

LAKE CHILWA BASIN CLIMATE CHANGE ADAPTATION PROGRAMME

Hotspots Identification Report

**LEAD Southern & Eastern Africa, WorldFish Center and Forestry Research
Institute of Malawi**

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A Synopsis of the Hotspots Identification Exercise undertaken by the LEAD Southern & Eastern Africa, WorldFish Centre and Forest Research Institute of Malawi in Collaboration with Machinga, Zomba and Phalombe District Councils.

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1. Introduction

Lead-Southern & Eastern Africa, the Forestry Department and WorldFish Center are implementing the Lake Chilwa Basin (LCB) Climate Change Adaptation Programme in collaboration with Machinga, Phalombe and Zomba district councils. The overall goal of the programme is to secure the livelihoods of 1.5 million people in the Lake Chilwa Basin and enhance resilience of the natural resource base. The programme aims to achieve this goal through the development and implementation of a basin-wide climate change adaptations program in support of the Malawi National Adaptation Programmes of Action (NAPA) that will enhance the capacity of communities to adopt sustainable livelihood and natural resource management practices. Programme activities will be implemented in ten selected locations within the basin called hotspots.

This document presents the hotspots that have been selected and describes the processes and approaches that were used to identify these hotspots. In the following section, we define a hotspot and present rationale for focusing our work on hotspots.

1.1 The Ecosystem Approach

1.2 Hotspot Definition

In our context, a hotspot is defined as an area within the Lake Chilwa Basin with resources or populations under threat or vulnerable due to climate change impacts. This included areas and populations that are currently better-off but whose livelihood and sustainability could be negatively affected by the bio-physical and socio-economic dynamics resulting from climate change. The Wildlife and Environmental Society of Malawi defines a hotspot as an area that is suffering from serious environmental problem (s) and is in need of immediate improvement. For example, an area of cleared forest on steep slopes which, if not replanted or protected, will give rise to a high rate of soil degradation (WESM, 2003).

1.3 Rationale for Focusing on Hotspots

The overarching framework of the Programme lies on focusing attention on the human-environment relationship at multiple scales from Basin to village. To effectively achieve this, the Programme will focus on key hotspots within the Basin in each District (Zomba, Phalombe and Machinga) to target interventions which address natural resource management practices that severely limit communities' resilience and threaten to make them vulnerable to the impacts of climate change.

A focus on hotspots reflects the recognition that there are specific locations within the Basin that have urgent vulnerability and degradation conditions. Also, due to the size of the Basin, we recognize the importance of focusing our efforts on a manageable set of problems within a contained area and hence the ecosystems approach becomes useful in that respect. We will define hotspots according to socio-economic and environmental criteria in a process involving stakeholder consultation and expert knowledge.

2. Selection of Hotspots

We used the ecosystem approach (EA) as our organizing framework for hotspot selection. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The EA framework was also used to analyze the interconnectedness of upstream and downstream communities and natural resource management in the hotspots. In cases where a hotspot was considerably large, smaller hotspots were identified within the larger hotspot as critical areas that require immediate intervention without necessarily undermining the conservation requirements of the entire hotspot.

2.1 Criteria for Hotspot Selection

Focusing attention on the human-environment relationship at multiple scales from Basin to village provides our overarching framework. Within this broad framework, we will focus on key hot spots within the Basin in each District (Zomba, Phalombe and Machinga) to target interventions which address natural resource management practices that severely limit communities' resilience and threaten to make them more vulnerable to the impacts of climate change. This focus on hotspots reflects the recognition that there are locations within the Basin that have urgent vulnerability and degradation conditions. Also, due to the size of the Basin, we recognize the importance of focusing our efforts on a manageable set of problems within a more contained area. We have defined hotspots according to socio-economic and environmental criteria in a process which involved stakeholder consultation and expert knowledge. Presented below are the criteria that were used in selecting the hotspots in all the three districts:

- a) Geographical extent of the hotspot;
- b) Inter-linkages of environmental issues;
- c) The degree and potential impact of the environmental problems;
- d) Historical trend/rate of degradation; and
- e) Livelihoods support potentials offered by fragile natural resources;
- f) Community based natural resource management capacity.

2.2 Process for Selecting Hotspots

2.2.1 District Executive Committee (DEC) consultative meetings

The programme team held three consultative meetings with Machinga, Phalombe and Zomba District Executive Committees (DEC). The DEC members were briefed on programme objectives, duration of the project, funding sources and role of District Councils in the LCB Climate Change Adaptation Programme. The three district councils accepted the project. Appendix 2 presents the list of participants at these meetings.

During the consultative meetings, members brainstormed on existing hotspots within the districts using the criteria explained above. The following documents were consulted to identify potential hotspots: District State of Environmental Reports, District Social Economic Profiles

(SEP), Village Action Plans (VAPs) and The Lake Chilwa Management Plan (2001)¹. Some of the hotspots that were identified by DANIDA funded Lake Chilwa Wetland and Catchment Management Project some 9 years ago, are still valid hotspots. The preliminary list of hotspots was further discussed by the programme partners.

2.2.2 District Environmental sub-committee (DESC) consultations

Three District Environmental Sub Committee (DESC) members from each of the district councils were invited to a meeting at Chancellor College to further critique the hotspots with programme partners before carrying out a field verification and ground truthing exercise in the three districts (Zomba, Phalombe, and Machinga) which are targeted by the programme.

2.3 Field Reconnaissance and Ground Truthing

The three teams carried out the hotspots ground-truthing exercise for 3 days. The objectives were to:

- a) Map the geographical extent of the problems and resource opportunities (GPS coordinates taken);
- b) Document linkages of issues and resource opportunities within their ecosystem/catchments;
- c) Document the degree of environmental issues and resource opportunities (photos taken); and
- d) Assess community capacity in resource management and utilization for sustainable livelihoods within the context of climate change.

2.4 Final List of Hotspots

2.4.1 Machinga

Introduction

Machinga district lies at altitudes between 400 to 1,500 meters above sea level. About 60% of the people's economic activities are natural resource based. These include farming, fishing and forest products trading and carpentry. The Lake Chilwa Basin in Machinga covers three main ecological zones: (i) Chikala Mountain; (ii) Ntaja escarpments, and (iii) the Kawinga plain. The ecological zones are linked by Mpiri, Mikoko and Lifune Rivers. However these ecological zones are under threat due to unsustainable exploitation of their natural resources.

Figure 1: Map of Machinga Showing Hotspots

Hotspot 1: Nacala Corridor and Namanja Beach

Opportunities

The corridor encompasses Lake Chilwa wetland which is used for crop cultivation (mainly rice). The Lake Chilwa is source of variety of fish for livelihoods support and

¹ Environmental Affairs Department. (2001). Lake Chilwa Wetland Management Plan

Namanja beach is the main fish landing site. The wetland also offers habitat for wildlife including the famous water fowls. The area is also served with a railway line for easy transportation of goods.

Issues

- Deforestation
- Land degradation
- Threat to biodiversity

Poor agricultural practices and land management

The hotspot lies within a relatively drier part of Machinga with predominant sandy soils on highly degraded land. The major crop in the hotspot is maize. Other crops include rice, cassava and sorghum. Infertile soils and high land degradation has resulted in poor yields and high food insecurity in the area.

Uncontrolled marsh fires

The Wetland marshes are most of times deliberately lit by passers-by while others are lit to clear land for cultivation of vegetables. These fires among other things leave the soil bare and silt is eroded during first rains. The eroded silt is deposited into the lake reducing depth and area of the open lake. The practice also destroys fish and wildlife habitats and biodiversity.

Picture 1: Fires in the Wetland (L) and Namanja Beach (R)

Eucalyptus is the predominant tree cover on customary land which was reported to have been promoted by fishermen for curing fish(Eucalyptus was promoted by the MAGFAD project under the Department of Fisheries)

Hotspot 2: Mpiri River catchment

Hotspot Issues

- Deforestation due to opening of gardens under irrigation farming.
- River bank erosion and reduction of the river channel due to siltation.

High Deforestation along the Mpiri River banks

The river catchment has been deforested due to river bank cultivation and cutting of trees for fuel wood. This, together with grazing of livestock, has led to river bank erosion, river width reduction and drying of water in some parts of the river. The remnant stamp of wood in the picture above is a clear manifestation that the river was covered with indigenous trees before.

Small scale irrigation schemes along the river banks

The Mpiri River is the main perennial river in the area as such it offers the major source of water for irrigation to small-holder farms.

Hotspot 3: Chikala hills, Linguni/Zumulu River Catchments and Mposa Beach

Hotspot Issues

- Encroachment of forest reserve and conversion of marshland due to expansion of agriculture land
- Conversion of marshes into vegetable and rice growing fields
- Over-exploitation of fish resources due to high fishing effort
- High fuel wood demand

Encroachment of forest reserve

Population growth is driving the demand for new land for settlement and farming in the hotspot. For example, Chikala Forest Reserve is the only source of additional land for farming and settlement at Chaone. The hotspot has also 3 irrigation schemes that abstract water from rivers whose source is the Chikala River. Small scale irrigation using treadle pumps, natural spring and river diversions, are growing with support from EU, FAO, AfDB and OVOP however these small schemes do not observe the buffer zone along streams. Some reasons given were that the pumps have short delivery pipes that cannot pump very far from the stream bank. The Lake Chilwa marshes are also being converted into rice and vegetable fields by burning the marsh vegetation. As a result marsh fires are prominent in the area.

Over-exploitation of fish resources

The number of fishers and fishing crafts are growing and these increase fishing pressure on the lake exploiting in-shore and habitat fishes resulting in reduced fish supplies (both quantities and sizes).

High fuel wood demand

The demand for fuel wood for fish smoking/curing is very high especially at Mposa beach. It was learnt that there are over 100 fishermen around Mposa smoking on the floating shelters (zimbowela). One fisher can use about 3 cubic meters of firewood in a day during periods of high catches. This translates into a maximum firewood demand of 300 cubic meters per day. Most of the firewood used is hardwood from the Chikala Forest. Only one block committee in the Chikala Forest Reserve has signed a Co-Management Agreement with the government, making it a very small proportion of the reserve that is under good management.

Gaps

The group identified the following gaps that require further investigations:

- Part of Chikala Forest Reserve has a eucalyptus buffer zone. There was mixed understanding by the group on the original objective of this buffer – to protect the indigenous forest or as a source of energy to the urban centres. There is need to understand this and the effect of the buffer on hydrology.
- Group approach was more prominent in agriculture and other sectors (EU project/rice schemes). What are the benefits/disadvantages of current collective action approaches
- There is need for more in-depth analysis of the contributions and limitations of previously implemented projects/programs in order to devise a more inclusive and pragmatic catchment conservation practices.

Suggested Interventions

- Afforestation initiatives;
- Strengthening of community committees like the BVC, VNRMC;
- Engage community policing to assist in enforcing forestry policy and Act;
- Involve the Traditional and Political leaders in enacting bye-laws on environmental conservation;
- Natural resources interventions should incorporate climate change adaptation strategies and livelihoods activities; and
- Engage fishermen in modern fish storage and curing methods (ice blocks, improved fish kills and solar driers).

2.4.2 Phalombe

Introduction

Phalombe district covers a total area of 1,633 km² of which 1,245 is under cultivation and settlements. It has a human population of 313,129 which translates into an average population density of 190. However, the population density in the Lake Chilwa basin which is the impact area of the project is 245. The Lake Chilwa basin covers five Traditional Authorities (TA) and these are Mkhumba, Kaduya, Jenala, Nazombe and Chiwalo. The district is bordered by Mozambique on the eastern side, Zomba to the North and Mulanje in the west and southern part.

Average annual rainfall ranges from 700-1,200mm. The soils of the area are hydromorphic and orthic ferrasols. The major environmental issues as stipulated in the socio-economic profile of the district include: land degradation, deforestation, threat to fish resources, threat to biodiversity and water resources and sanitation. The economy is agro-based and the major economic activities are crop and livestock production, fishing and mining at Nambazo.

Phalombe district has identified four hotspots as potential sites for implementing the programme activities. These hotspots fall within catchments of Lake Chilwa influent rivers and its lakeshore.

Figure 2: Map of Phalombe Showing Hotspots

Hotspot 1: Michesi Hill and Phalombe River

This hotspot is found in four TAs and these are Mkhumba, Kaduya and Nazombe. In terms of EPA, the hotspot is found in Naminjiwa and Nkhulambe. On the following areas within the hotspot show high degradation and have been selected for programme intervention: Michesi hill, Nandiwo river, Mphendegwe river, Nakoma area, SRW intake, and Phalombe riverbanks.

Hotspot Issues

- Deforestation in the forest reserve and riverbanks(Picture). This has been influenced by high fuelwood demand and encroachment as a result of increased population. Furthermore, some communities solely depend on proceeds from fuelwood sales.
- Land degradation. Poor land husbandry and high deforestation have led to formation of gullies making the land unproductive.;
- Loss of Biodiversity. Michesi hill and Mulanje Mountain had diverse tree species for different purposes in an ecosystem and homes. However man behaviour such as burning bushes and aimlessly cutting down of trees has greatly contributed to the loss of such species. ;
- Weak local institutional structures. Lack of capacity building in the local structures on natural resources management and mitigation measures on problems associated with climate change. There are also a few structures on the ground;
- Inadequate collaboration amongst stakeholders. Phalombe has a number of players working on natural resources conservation. However, there is no collaboration to determine the successes and gaps.;
- Siltation both at Southern Region Water Board water intake and downstream (Picture). One side of the source was heavily encroached in late 90's because of political aspects. Cultivation is even close to the river influencing soil erosion which silts at the intake.
High river bank erosion due intense flash floods. This is a problem to the lower stream of Phalombe river. This is a main problem in the lower stream where there are a lot of meanders.

Picture 1: Deforestation in Michesi FR (Left) and River Bank Cultivation along Phalombe River (Right)

Picture 2: Siltation at Phalombe SRWB Intake (L) and Graveyard washed away at Bona Village, Downstream Phalombe River (R)

Suggested Interventions

- Afforestation in bare hills and river banks
- Promote proper land husbandry practices and soil conservation measures.
- Capacity building of local institutions (VNRMCs and RVCs)
- Promotion of viable IGAs to reduce vulnerability of households
- Crop diversification and promotion of market linkages e.g. at Nakombe.
- Need for multisectoral approach (water, agriculture, forestry, legal, traditional leaders) –multisectoral policy conflict issue

- Reforestation of encroached forest areas through piloting of payment for ecosystem services through collaborative arrangements with Southern Region Water Board (on water intake) and Mulanje Mountain Conservation Trust
- Develop, through consultations with hydrologists, strategies to reduce excessive river bank erosion of Phalombe River. Rehabilitate excessively eroded river bank at Bona village and consult with the local and political leaders and the District Council to rebury the exposed remains of the dead at Bona graveyard.

Hotspot 2: Sombani River and Mpototo Lagoon

Mpototo Lagoon and Sombani river hotspot is located in TA Chiwalo and Mpinda EPA. The following areas show high degradation and vulnerability and hence they have been selected as focal sites for programme intervention: Mpototo lagoon, Sombani River and Mpototo Lagoon, Makhanga hill, Mauzi River, Swang'oma beach and Njalo Island.

Hotspots Issues

- High deforestation mainly in Makhanga, Malagani and Mauzi hills and along Sombani River. Apart from domestic purposes, fuelwood in these areas is also used for seasoning fish. Irrigation farming along the rivers has also promoted cutting down of trees mainly along Sombani River. ;
- Declining fish production in Mpototo Lagoon. The decline has been due to uncontrolled fishing and increase in population which has doubled the demand.;
- ;
- Low production of crops due to low land holding size, area prone to draught and infertile soils;
- Weak local institutional structures such as BVC, VNRMCs due to lack of capacity building mainly on their roles and responsibilities. Some areas do not have these structures and yet communities need to take a role in addressing problems emanating from to climate change.
- Area prone to cholera outbreaks due to lack of portable and clean water. Some people drink water from the lake and lagoon without treating it. Furthermore, at Swang'oma and Mpototo lagoon, you can hardly see a toilet which make people help themselves in the bush.;
- High prevalence of HIV/AIDS (According to DHO data). People from as far as Mozambique come to Swang'oma and Mpototo lagoon for fish business and recklessly indulge in unprotected sex. ;
- Excessive presence of Namasupuni at Mpototo lagoon;
- Hunger prone area due to low proceeds from the farming activities. These areas experience erratic rains;

Picture 3: Deforestation in Malagani Hill near Swang'oma Beach (L) and Swang'oma Beach (R)

Picture 4: Deforestation at Makhanga Hill (L) and thorny wood for fish smoking (R)

Picture 5: Fish trading at Swang'oma beach (Left and Right)

Suggested interventions

- Planting of water conserving species e.g. Mbawa along the lake shore and riverbanks and fast growing species in the upland in woodlots and homesteads for firewood;
- Promotion of viable IGA to support diversified livelihood options;
- Conservation farming and crop diversification;
- Enhancing market-linkages for crop and livestock products
- Strengthening of local structures such as BVC, VNRMC;
- Revamping and formation of local institutional structures such as BVC and VNRMCs;
- Removal of water hyacinth (namasupuni) using physical and biological methods; and
- Promotion of irrigation farming.

Hotspot 3: Chisengereni River and Mikongoloni Hill

The Chisengereni River and Mikongoloni hill are located in TA Jenala and also lie within Kasongo EPA.

Hotspot Issues

- Deforestation at the catchment area(Mikongoloni Hill) and riverbank. Communities in the area fully depend on firewood for cooking and they do not use energy saving mbaula. ;
- Gully formation along Chisengeleni River resulting in loss of arable land;
- Soil erosion and siltation of marshes and Lake Chilwa;
- Weak institutional structures;

Picture 6: Deforestation on Mikongoloni Hill (L) and Chisengeleni River caused by gully erosion (R)

Suggested interventions

- Reforestation programmes from the river source going down streams;
- Construction of check dams to reduce river water velocity;
- Training of local institutions on environmental management issues;
- Promotion of sunflower and sorghum as cash crops;
- Promotion of viable IGAs.

Hotspot 4: Chitekesa - Nambazo Stretch

Chitekesa - Nambazo Stretch is found in TAs Jenala and Chiwalo in Mpinda and Kasongo EPAs.

Hotspot Issues

- Area prone to droughts and floods;

- Low agricultural productivity.
- Poor road network
- Siltation of rivers
- High prevalence spread of HIV and AIDS

Picture 7: Poor road network within Chitekesa - Nambazo stretch

Suggested interventions

- Promotion of drought resistant crops;
- Afforestation of river banks, woodlots and homesteads;
- Demand for social services can be implemented here- by linking the communities; with public works programme for the construction of bridge in Chitekesa to link rice farmers in the floodplain and wetland to markets in Zomba and Blantyre;
- Promotion of crops such as sorghum, sunflower;
- Promotion of viable IGAs to improve community livelihoods;
- Revamping and formation of local institutional structures; and
- Awareness campaigns on prevention HIV and AIDS.

2.4.3 Zomba

Introduction

The District has a total population of 583,167 and a population density of 230 persons per km², more than half (52.6%) of whom are 18 years or younger. The annual population growth rate over the last decade was two percent.

The District currently has six Traditional Authorities and four Sub-Traditional Authorities.

Zomba has a total land area of 2,580 km², representing three percent of the total land area of Malawi. The District has one prime water body, Lake Chilwa. In addition, two small artificial lakes/reservoirs exist on the Zomba Plateau, which bear a high importance for aquatic life and water resources for the people of Zomba District and especially Zomba City which entirely relies on water from the Zomba Plateau reservoirs. The district also has ten rivers, namely the Shire, Likangala, Thondwe, Domasi, Mulunguzi, Naisi, Namadzi, Phalombe, Lintipe and Likwenu. Zomba Plateau is the source of all but two of these rivers, namely the Shire, which originates in Lake Malawi and Phalombe, which originates from Mulanje Mountain. Lake Chilwa is a prominent source of water and fish for many residents of the District and surrounding areas. The rivers form part of the Lake Chilwa Catchment Area. Soil degradation is rampant in Ngwerelo EPA due to poor farming practices followed by Malosa EPA because of cultivation along marginal areas. In the Phalombe plains of Mayaka and Jali, there is considerable decline of soil fertility because there is continuous use of the land without following proper land husbandry practices. The result of this is a steady decline in agricultural yield over the past three years. The use of fertilizer through the fertilizer programme, though highly successful in Zomba District, exacerbates the problem due to short term gains in productivity and yield, although the root causes are not tackled.

The economy of Zomba District is dominated by agriculture, where individual maize production accounts for the main activity, while tobacco and coffee are cultivated as the main cash crop and poultry production is increasingly becoming important. Other crops produced include rice, cassava, sweet potato, groundnuts, beans and pigeon peas. Animal husbandry is still underdeveloped; nevertheless cattle, poultry, goats, sheep, pigs and rabbits are raised for meat production in Zomba, with poultry being the most common. Zomba on the other hand is one of the few Districts with a large number of fish ponds. There are around 2,600 farmers engaged in aquaculture, operating more than 5,000 ponds and producing as much as 757 tonnes of fish annually. In addition, Lake Chilwa continues to be the main source of fish in the District, with an annual catchment of more than 5,000 tonnes. Small and medium-scale businesses dominate the District's non agro-based economy.

Figure 3: Map of Zomba Showing Hotspots

Zomba has four hotspots as follows:

- (a) Zomba Forest Reserve, Zilindo, Namadidi and Likangala River;
- (b) Malosa Forest Reserve, Domasi and Lifani Rivers;
- (c) Ngwelero EPA; and
- (d) Lake Chilwa with special focus on Kachulu, Mchenga beaches and Chisi Island.

Hotspot 1: Zomba Forest Reserve, Zilindo, Namadidi and Likangala River

Hotspot Issues

- Massive deforestation due to cultivation and settlement inside the reserve (Zilindo and Nankhunda). The areas are heavily encroached. Upper Likangaka (Namadidi hill) is bare;
- Disagreements between Forestry Department and Zilindo communities on the boundary of the Zomba Forestry Plantation. Encroachers believe that the Ku-Chawe road is the forest boundary whereby the official one is marked by a stream 1km away (Photo);
- Poor agriculture practices such as cultivation along river banks (Namadidi, Naziwale) and cultivation on marginal land and steep slopes (Namadidi hill);
- Sand mining in Naziwale and Namadidi streams); and
- Uncontrollable and unsustainable harvest of plantation trees in Zomba FR (Harvested areas are not replanted and colonized by invasive species, illegal pit sawing and hauling of logs and timber from the Reserve).

Picture 8: Encroachment in Zomba FR at Zilindo (L) and Nankhunda (R)

Picture 9: Cultivation along Likangala River (L) and Sand mining on Naziwale River

Suggested Interventions

- Survey and mark forest boundaries;
- Establish tree buffers along streams;

- Promote fish farming in Namadidi area;
- Promote community policing institutions;
- Promote silviculture;
- Promote natural regeneration;
- Promote the establishment of VFAs and individual woodlots;
- Promote Agro forestry among farming communities; and
- Promote forest resource benefit sharing with adjacent reserve communities.

Hotspot 2: Malosa Forest Reserve, Domasi and Lifani rivers

- Heavy deforestation due to cultivation and encroachment in forest reserve (Kasonga area);
- Deforestation due to cutting of indigenous trees for firewood and charcoal
- Poor Agricultural practices characterized by cultivation along river banks and steep marginal slopes (Domasi river and steep slopes around Kasonga area (Picture));
- Burning as a means of land clearing as observed at Sambaisa Irrigation Scheme; and
- Lack of consultation by stakeholders in the implementation of development projects (SRWB constructing a reservoir at the edge of the reserve without collaboration with the forestry department (Picture).

Picture 10: Cultivation and Settlement in Zomba FR at Kasonga (L) and Cultivation in Domasi River (R)

Picture 11: Bush burning during land preparation (L) and reservoir construction in Zomba FR (R)

Picture 12: Indigenous Firewood sold by encroachers in Zomba FR

Suggested Interventions

- Survey and market forest reserve boundaries;
- Establish and promote management of agreed buffers on rivers and streams.

Hotspot 3: Ngwelero EPA (Dimusa, Stevin and Mayaka Sections)

- Poor agricultural practices as evidenced river bank cultivation along Sunuzu river;
- Low yields due to poor soils
- Low prices of some agricultural prices due to shortage of viable markets (e.g. sun flower sold at K20/Kg versus pigeon peas sold at K100/kg);
- Low adoption of modern agricultural technologies (such as conservation agriculture) resulting in low production;
- Low uptake of alternative of livelihood strategies as communities have a strong dependence on maize;
- The area is generally prone to dry spells and erratic rainfall.

Picture 13: Cultivation (L) and water contamination (R) in Sunuzu River, Ngwelero EPA

Picture 14: Dumusu Village is characterized by infertile black clay soils

Picture 15: A comparison of maize under conventional versus conservation agriculture

Hotspot 4: Lake Chilwa (Kachulu and Mchenga beaches and Chisi Island)

- High demand for fish as evidenced by numerous boats and fishermen on the lake and the beaches (Picture);
- Environmentally unfriendly fish processing, (unhygienic drying and smoking kilns both on the beaches and island);
- Poor sanitation and practices, no sanitation facilities on beaches, no permanent structures on the beaches;
- Deforestation of the islands' forests mainly due to cultivation and cutting of trees for fish smoking; and
- Shortage of fresh fish storage equipment resulting in low prices of fresh fish.

Picture 16: Heavy patronage by fishermen and fish traders at Koka (L) and Mchenga Beaches (R)

Picture 17: Fisherman's shelter (L) and Cultivation on Chisi Island (Right and Top Left)

3. Project hotspots

3.1 Hotspots Map

Maps are currently being developed that will show hotspots in each district. However, the development of these maps is a continuous process that will follow the implementation of activities on the ground. Thus, GIS maps will be developed to illustrate the nature and extent of implementation of activities in the hotspots.

3.2 Gaps

4. Next steps

4.1 Livelihood, stakeholder and baseline survey

WorldFish Center will coordinate baseline surveys to characterize livelihoods, identify and categorize stakeholders. In addition, the Programme will also collect baseline information on all performance indicators.

4.2 Quick wins in Hotspots

The Programme will actively involve communities and other relevant stakeholders to identify activities for immediate implementation in the hotspots.

Appendix 1: Summary of Selected Hotspots

Description of Hotspot	What is special about this hotspot?		Suggested activities in this hotspot?	Relevance to Objectives
	Positive	Issues		
Hotspot No. 1: Lake Chilwa – Zomba Side <ul style="list-style-type: none"> - Chisi island - Mchenga and Kachulu beaches. 	<ul style="list-style-type: none"> - Habitat for fish and birds; - Rice producing area; 	<ul style="list-style-type: none"> - Fish catch dwindling (Chisi Island); - Deforestation due to cultivation (Chisi Island); - Poor sanitation; - Area prone water borne diseases such as cholera and bilharzias; - Cultivation taking place close to the Lake; - High prevalence of HIV/AIDS. 	<ul style="list-style-type: none"> - Improve management of fish and bird species through development of resource management plans and regulations (conflict resolution, land use plans); - Promotion of fish processing technologies like fish rack, energy saving stoves. - Afforestation 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions in management of threatened resources will be enhanced; - Objective 2: An integrated Management Plan for Lake Chilwa basin will be developed with a special focus on the hotspots; - Objective 3: Alternative livelihood strategies will be developed to provide people with alternative sources of income and divert them from marginal cultivation and prostitution; - Objective 4: The management of forest areas such as Chisi Hills will be enhanced to increase and sustain carbon sequestration.
Hotspot No. 2: <ul style="list-style-type: none"> - Zomba Mountain Forest Reserve; - Likangala River; - Zilindo and Namadidi settlements (Zomba) 	<ul style="list-style-type: none"> - Breeding site for fish (Domasi river); - Rice production (Likangala and Domasi Rice schemes); - Source of water for irrigation and domestic purposes. 	<ul style="list-style-type: none"> - Deforestation on the mountain and along river banks and Mulunguzi March (major river source) - Frequent fires - Inadequate resources for good forest management; - Encroachment through farming and settlement at Zilindo, Kasonga and Nankhunda areas; - Drying up of rivers due to river bank cultivation; - Poor land husbandry; - Flooding downstream of Likangala river. 	<ul style="list-style-type: none"> - Reforestation - Riverbank afforestation; - Improve coordination among stakeholders (agriculture, Forestry, Water, Security, Judiciary, Fisheries, etc.); 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management and conflict management; - Objective 2: Efforts will be made to ensure that communities and stakeholders actively participate in the management of the forest reserve, river catchments and cultivated areas; - Objective 3: Consultations will be made with government and other stakeholders to provide alternative settlement areas for the people residing in protected areas; - Objective 4: Improved management of the forest and the water catchment will obviously improve forest cover and hence carbon sequestration.
Hotspot No.3: <ul style="list-style-type: none"> - Malosa Forest Reserve; and - Domasi River (Zomba) 	<ul style="list-style-type: none"> - Breeding site for fish (Domasi river); - Rice production (Domasi Rice schemes); 	<ul style="list-style-type: none"> - Deforestation mainly for charcoal production and fires; - Drying up of the river due to river bank cultivation; - Poor land husbandry; 	<ul style="list-style-type: none"> - Riverbank afforestation; - Improve coordination among stakeholders (agriculture, Forestry, Water, Security, Judiciary, Fisheries, etc.); 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management and conflict management; - Objective 2: Efforts will be made to ensure that communities and stakeholders actively participate in the management of the forest reserve, river

Description of Hotspot	What is special about this hotspot?		Suggested activities in this hotspot?	Relevance to Objectives
	Positive	Issues		
	<ul style="list-style-type: none"> - Source of water for irrigation and domestic purposes. 	<ul style="list-style-type: none"> - Uncoordinated implementation of activities; - Pollution (drainage of sewage from Domasi Prison); - Diseases caused by black flies 	<ul style="list-style-type: none"> - Lobby for proper management of sewage from Domasi Prison. 	<ul style="list-style-type: none"> - catchments and cultivated areas; - Objective 3: Improved Enforcement of forest laws Consultations will be made with government and other stakeholders to improve the management of sewage from Domasi Prison; Conservation agriculture, agro forestry and promotion of manure will be used to enhance productivity; Environmentally friendly IGAs will be promoted; - Objective 4: Improved management of the forest will ultimately improve carbon sequestration.
<p>Hotspot No. 4: Ngweleru EPA</p> <ul style="list-style-type: none"> - Mayaka section - Steven section and - Chimbeta Section (Zomba) 	<ul style="list-style-type: none"> - Community is dedicated to development 	<ul style="list-style-type: none"> - Persistent droughts ; - Infertile soils (black clay); - Low agricultural production; - Early marriages. 	<ul style="list-style-type: none"> - Afforestation; - Land conservation initiatives (Conservation agric, drought resistant varieties); - IGAs promotion ; - Promote Integrated agriculture; - Lobby for development projects ; 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management; micro projects management and integrated agriculture ; - Objective 2: Integrated management plans will be developed to tackle issues of land use, water resources, agriculture and forestry, among others that will be linked to Lake Chilwa; - Objective 3: Hotspot communities will be supported with resources to undertake conservation agriculture, agro forestry and manure-making to enhance agricultural productivity; In addition, other IGAs will be explored and communicated. - Objective 4: Communities will be encouraged to manage existing forested areas and establish Village Forest Areas to improve and sustain carbon sequestration.
<p>Hotspot No. 5:</p> <ul style="list-style-type: none"> - Michesi Forest Reserve; - Phalombe River Bank (Phalombe) 	<ul style="list-style-type: none"> - Source of rivers e.g. Phalombe, Namphende and Muloza which supply water for domestic purposes and irrigation - Farming activities as a source of livelihood - Fishing done 	<ul style="list-style-type: none"> - Deforestation in the forest reserve - Land degradation - Siltation in water intakes - Riverbank cultivation - Pollution - Biodiversity loss - Fish depletion - Loss of vegetation due to riverbank and lakeshore cultivation - Siltation resulting in 	<ul style="list-style-type: none"> - Afforestation in the bare hills and along the river banks - Promote sustainable fisheries management programs and environmentally friendly enterprises - Promote proper land husbandry practices and soil conservation measures 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management based on capacity needs assessment; - Objective 2: Hotspot communities will be supported to develop and implement management plans for the forest and the rivers using the ecosystem approach; - Objective 3: Alternative IGAs will be promoted to divert people's attention from unsustainable utilization of natural resources; Conservation agriculture, agro forestry and promotion of manure

Description of Hotspot	What is special about this hotspot?		Suggested activities in this hotspot?	Relevance to Objectives
	Positive	Issues		
	<ul style="list-style-type: none"> - around the lagoon - Has different species of birds - Has grazing at Mpotu Lagoon 	<ul style="list-style-type: none"> - lowering of water levels in the lake and rivers - Frequent flooding downstream of Phalombe river - Gullies and soil erosion 	<ul style="list-style-type: none"> - Controlled fishing e.g. enforcing closed season - Capacity building of local institutions (BVCs, VNRMCs and RVCs) - Fish farming activities - Payment for Ecosystem Services and Livelihood options as adaptation strategies can be best tried here 	<ul style="list-style-type: none"> - will be used to enhance soil productivity; - Objective 4: Improved management of the forest will ultimately improve carbon sequestration.
<p>Hotspot No. 6: Mpotu Lagoon and Sombani River and areas including:</p> <ul style="list-style-type: none"> - Swang'oma Beach; and - Njalo Island (Phalombe) 	<ul style="list-style-type: none"> - Fishing as an economic activity; - Home for bird species; - Source of water for irrigation. 	<ul style="list-style-type: none"> - Fish catch dwindling ; - Deforestation in Kholonje, Makhanga and Malagani hills - Infertile soils(sandy soils); - Area prone to cholera outbreaks and floods; - Non-functional Local institutions such as BVCs and VNRMCs ; - High prevalence of HIV/AIDS - Excessive presence of water hyacinth (Namasupuni). 	<ul style="list-style-type: none"> - Reforestation; - Use of hybrid varieties; - Provision of water safety measures like chlorine and water guard to people residing in and along the lake residents. 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management; - Objective 2: Communities will be supported to develop integrated management plans for the island, the lagoon, the beaches as well as the rivers. - Objective 3: IGAs will be promoted using the sustainable livelihoods approach; - Objective 4: Improved management of the forest on the island will enhance carbon sequestration
<p>Hotspot No. 7: Mikongoloni Hill and Chisengeleni river (Phalombe)</p>	<ul style="list-style-type: none"> - Arable land good for crop production 	<ul style="list-style-type: none"> - Deforestation of the hill and the river bank; - Soil (gully) erosion posing threat to school; - Loss of valuable land. 	<ul style="list-style-type: none"> - Integrated river bank embankment measures; - Reforestation programmes; - Training of local 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management; - Objective 2: Communities will be supported to develop and implement plans for sustainable

Description of Hotspot	What is special about this hotspot?		Suggested activities in this hotspot?	Relevance to Objectives
	Positive	Issues		
			<ul style="list-style-type: none"> institutions on environmental management issues; - This can be a test case for demand for social services and capacity building. 	<ul style="list-style-type: none"> management of the river catchment; - Objective 3: Environmentally friendly IGAs will be promoted; - Objective 4: Improved management of the forest will ultimately improve carbon sequestration.
Hotspot No. 8: Chitekesa- Nambazo stretch (Phalombe)	<ul style="list-style-type: none"> - Arable land good for crop production 	<ul style="list-style-type: none"> - Area prone to floods; - Low agricultural productivity; - Poor road network; - Siltation of the rivers. 	<ul style="list-style-type: none"> - Afforestation; - Irrigation farming; - Integrated agriculture; - Alternative IGAs promotion; - Lobby for improvement of road infrastructure. 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions in integrated natural resources management will be enhanced; - Objective 2: Communities will be supported to develop and implement environmental micro projects; - Objective 3; Conservation agriculture, agro forestry and promotion of manure will be used to enhance agricultural productivity; Environmentally friendly will be tested and promoted; - Objective 4: Establishment of VFAs will be encouraged to enhance carbon sequestration outside protected areas.
Hotspot No. 9: Nacala corridor, Namanja Beach and Mpiri River (Machinga)	<ul style="list-style-type: none"> - Water resources for irrigation and domestic use (Mpiri the only perennial river) - Fishing as an economic activity - Rice production 	<ul style="list-style-type: none"> - Uncontrolled fires in marshes; - Deforestation along the river banks; - Poor land husbandry; - Infertile soils; - Fish catch dwindling. 	<ul style="list-style-type: none"> - Develop and implement fire management plan; - Afforestation especially in the water catchment area; - Soil fertility enhancement and land resources conservation measures; - Develop and implement integrated Lake Chilwa Management Plan; - Promote high yielding and early maturing rice varieties and other crops. 	<ul style="list-style-type: none"> - Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management; - Objective 2: Management plans will be developed and implemented to enhance natural resource management and planning in the corridor, the beach and the water catchment. - Objective 3: Household and enterprise adaptive capacity will be improved through IGA's - Objective 4: Establishment of Village Forest Areas will be promoted.

Description of Hotspot	What is special about this hotspot?		Suggested activities in this hotspot?	Relevance to Objectives
	Positive	Issues		
Hotspot No. 10 - Chikala Hills; - Mposa Beach; - Lingoni river; and - Zumulu river Catchments (Machinga)	- Source of gravity-fed scheme (Water resources for irrigation and domestic use) - Fishing as an economic activity	- Uncontrolled fires in marshes; - Deforestation along the river banks; - Poor land husbandry; - Unfertile soils; - Fish catch dwindling; - Too many fishermen.	- Promote agro forestry; - Promote afforestation especially along riverbanks; - Introduce and promote alternative IGAs; - Promote fish farming as an alternative IGA; - Develop and implement integrated Lake Chilwa Management Plan; - Explore trading of carbon under REDD+.	- Objective 1: Capacity of district and local institutions will be improved in integrated natural resources management; - Objective 2: Integrated Management Plans will be developed and implemented in the catchment areas and the lowlands; - Objective 3: Environmentally friendly IGAs will be promoted using the sustainable livelihoods approach; - Objective 4: Forest areas will be conserved and ultimately this will improve carbon sequestration.

Appendix 2A: List of Participants – Machinga Consultative Workshop

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Appendix 2B: List of Participants – Phalombe Consultative Workshop

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Appendix 2C: List of Participants – Zomba Consultative Workshop

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Appendix 3: List of Participants – Hotspots Verification Exercise

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