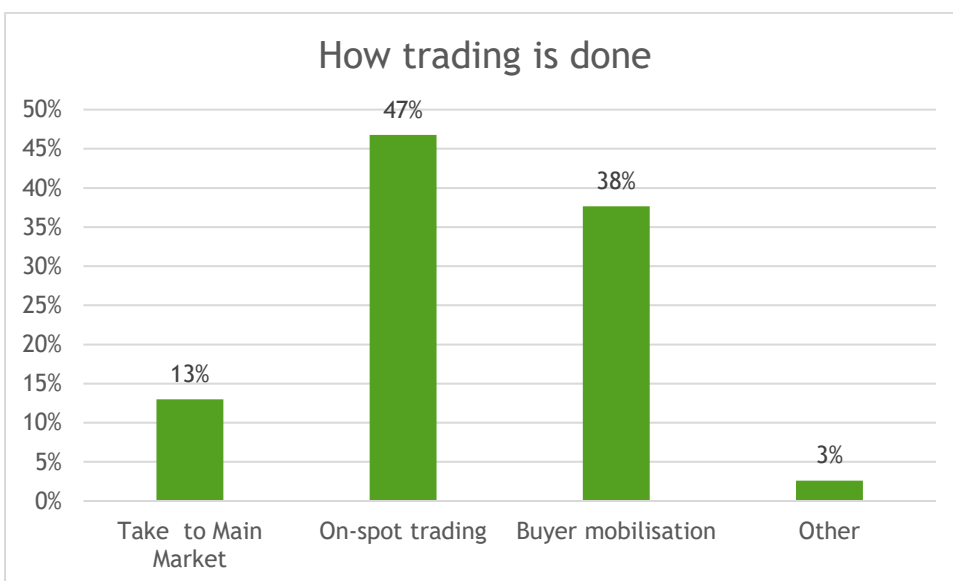


Figure 3.20: Shows how trading of the product is done in the three wards

Part of the survey was to make a recommendation on business models that can be used for these unsustainable practices. In this regard, the consultancy seeks to understand the current business

models which are been used. This was done by understanding how trading of these products was done in the three wards. The results of the study in the above figure show that much of the products are sold on-spot (47%) this is because businesses like Kachasu brewing are illegal and are not given any trading spots in the market. Therefore, for such businesses, buyer mobilization (38%) is been used to facilitate the trade of such products. For instance, sand miners and Kachasu brewers would trade their produce on-spot and buyers would mobilize the producers under some form of an informal agreement. Charcoal producers were able to take their produce to the market, mainly using bicycles or trading charcoal by the roadside. Meanwhile, others would take their produce to go and exchange it with other produce. For instance, some charcoal producers and Kachasu brewers would take their produce to the fishing camps in the Kafue basin and exchange these for fish.

### **3.5. Practical linkages of alternative livelihood options to viable markets at both domestic and external**

Whenever alternative livelihoods are been discussed, there is always the issue of the viable market which must be addressed. This study took to understand how viable the alternative livelihoods which have been highlighted in the later section.

The table below shows the willingness of the producers to be connected to the market. The consultancy assessed the market potential for both the current and the alternative livelihood activities. Taking note that the current livelihood activities are considered illegal under the law, there is still a wide gap to engage both the domestic and foreign markets.

*Table 3.10: Shows the Wiliness to be connected to the main market*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	67	87.0	87.0	87.0
	No	10	13.0	13.0	100.0
	Total	77	100.0	100.0	

From the survey, it was established that there is a black market where these products are been traded. For instance, Kachasu brewers mentioned having a very good market linkage with some major companies in Lusaka. This trade is normally done at the night because of the legality of the business. As for other livelihood activities, the returns have not attracted tax attention from the relevant authorities that's why there has not been much enforcement, especially on sand mining, charcoal production and brick making.

Similarly, the identified livelihood activities such as fish farming, livestock rearing and vegetable gardening. There is an invisible or informal market in the two wards which delivers the product to the Kasumbalesa border post in the DRC. The consultancy, therefore, found that

to strengthen market linkages there is a need for a market or trading place so that all traders can bring their produce to one place and agree on prices. For now, even the little market linkage that exists for these alternative livelihoods has not been sufficient to move people out of the current economic situation because the buyers have the powers to exploit the producers. For instance, if a trading place was established and publicized to the entire Country it will be easy for buyers to come and buy the produce from these producers who are clustered in one place. Further, both domestic and external markets have shown potential for alternative livelihoods in the three wards, especially for vegetable gardening and fish business.

The study recommended the following market linkages for the alternative livelihood activities in the three wards of Mazabuka District:

- ***Buy and Build Strategy:*** The three wards of Mazabuka district already have great potential to produce more than 5000 tons of fish and 10,000 chickens annually. Through this strategy, big firms like Zambeef, Capital fisheries etc can generate value and grow their returns by supporting the people in these three wards to be the suppliers of these products. Under this strategy, these private firms can set up supply centres, train the local people of the three wards on quality and standards, provision of capital through equity finance to lower the cost of production. Under this strategy, there will be the need for WWF to engage multiple firms to establish the potential of having production centres in the district. Already, Parmalat Milk has set up dairy cooperatives which have proved to be working.
- ***Corporate Social Investment (CSI):*** One would say that there haven't been any corporate social responsibilities, especially for the people of Kaleya ward who are into *Kachasu* brewing. For instance, big players on the market such as Zambia Breweries import all their alcohol from South Africa and Brazil. Kaleya ward has the potential to produce more than 30% of the alcohol for most manufacturing industries in the country. It will be practical for Zambia sugar the main supplier of molasses to train the people of Kaleya in marketing skills through their CSI. Zambia Breweries and the Zambia Bureau of Standards could come in to ensure the quality of the product and also establish a value chain to supply to Brewing companies in the country.
- ***Manufacturing Tools:*** The consultancy explored the tools used by other players on the market to promote conservation, for instance, COMACO uses manufacturing as a tool to supply over 8,000 tons (and increasing) of nutritious food products to Zambia's cities and towns each year, under the brand *It's Wild!*. Profits from *It's Wild!* sales are filtered back into the communities through dividend sharing and COMACO guarantees premium prices

if conservation standards are met. WWF can adopt this strategy to increase market linkages for alternative livelihood products.

### 3.6. Development of Sustainable Business Models

To understand the business support services and capacities for alternative livelihood options. The consultancy seeks to understand the kind of support the people in the three wards are already receiving and if they are members of a cooperative and if not, they are willing to be part of one. Further what benefits have been derived from the current cooperatives?

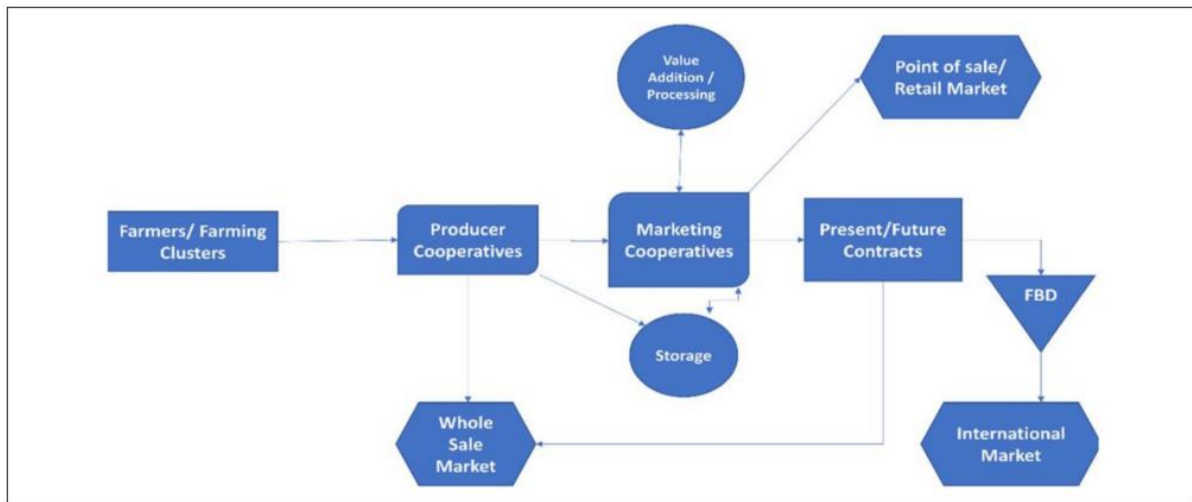
*Table 3.11: Shows members who are part of a Cooperative*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	20	26.0	26.0	26.0
	Yes	57	74.0	74.0	100.0
	Total	77	100.0	100.0	

The findings of the study in the table above show that 74% of the people survey in the three wards are part of a cooperative. Despite, the cooperatives not addressing the unsustainable livelihood practices in the three wards, it is important to state that if a cooperative approach was used to address unsustainable practices will yield positive results. These existing business support services known as cooperatives have only focused on teaching the community members about fertilizer applications and pesticide applications, especially cotton farmers. For instance, in Itebe there is a dairy cooperative and a milk collection centre. The challenge faced in these cooperatives has been conditions set for accessing loans and grants are prohibitive to cooperatives. Thus, this is hampering the development of the agriculture and livestock sectors. Due to this, the local community members have continued with unsustainable livelihood practices which provide quicker means of income.

Additionally, the study established that the people involved in unsustainable livelihood practices are willing to form cooperatives that can be used to address the current practices and voice out on climate action activities. For instance, in Kaleya, the Kachasu brewers have expressed willingness to form cooperatives which govt can use to communicate to the members and find a solution for these unsustainable livelihood activities. Similarly, sand miners in Mwanachingwala stated that cooperatives would help them sell their produce at reasonable prices and this was observed with the charcoal producers who stated that cooperatives would help them access grants and opportunities to switch to other alternative livelihood activities.

### 3.6.1. Application of the Cooperative Business Model to the three wards



Based on the findings of the study, the community members in these three wards were part of a cooperative. The study proposes the use of a cooperative business model as a business support service for alternative livelihoods. The above model proposes two types of cooperatives namely producer and marketing cooperatives. The producer cooperatives mainly would apply in Kaleya and Mwanachingwala districts for sand miners and *Kachasu* brewers. The members will use the cooperative to more effectively negotiate prices and access larger markets. The cooperative can further process member products to add value and increase producer returns. This type of cooperative will help the people of Kaleya to improve the value chain of *Kachasu* which for some time now has raised concerns about the pricing and environmental issues. Further, the consultancy proposes a marketing cooperative for the people of Itebe who want to venture into fish farming as an alternative livelihood activity for charcoal producers. The goal of a marketing cooperative is to benefit members by helping them increase their margins, maintain control of their product to point of sale, and secure a reliable and consistent market for their goods. These marketing cooperatives will be used to negotiate sales contracts, including prices and terms, with buyers. Even though this applies best to the people of Itebe, this model can be used in the three wards as a combination with the other producer model. Through the above cooperative models, value addition and processing will be enhanced to promote market linkages for alternative livelihoods. This will also enhance the current contract the local people have with the buyers, and also because of this model point of sale/organized market structures will be realized in the three wards to mitigate exploitation by buyers. The target should be to understand how the current cooperative work and see if possible to replicate the approach or introduce new cooperative approaches for the three wards.

### **3.6.2. Carbon Credit/Offset Mechanism**

Having evaluated the impact of climate change in the three wards, and also the state of forest and conservation activities. The consultancy proposes a carbon offset mechanism for the three wards to promote conservation activities. Through a carbon offset scheme, communities will be paid for their conservation efforts.

Notably, the demand for wood in the three wards is high due to unsustainable livelihood activities. Through a carbon offset scheme for charcoal producers, *Kachasu* brewers and sand miners, carbon revenue can be invested in community development projects, such as the drilling of new wells in regions with limited access to clean water, or the launch of additional incomes sources like community poultry farming, fish farming and livestock rearing.

Under this mechanism, projects like the production of biogas from waste or sludge, this biogas is then used as the source of energy during the brewing of *Kachasu* (*refer to next section*). Further, in collaboration with Zambia sugar company, there is a lot of potentials to produce Biomass briquettes from Bagasse and these briquettes are used to replace wood during *Kachasu* brewing. Under the carbon offset mechanism, WWF and other stakeholders could identify some other projects which could fit these marginalised groups of people.

### **3.7. Current Intervention Models**

The survey took to understand current/existing intervention models in the three wards of Mazabuka district. Intervention models were looked at from training/capacity building or crisis intervention models to help address the climate change crisis in the three wards. In this regards the consultancy took to understand if they were direct intervention models focused on these marginalized groups.

From the focus discussion with the producers in the different wards, the survey established the following findings.

### 3.7.1. Direct Intervention

Table 2.9: Shows the direct intervention models available in the three wards

Livelihood Activity	Type of Intervention	Name of the organisation responsible	Frequency
Charcoal production	Licensing, impounding, Training	Forestry Department	Yearly
Sand Mining	Licensing, impounding	City Council	Quarterly
Kachasu Brewing	Impounding	City Council	Weekly
Brick making	Non	N/A	N/A
Firewood collection	Non	N/A	N/A

The table above shows the direct intervention models that is currently been used in the three wards. The consultancy found that direct intervention models were focused on licensing and impounding the produce from these livelihood activities. For instance, charcoal producers are required to obtain a charcoal conveyance license to enable them to transport charcoal. Due to limited resources, the Forest Department has been unable to conduct training on charcoal producers on sustainable charcoal production, and how to obtain a charcoal conveyance licence. Once a year the Department of Forestry have conducted patrols to impound unlicensed charcoal mainly along the highways.

Similarly, sand miners are also required to obtain a licence from the city council and ZEMA. But the scale of the mining was not done commercial therefore, sand miners never saw the need to acquire a mining licence from any of these departments. The city council would only give licenses to the transporter, not to the actual miners. Further, it was also found that there were no intervention models that were used on the sand miners in the three wards.

Further, to this, Kachasu brewing is considered a highly illegal activity under public health Activities. The department responsible for issuing licenses to the brewers in the three wards has only focused on impounding and fining the brewers. This has created strong conflict within the business sphere as the government has not provided in business model or intervention model that could be used to improve the lives of the people responsible for this activity.

### **3.7.2. Other types of Intervention as highlighted during the validation workshop**

The consultancy held a validation workshop with different stakeholders from Government departments and NGOs. Part of the workshop was to identify the current intervention programmes being implemented in the three wards. Below are some of the intervention measures that were highlighted and discussed below.

#### **i. Social Intervention**

Social interventions are programs mainly designed to deliver social benefits and develop the human capital of specific target groups (referred to as beneficiaries). The Department of Social Warfare is responsible for the provision and promotion of quality social welfare services aimed at alleviating poverty, reducing destitution, promoting family values and reducing juvenile delinquency. Despite this, there were no programmes or intervention measures identified in the three wards to help the marginalized groups involved in unsustainable livelihood activities. Therefore, this project identified the potential for implementation of social intervention measures through the identified alternative livelihood activities. For instance, under the VCA, and working with other stakeholders, the marginalized groups could be empowered through soft skills and capital to help reduce the poverty burden.

#### **ii. Environmental Intervention**

As earlier established the current livelihood activities in the three wards have both environmental and health implications on the district. For instance, air pollution from charcoal kilns, and water and land pollution from brewing *Kachasu*. In terms of Environmental interventions, it was established that there were no existing in the three wards. For instance, the people of Kaleya who brew *Kachasu* have been requesting the Municipal council to help in managing the sludge from the brewing activities either by providing a central drainage system or septic tank. Similarly, deforestation and forest degradation was observed to be the main challenge, the Department of Forest within its capacity has been implementing reforestation programmes on World Environmental Day. Lastly, ZEMA is aware of the illegal sand mining activities along the Magoye stream, though there is no intervention in place to help mitigate the situation. The above-highlighted activities also pose serious health issues for the women and girls who spend long hours exposed to smoke and heat during brewing. So are the sand miners who at times are buried alive during their operations.

### iii. Financial Intervention

Despite the producers in the three wards admitting that they have been powerless in their attempts to stop destructive behaviour on the environment. They also individually expressed concern about the impact of climate change in the district as a result of their livelihood activities. The main drivers as highlighted earlier were poverty and unemployment, these created a steep financial gap. With this regard, the available financial intervention in the three wards was identified to be Community Development Fund (CDF). This came with its challenges as it was not easy to access by the community members. This consultancy establishes the need for soft loans, village banking activities and also capacity building on capital raising and business coaching.

### 3.8. Policy and regulation gaps that could help in strengthening interventions

The survey took to understand the policy and regulation gaps that exist in the three wards, the producers were asked whether they need permission to undertake livelihood activities. The results of the survey in the figure below cluster the responses from the three wards and livelihood activities whether they seek permission from the headmen.

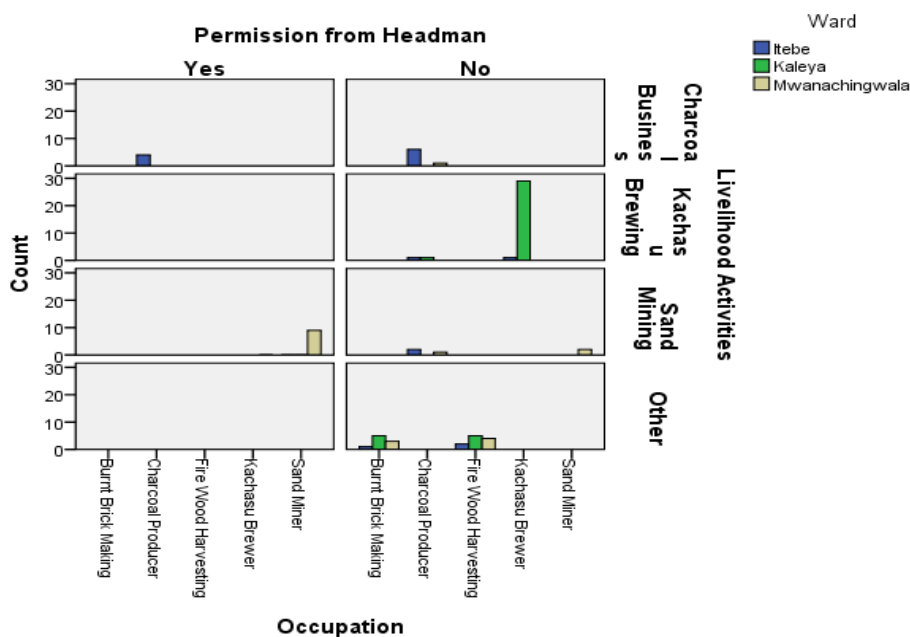


Figure 3.21: Shows whether producers seek permission from the headmen

As shown in the figure above, the majority of the producer in the three wards do not seek permission from the headmen to undertake these unsustainable livelihood activities. Sand miners in Mwanachingwala ward and some charcoal producers in Itebe would seek permission

from the headmen. This was mainly common for new members of the community who would seek permission from the headmen to undertake some of these activities.

When it comes to policies and regulations in general, there were no interactions between policies at the national level and the current happenings in the three wards. For instance, the policies were unable to address unsustainable livelihood practices. This was because in as much as policies were formulated the local leaders were neither consulted. The headmen for example stated that they are not aware or have knowledge of the forest Act which the Forest department uses when they come into the villages. If the local leadership is empowered to understand and enforce these laws and regulations. Further, there is a need for trading policies that will ensure a win-win situation in the local communities. In most cases, people from urban areas come to extract resources in the local communities without leaving any tangible benefits or community members are exploited along the value chain.

Similarly, in the Kaleya ward, there has been no communication between the headmen and the municipal council on liquor licensing. There is an urgent call for the municipal council to come and have meetings with the brewers to educate them on the Act and other regulations.

Lastly, it was also observed that the fines are too little to discourage unsustainable livelihood practices. For instance, charcoal producers would either receive a fine of ZMW 100 or have their bicycles impounded. In such cases, the charcoal producer would pay the ZMW 100 fine and continue producing charcoal.

#### **4. RECOMMENDATIONS AND CONCLUSION**

The evaluation presented in the previous chapters has demonstrated many critical issues needed to establish sustainable alternative livelihood options for the people of Mwanachingwala, Kaleya and Itebe ward. There are numerous reasons which justify the engagement of these people in these unsustainable livelihood options. The major problem for instance is that charcoal producers harvest excessive amounts of wood and use inefficient methods of production. Similarly, Kachasu brewers and burnt brick makers use excessive amounts of wood in their production and have not sought alternative energy sources.

##### **4.1. Conclusion**

Initial insights into the key unsustainable livelihood options in the three wards provide areas of intervention where alternative livelihood options can be introduced. It provides an important basis for a more in-depth investigation of the drivers of these unsustainable livelihood activities and how best the community can generate income through sustainable practices. Fish farming, poultry and gardening were the best alternative livelihood options in these three wards. From an economic point of view, the findings of the study indicate that apart from livestock rearing, fish farming was more profitable and would transform the lives of these communities. Similarly, the study shows that Kachasu production can be produced profitably using other alternative energy sources other than wood. For instance, Kachasu brewers could work with Zambia sugar to produce pellets from bagasse and sugar cane leaves which can be used as a source of fuel for heating.

The environmental impacts of Kachasu brewing were found to be higher because the process was not only polluting the environment but also depleting the carbon sink. The social impact of these unsustainable livelihood activities indicated child labour and safety and health issues. For instance, most Kachasu brewers did not have safety attires, and so are the sand miners. The Kachasu brewers were exposed to heat and emissions smoke that risked them developing lung problems.

## 4.2.Recommendations

From the field surveys, the consultant was able to establish the following recommendations to address the unsustainable practices.

**Kachasu Brewing:** There is a need for the local government to revisit the liquor licensing Act to establish a win-win situation between the Kachasu brewers and the government. Instead of spending time and resources on confiscating and prosecuting vulnerable and underprivileged women. Kachasu industry has the potential to grow the local economy through increased revenue for the local authority in form of levies and improved living standards in the communities through job creation for the youth. Therefore, just like the way dairy cooperatives operate, the same model can be used to have a collection point for *Kachasu* and government can reduce the importation of ethanol from Brazil and South Africa.

**Provision of alternative energy for *Kachasu* brewing.** *Kachasu* brewing discharges *sewage* sludge and some bits of molasses. Biogas digestion for 28 days under mesophilic conditions will generate biogas that can be used as an alternative source of energy for the brewers. For instance, 0.5%, 1%, 1.5%, 2% and 3% (m/m) of molasses added to the mixture of sludge will have a positive effect on biogas production. This can yield 0.5% of molasses (95.69 mL/g VS), and methane content (73%). Simply there is massive potential for biogas production from *Kachasu* brewing discharges sewage sludge and some bits of molasses in the Kaleya ward and this can replace the usage of wood and thus save the forest. Further, biogas is clean and smokeless thus safe and healthy to use.

**Sand Mining:** with the help of the local government and ZEMA there is a need to conduct an EIA and sensitize people on how to mine sand sustainably to prevent further environmental damages and accidents.

**Establishment of demonstration sites:** It is also recommended that demonstration sites for every livelihood activity are established. Demonstrations and training in the production of these products will result in easy adoption by the local people who from the interviews indicated a lack of knowledge about the proposed alternative livelihood options. Dissemination of the technologies through media and road shows should be used for knowledge sharing amongst the people.

**Provision of incentives:** There is a need for implementation of policies that will incentivize and support the adoption of alternative livelihood options and fuels such as briquettes, pellets and biogas through the provision of incentives to the producers and traders of the commodity.

**Establish a decision-support tool.** Having highlighted the economic potential of the alternative livelihood options, a decision support system framework at the local community level should be established. Such a framework should guide relevant stakeholders to identify optimal and sustainable means of production.

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## **APPENDIX I**

### Data Collection Tools – Questionnaire

- Household Questionnaire
- Producers Questionnaire
- Stakeholder Questionnaire

## **APPENDIX II**

- Participant List for the stakeholder validation workshop

## **APPENDIX III**

- TORs for the study

# **Transforming the most vulnerable to climate change impacts into climate smart leaders in Zambia”**

## **Key informant interview for Stakeholders and focal point persons**

I want to thank you for taking the time to meet with me today. My name is \_\_\_\_\_ from CUTs International Lusaka. We are conducting these interviews to identify alternative livelihoods or economic activities that could thrive in Mazabuka with a special focus on Kaleya, Mwanachingwala and Itebe Wards. The interview will take 30 minutes. I will be recording the interview because I do not want to miss any of your responses. All responses will be kept confidential. This means that your identify as the respondent will not be linked to the information that will be included in the report.

I am going to ask some specific questions about your work in the climate change space. If you do not understand a question, please ask me to explain further. If you are not comfortable answering a question, please feel free to say so and we will skip that question.

Are there any questions about what I have just explained?

Are you willing to participate in this interview? Yes / No

Do you consent to this interview being recorded? Yes / No

Interviewee

Name: \_\_\_\_\_

Date: \_\_\_/\_\_\_/\_\_\_\_\_

Name of Organisation: \_\_\_\_\_

Position: (e.g. Programme Manager/ Officer etc.): \_\_\_\_\_

Age:

Gender:

**Section 1: General questions about existing unsustainable livelihood practices**

1. What are the main unsustainable livelihood activities that are a threat to the environment in your district (Mazabuka) or Ward? (mention examples of sand mining, charcoal production and Kachasu brewing)

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2. What **land/forest** based activities occur in your district (Mazabuka) or Ward?

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3. What are the key drivers of these activities?

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4. To what extent do you think these activities are a problem to the environment?

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5. Are these activities legalised or illegal?

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6. Do you think these activities can be improved for the communities to benefit?

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7. In what way do you think these activities can be improved?

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2. What population (no. of households) within the ward is estimated to engage in these activities?  
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3. Which actors should be targeted in order to improve these activities in the communities and wards?  
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4. Why do you think these actors are important?  
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5. What role do these actors play?  
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**Section 2. Identify the possibility of development of sustainable business models to the existing unsustainable practices**

12. What business models are currently used by the producers? (a plan for the successful operation of a business, identifying sources of revenue, the intended customer base, products, and details of financing)  
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13. Which is the main market for these goods and services which are locally produced?

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13. What can be done to strengthen the value chain of your product?

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14. What can be done to address challenges in production and consumption of these products?

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15. Are production and consumption activities monitored in the district?

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16. What are the existing policies or regulations (if any) adequate in strengthening interventions?

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17. Are there gaps in the policies or regulations and how can they be bridged?

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18. What practical linkages, business support services and capacities can be recommendations to strengthen linkages of alternative livelihood options to viable markets at both domestic and external?

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.....

### **Identification of Alternative Livelihood**

13. What viable alternative livelihood options are available in the ward? e.g. Bee keeping, livestock rearing etc.

14. Are there NGOs that are offering support services to strengthen or find other alternative livelihood options in the ward?

15. What do you suggest should be done to strengthen these livelihood options?

### **Market Linkages**

16. What markets should these producers be linked to in order to sustain their livelihoods?

17. What business support services should be introduced to the wards in order to improve the current businesses?

18. Do you think the current policies are forcing people to engage into these unsustainable activities?

## Producer Questionnaire

Please could you confirm that you have consented to this interview?

If you do not understand a question, please ask me to explain further. If you are not comfortable answering a question then skip that question

**A. Section 1: Demographic information of participant:** Now I will ask you about your individual information. Please feel free to answer

Ward :

.....

Village :

.....

1. What is your occupation?

.....  
.....

2. What is the gender of the respondent?

Male

Female

3. How old are you?

Less than 20

20 to 35 years

36 to 50 years

51 to 65 years

66 to 80 years

Over 80 years

4. What is your marital status?

Single

Married(monogamous)

Married (polygamous)

Widow/widowed

divorced

5. What is the highest level of education you attained?

None

Primary (Grade 1-7)

Secondary (8-12)

Vocational (skills based short training)

Tertiary (College/University)

6. What is your employment status?

Unemployed

Formal employment (with government, NGO)

Informal employment (small business, self-employed)

Farming

Other: .....

7. What livelihood activities are you involved in?

Charcoal production/ selling

Kachasu brewing

Sand mining

Any

other.....

8. Are you aware of the danger it has on the environment?

Yes

No

9. If yes, which are any three such dangers?

.....  
.....

.....  
.....

10. What is your main source of income?

Activity	Month conducted	Capital requirement	Quantity sold	Price per unit	Revenue (How much do you make)	Main market

11. What kind of support do you receive from the above-named livelihood activity?

If yes state, the kind of support

.....  
.....

If no, state what kind of support you would want to receive

.....  
.....

12. What are the key drivers in the existing unsustainable economic activities /livelihoods? Or why do you think most people are involved in this livelihood activity?

.....

13. Do you need permission from the village headman or local authority to undertake the livelihood activity?

Yes

No

14. Explain the answer above? (ask if they pay a fee to any )

.....  
.....

.....  
.....

15. How do you trade your products from this livelihood activity?

Take to the market : where is the market.....

On-spot trading.....

Buyers mobilise producers.....

Other:.....

16. How do you trade your products or goods?

Cash

Exchange with other goods

State types of good.....

17. Are you satisfied with the returns from the business activity?

Yes

No

18. How best can your returns be maximised or business model to be improved to enjoy more benefits?

.....  
.....  
.....

19. Are you willing to be connected to main market?

Yes

No

Why. ....

20. Which buyers / market would you love to be linked to?

.....  
.....  
.....

21. What type of support would you need to be linked to this market or buyers?

22. ....  
.....  
.....

23. Are you part of a cooperative?

Yes

No

Why. ....

24. Are you willing to be part of a cooperative?

Yes

No

Why. ....

25. If you to venture into another business, which one?

.....  
.....

Reason.

.....

26. Are there any organisations or NGOs currently supporting your livelihood activity?

Yes

No

27. State how NGOs can support your livelihood activities?

.....  
.....  
.....

28. Have you been involved in decision making in the village regarding the current livelihood activity?

Yes

No

**Table to be filled**

	Kachasu	Sand mining	Charcoal	Other
--	---------	-------------	----------	-------

Raw material quantity		quantity		
Charcoal or firewood		Manual labour		
Quantity used		Team work?		
Quantity produced		Quantity produced		
Is production daily, weekly, monthly				

## Household Questionnaire

29. What are the key drivers in the existing unsustainable economic activities /livelihoods?

.....  
 .....

30. Who are the key drivers of the existing unsustainable livelihoods?

- Male
- Female
- Unemployed
- Employed
- Youths

31. Who are more involved in the unsustainable livelihoods/economic activities?

- Men
- Women
- Youths

32. What sustainable livelihood activities do you think should be promoted and empowered in your community?

.....  
.....  
.....

33. Are you involved in charcoal production/sand mining/kachasu brewing?

.....  
.....

34. What are your reasons for practicing it?

.....  
.....  
.....  
.....

35. What do you think is the solution to stop these practices in your community?

.....  
.....  
.....  
.....

36. If you were to be assisted financially, what economic activity would you undertake and how much money could you want?

.....  
.....  
.....  
.....

37. What possible markets are available for the above stated economic activity?

.....  
.....  
.....  
.....  
.....

38. What recommendations can you give to strengthen market linkages

.....  
.....  
.....  
.....

39. Would you be in support if they stopped people from practicing unsustainable livelihood? Give reason for your answer.

INTERVENTION

40. Have you received any assistance pertaining your business?

Yes

No

If yes by who?.....

41. Have you made any effort personally to practice a more sustainable/viable livelihood?

Yes

No

If yes, what did you do?

.....  
.....  
...

If no, why?

.....  
.....  
.....  
...

42. What ongoing measures are being taken by the following actors to assist you and others to stop practicing these unsustainable activities

Stakeholders	Role to stop the practice
Chiefs/headmen	
Community	
Religious org./ church	

Government	
Other agencies	

43. What is your main source of income?

Activity	Month conducted	Capital requirement	Quantity sold	Price per unit	Revenue (How much do you make)	Main market

## Section 2: General questions about agricultural production

1. Who owns land for agricultural production?
  - Men
  - Women
  - a. Do you (women) have time to farm your own land?
    - Both men and women
    - b. Do you (women) have time to farm your own land?
      - Other, please specify \_\_\_\_\_
2. What type of agricultural production are you involved in?
  - a. Grow crops only.
  - b. Raise/keep livestock only.

- c. Both growing crops and keeping livestock.
3. Which of the following crops do you grow?
- a. Maize  Yes  No
  - b. Sunflower  Yes  No
  - c. Groundnuts  Yes  No
  - d. Soya beans  Yes  No
  - e. Cassava  Yes  No
  - f. Cotton  Yes  No
  - g. Beans  Yes  No
  - h. Sweet potatoes  Yes  No
  - h. If, other, please specify \_\_\_\_\_  Yes  No
4. Do you grow the crops you have mentioned on your husband's land or your own land?
- a. I grow the crops on my own land  Yes  No
  - b. I grow the crops on my husband's land  Yes  No
  - c. If other, please specify \_\_\_\_\_  Yes  No
5. Which crops from the ones you have mentioned are your main source of income? *List the crops.*
- .....
- .....
6. Have you seen a change in the quality and quantity of your yield (take note of the interviewee's age) in the last ten/ twenty years?
- Yes
  - No.
7. If yes, which crops from the ones you have mentioned affected by climate change? *List the crops.*
- .....
- .....
8. How does climate change affect the crops you have mentioned? *List effects for each crop mentioned in Q3.*
- .....
- .....
9. What type of livestock do you rear?
- a. Cattle  Yes  No
  - b. Sheep  Yes  No
  - c. Goats  Yes  No
  - d. Poultry  Yes  No
  - e. Fish  Yes  No
  - h. If other, please specify \_\_\_\_\_  Yes  No
10. Which livestock from the ones you have mentioned is your main source of income?
- .....
- .....

11. What is your source of water for agricultural production?
- a. Stream/river.       Yes  No
  - b. Rain                       Yes  No
  - c. Pipe/tap.               Yes  No
  - d. Borehole.               Yes  No
  - e. Well.                       Yes  No
  - f. If other, please specify \_\_\_\_\_  Yes  No
12. Have you noticed any changes in water quality from sources you have mentioned over the last 5 years?
- Yes
  - No
  - Why do you say so .....
13. Have you noticed any changes in water quantity from the sources you have mentioned over the last 5 years?
- Yes
  - No
  - Why do you say so .....
14. Do you apply chemical fertilizers in your farming?
- Yes
  - No
15. If yes, what chemical fertilizers do you use?
- .....
- .....
16. Do you use pesticides in your farming?
- Yes
  - No,
17. Do you have access to agricultural services?
- Yes
  - No
18. If yes, what type of agricultural services do you access?
- Financial support
  - Training
  - Input support (seeds and fertilizer)
  - Equipment/tool support
  - Information provision/support
19. Which organisations do the agriculture officers come from?
- Private companies**
- NGOs**
- Government**
- a. If yes, can you tell me the name of the organisation?
  - b. What services do the named organisation provide?
  - c. How often do you access the named agricultural services from the named organisation?

- i. Every month  Yes  No
- ii. Every quarter  Yes  No
- iii. Every six months  Yes  No
- iv. Once a year  Yes  No
- d. How do these services help you?
- e. Have you attended any trainings facilitated by the named organisation(s)?  Yes  No.
- f. If, yes, what was the topic (i.e. production, post-harvest handling and storage, processing, waste management and marketing)?
- g. How did the training help you?
- h. Do the extension officers from the named organization(s) provide information on environmental issues?  Yes  No.
- i. If yes, to what extent?

## APPENDIX II

List of stakeholders engaged during the validation workshop



WWF/VCA  
Mazabuka VCA Study Market Research Validation Meeting.  
Attendance Register  
Tuesday, 30<sup>th</sup> August 2022  
Benoni, Lusaka

By signing this form, I give my consent to CUTS to collect, store and process my personal information as necessary for my participation in this and other CUTS program activities and to share my information when needed with VCA and VCA donors for as long as a valid business need exists.

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WWF/VCA  
Mazabuka VCA Study Market Research Validation Meeting.  
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By signing this form, I give my consent to CUTS to collect, store and process my personal information as necessary for my participation in this and other CUTS program activities and to share my information when needed with VCA and VCA donors for as long as a valid business need exists.

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APPENDIX III

## TERMS OF REFERENCE

### **Voices for Just Climate Action (VCA) Market Research on Alternative Livelihood Options in Mazabuka District.**

#### **Background**

Established in Zambia in 2000, CUTS International Lusaka has been functioning as a centre for action (policy) research, advocacy and networking on issues of trade and development, competition policy, investment regulation and consumer protection. CUTS also places a strong focus on crucial cross cutting issues such as Gender and Climate Change. While distinguishing itself through its stress on consumer – producer synergies for sustainable increase in consumer welfare, CUTS recognises the need to address the impacts of climate change which have the potential to diminish consumer welfare. Therefore, CUTS seeks to contribute to mitigation and adaptation efforts by influencing policy and regulation at national level.

CUTS is currently implementing a project called “Transforming the most vulnerable to climate change impacts into climate smart leaders in Zambia” in Mazabuka. This project is under the Voices for Just Climate Action (VCA). The VCA is a 5-year programme (2021-2025) supported by the Dutch government and World Wildlife Fund (WWF) Zambia. It has a primary objective of scaling up Zambia’s climate action response while targeting vulnerable communities. VCA recognises that climate change is not just an environmental issue but also a societal challenge that brings in ethical and human rights issues. Climate change affects the enjoyment of indivisible, interdependent and interrelated human rights, hitting the most vulnerable the hardest and threatening to increase existing inequalities between the rich and poor, ethnicities, gender, generations and communities. It is indisputable that the brunt of the burden falls on those already in poverty and on underrepresented groups such as indigenous peoples, the rural and urban poor, women and youth, although they are the least responsible for climate change.

#### **Rationale for the study**

Mazabuka is one of the districts in Zambia where the impacts of climate change are highly visible. In recent years, communities have experienced droughts, and flash floods including the flooding of the Kafue River which has impacted dwellers in proximity. This has a huge bearing on the livelihoods of the communities who people who are solely dependent on mixed crop-livestock agriculture, which on the other end is also highly dependent on rain irrigation.

In understanding some of these impacts, it is important to note some unsustainable livelihood activities that may give an impetus to some of these stated impacts. Firstly, the brewing of the illicit traditional beverage (Kachasu) is one of the key issues that threatens the environment. The practice is highly reliant on biomass in sourcing energy. This is therefore a potential driver of deforestation which consequently drives

climate change. Secondly, sand mining remains another practice with a negative bearing on the environment and the people as it causes sedimentation which is destructive to the environment. Lastly, the heavy reliance on biomass- firewood and charcoal is another practice that limits progress in addressing climate change in the area.

On this basis, it is important to identify alternative livelihoods or economic activities that could serve as an alternative to these unsustainable practices.

To this end, CUTS will engage a consultant to conduct a market research for alternative livelihoods that could thrive in Mazabuka with a special focus on Kaleya, Mwanachingwala and Itebe Wards where these practices remain rampant.

### **Objective**

The primary objective is to identify viable alternative livelihoods that have the potential to thrive in Mazabuka with a special focus on the three stated wards- Kaleya, Mwanachingwala and Itebe by identifying markets for those livelihood options.

### **Scope of the research**

1. Collect and Review VCA documents to fully understand the programme and substantiate all stages of the research
2. Identify the key drivers for the existing unsustainable livelihood practices
3. Identify the possibility of development of sustainable business models to the existing unsustainable practices
4. Documentation and analysis of any existing/current intervention models in target wards
5. Provide evidence for key drivers of the unsustainable livelihoods
6. Identification of viable alternative livelihood options in Mazabuka district with a special focus on the three target wards e.g. Bee keeping, livestock rearing etc.
7. Identification of practical linkages of alternative livelihood options to viable markets at both domestic and external.
8. Identify business support services and capacities required for alternative livelihood.
9. Identification of policy and regulation gaps that could help in strengthening interventions
10. Recommendations to strengthen linkages between Mazabuka community and identified markets
11. Recommendations to address the unsustainable practices

### **Expected outputs**

- Produce a well written and comprehensive report that clearly shows the best available alternative livelihoods with clear market linkages for Mazabuka district with a clear focus on the scope of the research

- Facilitate a workshop to present the findings of the report

### **Methodology**

The consultant will strictly follow the work plan and the time schedule agreed with CUTS in undertaking the contract assignment.

- a) The consultant will determine an appropriate methodology in consultation with CUTS.
- b) The consultant will work in close collaboration with CUTS.
- c) The consultant will be responsible for undertaking collection of all the required information from various sources, including Government departments, Ministries and other sources deemed relevant to the market research.
- d) The consultant will facilitate in presentations and coordination of the stakeholder workshops/consultations organized as per the agreed work schedule
- e) The market research will be conducted in Mazabuka in the three target wards.

### **Duration of the Work**

The market research is expected to be completed in a period of 30 working days which will be determined upon contract offer after which a final draft of the assessment report would be due for review by CUTS. CUTS will facilitate necessary linkages for the consultant to undertake the assessment.

← 15

All interested applicants are encouraged to send their expression of interests with a proposed budget to [lusaka@cuts.org](mailto:lusaka@cuts.org) by 16<sup>th</sup> March 2022

ENDS/