



GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Naoko Ishii
CEO and Chairperson

August 29, 2016

Dear LDCF/SCCF Council Member:

FAO as the Implementing Agency for the project entitled: *Malawi: Building Climate Change Resilience in the Fisheries Sector in Malawi*, has submitted the attached proposed project document for CEO endorsement prior to final approval of the project document in accordance with FAO procedures.

The Secretariat has reviewed the project document. It is consistent with the proposal approved by LDCF/SCCF Council in March 2014 and the proposed project remains consistent with the Instrument and LDCF/SCCF policies and procedures. The attached explanation prepared by FAO satisfactorily details how Council's comments have been addressed. I am, therefore, endorsing the project document.

We have today posted the proposed project document on the GEF website at www.TheGEF.org. If you do not have access to the Web, you may request the local field office of UNDP or the World Bank to download the document for you. Alternatively, you may request a copy of the document from the Secretariat. If you make such a request, please confirm for us your current mailing address.

Sincerely,

Naoko Ishii
Chief Executive Officer and Chairperson

Attachment: GEFSEC Project Review Document
Copy to: Country Operational Focal Point, GEF Agencies, STAP, Trustee



REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: LDCF

PART I: PROJECT INFORMATION

Project Title: Building Climate Change Resilience in the Fisheries Sector in Malawi			
Country(ies):	Malawi	GEF Project ID: ¹	5328
GEF Agency(ies):	FAO	GEF Agency Project ID:	620333
Other Executing Partner(s):	Department of Fisheries	Submission Date:	14 June 2016 12 August 2016
GEF Focal Area (s):	CCA	Project Duration(Months)	60
Name of Parent Program (if applicable): ➤ For SFM/REDD+ <input type="checkbox"/> ➤ For SGP <input type="checkbox"/> ➤ For PPP <input type="checkbox"/>	N/A	Project Agency Fee (\$):	518,700

A. FOCAL AREA STRATEGY FRAMEWORK²

Focal Area Objectives	Expected FA Outcomes	Trust Fund	Grant Amount (\$)	Co-financing (\$)
CCA-1: Reducing Vulnerability: Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level	Outcome 1.1: Mainstreamed adaptation in broader development frameworks at country level and in targeted vulnerable areas Outcome 1.2: Reduced vulnerability to climate change in development sectors Outcome 1.3: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	LDCF	2,162,010	4,800,000
CCA-2: Increasing Adaptive Capacity: Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level	Outcome 2.1: Increased knowledge and understanding of climate variability and change-induced threats at country level and in targeted vulnerable areas Outcome 2.2: Strengthened adaptive capacity to reduce risks to climate-induced economic losses Outcome 2.3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	LDCF	2,347,800	5,211,000
CCA-3: Adaptation Technology Transfer: Promote transfer and	Outcome 3.1: Successful demonstration, deployment, and transfer of relevant adaptation technology in targeted areas	LDCF	950,190	2,109,000

¹ Project ID number will be assigned by GEFSEC.

² Refer to the [Focal Area/LDCF/SCGE Results Framework](#) when completing Table A.

adoption of adaptation technology	Outcome 3.2: Enhanced enabling environment to support adaptation-related technology transfer			
Total			5,460,000	12,120,000

B. PROJECT FRAMEWORK

Project Objective: To improve the resilience of fishing communities around Lake Malombe to the effects of climate change						
Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount (\$)	Confirmed Co-financing (\$)
1: Strengthening access to information and knowledge regarding climate change and its implications.	TA	<p>1.1: Enhanced access to and use of information on climate trends, extreme events and resource status, necessary for the formulation and implementation of effective and timely resilience and management measures:</p> <ul style="list-style-type: none"> - 80% of DoF staff in 28 Districts nationwide, 80% of staff in Mangochi district authority, leaders of 3 Traditional Authorities (TA) and leaders of 29 BVCs have access to relevant and understandable information - All limits on fishing practices and gear, all district and community level development plans and strategies in the project area and all resilience and restoration plans and strategies (both aquatic and terrestrial) are based on reliable information on the above parameters 	<p>1.1.1: Detailed Vulnerability and Disaster Risk Assessments (VDRAs) of 47 fishing communities around Lake Malombe</p> <p>1.1.2: Information resources on ecological parameters determining management and resilience options in and around Lake Malombe</p> <p>1.1.3: Climate and environmental monitoring and early warning (EWS) systems</p> <p>1.1.4: Strengthened fisheries monitoring system</p> <p>1.1.5: Mechanisms for dissemination and use of knowledge in adaptive management</p>	LDCF	788,567	3,476,189
2: Creating an enabling environment for the promotion of climate change resilience among fishing communities	TA/ IN V	<p>2.1: CC resilience mainstreamed into key policy and planning instruments of relevance to fisheries and fishing communities:</p> <ul style="list-style-type: none"> - Specific/increased reference to CC issues in the fisheries sector in the National Climate Change Policy and Disaster Risk Management Policy, MGDS, NAPA and ASWAp. - Climate resilience provided for explicitly, with corresponding budget allocation, in 1 District Development Plan, Area Development Plans of 3 TAs (Chimwala, Chowe, Mponda) and 45 Village Development Plans 	<p>2.1.1. Think tank on climate change in the fisheries and aquaculture sector with an integrated vision and incorporating results of CC and fisheries monitoring systems</p> <p>2.1.2. Policy review document</p> <p>2.1.3. A policy influencing strategy for mainstreaming climate resilient fisheries and aquaculture, developed and implemented.</p> <p>2.1.4 Policy guidance materials</p> <p>2.1.5. Guidelines/Code of Conduct for responsible CC-resilient aquaculture developments in riparian areas in Malawi</p>	LDCF	1,638,557 (INV = \$118,000)	4,371,429
		<p>2.2 Strengthened capacities of fisheries professionals and other relevant stakeholders to address climate resilience building in fisheries sector</p>	<p>2.2.1 Capacity development programme for staff of key institutions in relation to</p>			

		<p>(target institutions: DoF HQ, District Fisheries Office Mangochi, 4 DoF sub-stations, 5 other districts along Lake Malawi, 2 Aquaculture Research Stations, Mangochi Fisheries College, 2 Fisheries Research Stations (Monkey Bay, Senga Bay), 27 BVCs, 47 Villages, 3 TAs and Mangochi District):</p> <ul style="list-style-type: none"> - 50% of members of all target institutions have increased KAP score - 30% increase in recurrent budget approved for district fisheries offices in accordance with provisions of resource management and restoration plans, 40% increase in disbursement and 50% increase in execution 	<p>climate change preparedness and resilience building</p> <p>2.2.2 Improved physical capacities for DoF to sustain the resilience strategies</p>			
		<p>2.3 Strengthened awareness of climate change issues and responses of relevance to the fisheries sector and fishing communities:</p> <ul style="list-style-type: none"> - 50% of supermarket consumers purchasing fish from Lake Malombe, 60% of traders in fish from Lake Malombe and 75% of fishers on Lake Malombe aware of fisheries resilience issues 	<p>2.3.1 National “Chambo” campaign, supporting behaviour change and motivation, rolled out</p>			
<p>3: Strengthening capacities at local level to increase the resilience of fishing communities to climate change</p>	<p>TA/ INV</p>	<p>3.1: Adaptive co-management and resource governance systems in support of climate-resilient capture fisheries:</p> <ul style="list-style-type: none"> - 80% of people (men and women) in all major stakeholder groups consider that they are satisfactorily represented in co-management structures - 70% implementation of resource management plans - 80% of all categories of fishers comply with norms and regulations for resource co-management - 6,000ha additional no-take area <p>3.2: Fish stocks and habitats restored through EAFA approaches, resulting in:</p> <ul style="list-style-type: none"> - 10ha covered by seine prevention objects (SPOs) - Planting of 40ha of aquatic vegetation - Increased representation of chambo from 2% to 9% - Proportion of kasawala (immature chambo less than 15 cm) in populations increases from 2% to 50% <p>3.3: Aquaculture is climate-proofed and able to contribute to diverse and resilient livelihood strategies of the</p>	<p>3.1.1: Multi-stakeholder co-management structures</p> <p>3.1.2: Participatory resource management plan(s)</p> <p>3.1.3: Norms and regulations for resource co-management</p> <p>3.1.4: Enforcement mechanisms for resource co-management</p> <p>3.2.1: A verified and updated restoration plan for Lake Malombe, including risk assessment</p> <p>3.2.2: Restoration programme</p> <p>3.2.3: Restocking programme for healthy native chambo</p> <p>3.3.1: Aquaculture resilience plan developed, implemented and underpinned through on-</p>	<p>LDCF</p>	<p>2,384,943 (INV = \$622,410)</p>	<p>2,314,286</p>

	most vulnerable sectors of the population: - 500 ponds with climate resilience measure	going research and impact tracking programme 3.3.2: Action learning and knowledge generation programme 3.3.3: Capacity development programme for resilient aquaculture 3.3.4: Impact tracking programme			
	3.4: Local people have access to diverse, pro-poor farming systems as a central element of resilient rural livelihoods: - 1,500 farms integrating aquaculture and efficient water management into diverse portfolio of CC resilience measures	3.4.1: Participatory extension programmes 3.4.2 Solar driers			
4. Monitoring and Evaluation and Adaptation learning	4.1 Project implementation is based on results-based management and application of lessons learned and good practices in current and future interventions.	4.1.1: Monitoring, evaluation and reporting system established, supporting adaptive project management 4.1.2: Mechanisms for effective management and dissemination of knowledge	LDCF	387,933	1,380,950
Subtotal				5,200,000	11,542,854
Project management Cost (PMC)				260,000	577,146
Total project costs				5,460,000	12,120,000

C. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$)

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing	Co-financing Amount (\$)
Government	DoF	Grant	1,500,000
Government	DCCMS	Grant	300,000
Bilateral aid agency	FISH	Grant	5,500,000
GEF Agency	FAO (TCP)	Grant	470,000
GEF Agency	FAO (In Kind Contribution)	In kind	100,000
CSO	LUANAR	Grant	750,000
Government	MoAIWD	Grant	1,500,000
GEF Agency	UNDP	Grant	2,000,000
Total Co-financing			12,120,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL, AREA AND COUNTRY

GEF Agency	Type of Trust Fund	Focal Area	Country Name	(in \$)		
				Grant Amount (a)	Agency Fee (b)	Total c=a+b
FAO	LDCF	Climate Change Adaptation	Malawi	5,460,000	518,700	5,978,700
Total Grant Resources				5,460,000	518,700	5,978,700

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount (\$)	Co-financing (\$)	Project Total (\$)
Local consultants	972,250	2,158,181	3,130,431
International consultants	998,400	2,216,229	3,214,629

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT?

NA

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF

A.1 National strategies and plans or reports and assessments under relevant conventions

1. No major changes from the approved PIF. the project is closely aligned with the ongoing in-country NAP process. The current NAPA highlights the following proposed interventions:

- Fish breeding to restock the lakes, rivers and dams,
- Improving knowledge and understanding on how temperature profiles in the lake disrupt fish breeding and survival,
- Establishing climate observations or monitoring systems on Lake Malawi, and
- Mainstreaming climate change into fisheries strategies.

2. Furthermore, lessons gained by implementing the project will also inform the follow-on revision of the NAPA through engagement with National Technical Committee on Climate Change, of which the Department of Fisheries is a member.

A.2 GEF focal area and/or fund(s) strategies, eligibility criteria and priorities

3. Reference has also been included that the project will contribute to CCA-3: Outcome 3.1 (successful demonstration, deployment, and transfer of relevant adaptation technology in targeted areas) and Outcome 3.2 (Enhanced enabling environment to support adaptation-related technology transfer).

A.3 The GEF Agency’s comparative advantage:

4. No changes from the approved PIF.

A.4 The baseline project and the problem it seeks to address:

5. The threats that the project seeks to address remain essentially the same as in the PIF, but significant additional detail has been added on the basis of extensive literature review and local consultation, which have permitted a deeper understanding of their nature, magnitude and underlying drivers.

6. The barriers that the project seeks to address remain essentially the same as in the PIF, but have been slightly reworded and restructured to improve clarity and correspondence with the revised component structure (see below).

PIF	CEO Endorsement
1. Limited systematic analysis of CC-related vulnerabilities in the fisheries sector	1. Limited knowledge and understanding of climate risks associated with the fisheries sector
2. Absence of reliable information and knowledge about CC risks and vulnerabilities	2. Inadequate Policy, Regulatory and Institutional Frameworks to Support CC-Resilience Strategies
3. Limited integration of fisheries-specific climate responses in national policies	3. Inadequate Capacities and Resources at Local Level to Sustain CC-Resilience Strategies
4. Generally low management capacities in the fisheries sector	

5. Limited understanding of possible adaptive responses in the fisheries sector	
6. Dysfunctional decision support mechanisms	

A.5 Incremental / Additional cost reasoning:

7. The structure of the components has been modified to improve the logical flow, as follows:

PIF	CEO Endorsement
Component 1: Mainstreaming climate change adaptation into fisheries sector policies and capacity building of key fisheries actors	Component 1: Strengthening access to information and knowledge regarding climate change and its implications.
Component 2: Building local level adaptive capacities	Component 2: Creating an enabling environment for the promotion of climate change resilience among fishing communities
Component 3: Climate monitoring and early warning system on Lake Malombe	Component 3: Strengthening capacities at local level to increase the resilience of fishing communities to climate change
Component 4: M&E and adaptation learning	Component 4: M&E and adaptation learning

8. This modified structure separates more clearly the project's actions and resource flows between different levels of operation and between different actors, in particular allowing the concentration of outputs related to information access in the first component, rather than splitting them between Components 1 and 3 as in the PIF.

9. Emphasis has also been placed on ensuring livelihood diversity as a key element of resilience, rather than placing excessive dependence on aquaculture on its own as a resilience option, which would have the potential to increase exposure to risk in the event of its failure.

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

Risks	Rating	Mitigation Measures
Insufficient fisheries sector stakeholder capacities to absorb CC action needs	L	The support for this project in itself is an awareness raising and capacity support initiative. Careful planning of implementation arrangements and project activities address this risk. Primary and secondary stakeholders are targeted through strategically designed interventions under all project components. Primary stakeholder at the intervention site level will be actively engaged in all aspects of project interventions on site. DoF is the lead institution for the project and DoF district level staff are ultimately the drivers for the successful project execution. An awareness raising campaign on Chambo will be conducted, which will also address climate change sensitisation. A dedicated project technical support mechanism will be designed to ensure effective project execution. As indicated above, capacity building esp. within DoF is a focus of this project. Lessons learnt from this CC intervention will be unscaled to extension and research staff outside of Mangochi. Component 4 of the project specifically targets national level capacity support on a systemic level.
Low pilot level capacities	M	Dedicated local level support is firmly planned. The PPG phase entailed detailed stakeholder consultations in the project target area and with key institutions/governance structures. Participation, fishermen/ farmers action (research) approaches are central to the project design, as is ownership building. The project support structure is elaborate and facilitates for relevant back-stopping from the PMU and associated experts.

Restoration failures, e.g. difficulties in regenerating water plants & habitat, fingerling supply chain problems	M	During the PPG phase relevant expertise was consulted to set out a design concept that is considered feasible. By building a dual approach to habitat restoration, using experiences from elsewhere in the world to introduce artificial breeding habitat and areas for vegetation rehabilitation, while also introducing the co-management related measure of establishing “protected areas” where water vegetation could naturally re-establish itself is seen as a sensible option. Special care has been put into investigating the options for establishing a fingerling supply chain of relevant chambo species for restocking. Nevertheless, as large amount of fingerlings are foreseen to be introduced into the lake, it is important to establish relevant contracts and commitments to supply at project onset. Fish feeds for the aquaculture interventions must be available (can be imported from Zambia to start, if needed), and integrated poultry-natural feeds systems are explored.
Co-management failures, e.g. resistance to implement/ enforce agreed measures, criminal elements in community	M	The project will adopt a highly participatory approach based on extensive local consultation and fully involving local communities in all aspects of co-management, including the establishment of governance structures, the definition of norms and the formulation of management and restoration plans, all of which will be based on participatory analyses of needs. Emphasis will be placed on ensuring the continued local ownership of these elements, and also on tailoring all of the project’s interventions at local level to the needs of the different socioeconomic sectors within the target communities in order to promote social acceptance, sustainability and the equitable generation of benefits, and minimize the risk of conflicts.
Aquaculture failures, e.g. capacity of local partner too low to implement activities successfully negative climate impacts	MH	Aquaculture especially community-based has failed in Malawi many times, although there are some stories of success. The government of Malawi is committed to further invest into aquaculture development as one option for climate resilience building and achieving food security. The PPG phase invested into scoping local and international knowledge and best practices for setting out possible designs for an aquaculture component in the project, It is recognised that an intense investment into scoping and further developing the concept with the beneficiaries needs to be made at project onset. It is critical to engage the local communities in the final design concept, as well as in training and ownership building right from the beginning. A commercialised approach to supporting incubators will be tested. FAO has considerable experience in developing aquaculture projects and especially also in ensuring climate change resilience of aquaculture development.
Unintended environmental risks, e.g. genetic pollution, species imbalances, loopholes in effluent management	M	Both the restocking and the aquaculture components of this project bear some environmental risk, which are largely managed through a rigorous design concept. It is clear that this project will change Lake Malombe from a purely “naturally” managed system (including local people and overfishing) to an “engineered” system, into which fish species will be introduced in balances not previously recorded from the lake. A dedicated environmental monitoring programme under component 1 will be implemented to provide tracking information on all interventions. It was reported that some of the potential fingerling supplies maybe affected by “genetic pollution” and genetically modified elements. All project interventions will undergo continuous environmental screening as stipulated under the national EIA laws, and any identified risks will be addressed with the Technical Task team’s inputs and where needed with international expertise through FAO. This also goes for any other potential aquaculture related risks, including effluent water management.
Social/domestic conflict	L	Building climate change resilience – and changing failing systems –will come with social changes. There may be some resistance to change among actors in the communities who may feel their social and economic interests are threatened through the co-management proposals, particularly the improved enforcement of norms on damaging fishing practices. The project will address this risk by applying a fully inclusive and participatory approach to consultation and planning in relation to management strategies, organizational structures and governance, and will promote a range of technical management options (ranging from improved capture

		fisheries practices through integrating low-tech aquaculture into smallholder farming systems and medium-level commercial aquaculture), with the potential to generate benefits tailored to each of the stakeholder sectors, including those who fear potential marginalization..
Limited political will	L	By linking this project to the newly established national CC coordination mechanisms in the Planning Department and by addressing explicit NAPA priorities maximum alignment with national priorities is given. The participatory identification of the project focus through NAPA and engagement of key stakeholder during the PIF and PPG preparation should have laid a strong political commitment foundation for this project. Furthermore there is dedicated commitment from DoF and at the political level of MAFS to invest into food security in the light of climate risks – and fisheries is the obvious strategy for Malawi. The dedicated Chambo campaign will be designed to mobilize public and political support for the approach.
Climate related disasters	M	A severe flood event could potentially affect the intended local partners which could lead to unavailability to partner in the implementation of project activities. Aquaculture infrastructure could be destroyed, and impacts on the Lake Malombe ecosystem could be so dramatic that the invested restoration activities may seem lost. Severe droughts and heat could equally have detrimental impacts. The project will be designed to reduce vulnerability to extreme events and it is anticipated that local level project interventions would provide tangible benefits to the project stakeholders. Approaches and techniques will be tested and pioneered that may hopefully provide climate proofing beyond what we know.

A.7 Coordination with other relevant GEF financed initiatives

10. The DoF will seek to engage with relevant projects and partners on the national and district level, supported by the existing NCCSC and GEFSC structures coordinated by the Department of Environment. Relevant representation on the Project Steering Committee (see below) will enable flow of information and governance interaction.

11. Coordination with relevant projects with presence in Mangochi District will convene regular project update meetings amongst the community of practice in Mangochi. These meetings will be led by DoF and supported by the PMU. A meeting schedule will be agreed upon and will be set up according to demand, following the inception workshop.

12. The project will be closely coordinated with the following GEF-financed initiatives:

13. **AfDB-GEF LDCF project “Climate Adaptation for Rural Livelihoods and Agriculture (CARLA)”**. The goal of the CARLA project is to improve resilience to current climate variability and future climate change by developing and implementing adaptation strategies and measures that will improve agricultural production and rural livelihoods. Lessons learned in this on-going project which focuses on community level climate change adaptation have been considered in this project’s design, especially with a view too food security.

14. **WB-GEF multi-focal area “Shire Natural Ecosystems Management Project”**. Cutting across the biodiversity, sustainable land management and climate change focal areas, this project aimed to develop a strategic planning and development framework for the Shire River Basin and support targeted investments to improve land and water resources management, and associated ecological services and livelihoods in the Basin. Lessons learned are being considered for upper catchment climate actions needed, which will be part of the climate change awareness raising and learning with various institutions at district and sub-district level.

15. **UNDP-GEF LDCF project “Climate Proofing local development gains in rural and urban areas of Machinga and Mangochi Districts Malawi”**. This project will utilize community-based approaches to adaptation in order to mainstream climate change considerations into the baseline programmes

(decentralization and agricultural subsidy programme). Thus increasing the resilience of local economic development in the Shire River basin. The goal of the project is to secure the development and food security gains from the baseline programs by empowering communities to integrate climate risk considerations in the development policies, plans, projects and actions. The project will provide knowledge, tools, capacities and methodologies for the adoption of an ecosystems and community based approach to adaptation, which is more effective in enabling climate vulnerable people to plan for and adapt to the impacts of climate change; benefiting over 458,371 in 91,674 households. Catalytic linkages are foreseen between these two projects, especially concerning climate change related awareness raising, training and outreach. The primary stakeholder groups of the two projects complement each other in Mangochi and selected parts of Machinga districts.

16. UNDP-GEF LDCF project “Strengthening climate information and early warning systems in Eastern and Southern Africa for climate resilient development and adaptation to climate change – Malawi”. The project aims to strengthen the capacity of the Department of Climate Change and Meteorological Services to monitor extreme weather and climate change, and for integrating sector-specific climate information into development plans and early warning systems. Linkages relevant to the fisheries sector will be established.

17. UNDP-GEF project “Implementing Urgent Adaptation Priorities Through Strengthened Decentralized and National Development Plans”. This project aims to strengthen consideration of climate change adaptation needs in decentralised and national development plans: as such, the team of the project proposed here will pay particular attention to coordination and realizing synergies in relation to the proposed incidence work in national and decentralized policy and planning frameworks.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1. Describe how the stakeholders will be engaged in project implementation:

18. The principal institutional stakeholder of the project will be DoF, which, in addition to acting as project executing partner, will fill and cofinance the posts of National Project Coordinator and around half of the technical posts of the PMU, as well as all of the field staff. This arrangement will serve to maximize ownership and capacity building in the institution, which is the lead actor in the fisheries sector. DoF will also provide the National Project Director, and will chair the Project Steering Committee.

19. The engagement of District authorities (which have assumed an increased role under recent decentralization policies and legislation) will similarly be furthered by its hosting the PMU office at Mangochi.

20. The project will place strong emphasis on promoting participation and engagement by local stakeholders at community level, in accordance with a preliminary participation developed during the PPG phase, which will be further detailed during project implementation. Its actions under Component 3, in particular, will focus on the promotion of co-management of fisheries and the strengthening of community-based governance of fisheries and other natural resources. This will build upon earlier investments in participatory fisheries management, and will pay particular attention to promoting local ownership of governance structures such as Beach Village Communities, which in the past have been regarded by some stakeholder sectors as Government initiatives. Norms for fisheries management (including provisions for example for permitted off-take levels and fishing gear), and plans for ecosystem management and restoration, and proposed investments in no-take areas and seine-prevention objects, will all be defined with the full participation of local stakeholders.

21. Specific instances in which the project will promote stakeholder engagement and participation include the following:

- Output 1.1.3. Climate and environmental monitoring and early warning (EWS) systems: the monitoring systems and EWS to be supported by this project will build on these baseline investments, but will be more specific to the case of fisheries, aquatic ecosystems and fishing communities on and around Lake Malombe, and will be carried out with the participation of the BVCs.
- Output 1.1.5. Mechanisms for dissemination and input of knowledge into adaptive management of fisheries and other natural resources: the participatory resource management and restoration plans proposed under Component 3 will set out the management strategies that will need to be guided in an adaptive manner by the information flows generated through the above Outputs. With the participation of relevant institutional and local stakeholders, each of the management strategies proposed in the plans will be reviewed and the key stakeholders responsible for each, together with the types of information they will need, will be identified, and they will be characterised in terms of their ability to access and manage information.
- Output 3.1.1: Multi-stakeholder co-management structures: with the participation and subject to the approval of local stakeholders, the project will define a stakeholder participation plan that will set out principles and specific strategies for ensuring the effective and equitable participation of all relevant stakeholders in the governance structures that will be strengthened by the project. This would include the setting up of a joint coordination and information sharing platform for cross-sectoral planning and extension, to address issues such as upstream resource governance i.e. on forestry practices and agriculture. This would include the initiation of exchange platforms with project partners, including FISH and other NGOs.
- Output 3.1.2: Participatory resource management plan(s): This zoning and management planning will be based on a combination of sound science, an integrated understanding of the interactions between biological, productive and social parameters (applying an integrated sustainable livelihoods approach and taking into account considerations of gender equity, poverty reduction and resilience), and the views and priorities of the diverse local stakeholder groups who are directly or indirectly associated with the resources of the lake. The plan will be developed in a participatory and collaborative manner between local communities and entities of district and central level Government (including, but not limited to, the DoF), and they will be subject to validation and approval by all of these stakeholders.
- Output 3.1.3: Norms and regulations for resource co-management: the project will facilitate workshops to define needs for modifications or additions to existing norms and regulations in order to allow the provisions of the management plan to be implemented. Full stakeholder participation in this process will be essential in order to ensure buy-in to the norms and regulations in local communities, and therefore their support to their application, as well as to screen for and minimise the risk of negative impacts on local people's livelihoods.
- Output 3.1.4: Enforcement mechanisms for resource co-management: the by-laws and other norms and regulations defined as Output 3.1.3 will be underpinned by effective enforcement, which will feature shared responsibilities and participation of local communities and Government entities (especially DoF). The project will negotiate sustainable options for enabling community surveillance, in close collaboration with the relevant authorities (including DoF, police, marine police, park authorities and the judiciary). The organization of community surveillance teams to support compliance will be assisted by DoF extension officers. The project will assist in negotiating collaboration between neighbouring BVCs and form clusters, associations or federations of BVCs.
- Output 3.2.1: A verified and updated restoration plan for Lake Malombe: following the same process as proposed above in relation to the overall participatory resource management plan for the lake, the restoration plan will be developed with the full participation of local stakeholders, authorities from district level and relevant Government entities (especially DoF), taking into

account technical information on resource status, fisheries biology and lessons learnt generated through Component 1, and resulting in the definition of management and restoration practices, their spatial zoning and responsibilities for their implementation.

- Output 3.3.1: Aquaculture resilience plan developed, implemented and underpinned through on-going research and impact tracking programme: The plan will be prepared with the participation of all relevant stakeholders: the project will help to organize and facilitate a structured series of workshops, in which stakeholders (including fish farmers, representatives of community organizations, private sector actors, NGOs, district authorities and DoF) will review the current status of aquaculture in the area in terms of its potential, challenges and vulnerability to climate change. On the basis of these analyses, the participants will generate proposals for the climate-proofing of the sub-sector.
- Output 3.3.4: Impact tracking programme. The sustainability and local ownership of the tracking programme will depend on its indicators being relevant to the needs and interests of the stakeholders who will ultimately be responsible for sustaining it in the long term. The indicators, together with the mechanisms and responsibilities for their measurement and for the input of the results in support of the adaptive implementation of the plan, will therefore be developed in a participatory manner with facilitation and advisory support provided by the project.
- Output 3.4.1: Participatory learning and extension programmes and demonstrations: in the same way as described above with the climate-proofing of aquaculture, the project will prioritise a participatory action learning approach to the development and dissemination of diversified farming systems. Successful farms will subsequently have the potential to be used as resources for the demonstration of the systems to other stakeholders.

B. 2. Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions:

22. The strategic approach of the project recognizes the links between the generation of socioeconomic and adaptation benefits, and ecosystem resilience, on the basis of the following considerations:

- The actors with least ability to adapt to climate change through switching livelihood support options are the poorest. Those with greater access to economic resources, who currently own most of the factors of production in the form of fishing boats and gear, are considered to have a relatively high capability to adapt by investing their capital in alternative businesses. There is therefore a need to ensure that adaptation strategies are formulated in such a way as to maximise their benefits for the poor, both through improvements to their own production systems and through the generation of employment opportunities and other economic multiplier effects as a result of improvements to production systems managed by the less poor.
- There are already a number of aquaculture ponds in the project area, and aquaculture has some potential to contribute to the income and food needs of local stakeholders. A number of factors, however, including poorly developed value chains, limited technical and organisational capacities, high capital requirements and the risk of price fluctuations due to the availability of fish from the large wild fisheries of Lakes Malombe and Malawi, limit the potential of aquaculture as a reliable alternative livelihood strategy capable of generating significant resilience benefits for the poor. These constraints are beyond the scope of this project alone to address effectively. The project will not therefore aim to increase the scale of aquaculture in the area, but rather will focus on supporting the “climate-proofing” aquaculture and on integrating it into diverse and resilient farming/livelihood systems, accessible to the poor.

23. Taking into account these considerations, the project will aim to create a situation in which:

- 1) **Capture fisheries on Lake Malombe are restored and “climate-proofed”**, allowing them to generate livelihood benefits for local people in the form of income and food security, despite the

BAU stresses of overfishing and the added stresses to ecosystems and livelihoods that are expected as a result of climate change;

- 2) **Local people (especially the poor) have access to resilient options for meeting income and food security needs**, in order to buffer their livelihoods against the potential impacts of climate change and BAU pressures on their existing livelihood support strategies.

24. The principal contribution of the project to the socioeconomic wellbeing of the target population will be in terms of increases in their resilience to the impacts of climate change. Specifically, the project will increase the resilience of the livelihoods of the members of 29 fishing villages (corresponding to Beach Village Communities). This will be expressed in reductions in men and women’s perceptions of their vulnerability and risk exposure, from “extreme” to “medium”, in accordance with AMAT indicator 1.2.14: the precise definitions of these categories will be confirmed at project start in accordance considerations of relevance to local socioeconomic, cultural and biophysical contexts.

25. The project will furthermore ensure that the quantity and quality of family food consumption (including the poorest, more vulnerable and female-headed households) will be maintained at or above baseline levels, reflecting the fact that livelihood and economic resilience measures (which may require increased dedication of time, land and financial resources) will not be carried out at the expense of food security.

26. In addition, the application of viable and profitable adaptation measures promoted by the project will result in a net increase of 10% in average household income, including the poorest, more vulnerable and female-headed households.

27. The promotion of alternative income sources, particularly from locally-appropriate forms of aquaculture, will, in addition to generating direct socioeconomic benefits, serve to reduce pressures on capture fisheries in Lake Malombe itself and thereby facilitate the recovery of the status and resilience of fish populations and aquatic ecosystems there.

28. The restoration activities foreseen under Output 3.2.2 will also generate direct financial benefits to members of the target communities in the form of payments for daily labour: these benefits will serve to contribute to the awareness among community members of the importance of the ecosystem and its

29. Project design has incorporated gender considerations through gender-specific vulnerability assessment and capacity development planning, as summarized below:

EXISTING GAPS/ ISSUES	PRIORITY ISSUES/GAPS	HOW TO ADDRESS THE ISSUES
<p>Sociological and cultural:</p> <ul style="list-style-type: none"> - Traditions and customs e.g. patriarchal systems - Land tenure systems that favour men as land rights are governed by institutions that are culturally and socially determined hence affecting fish farming <p>Legal and legislative:</p> <ul style="list-style-type: none"> - Absence or non application of laws - Dichotomy between laws and customs - Laws that discriminate against women 	<ul style="list-style-type: none"> - Social protection for women - Improving trade policies to take care of women’s needs - Female-Headed households to be given special attention when developing safety nets - Improve access to information on fish and markets - Improve access to credit facilities - Civic education on women empowerment 	<ul style="list-style-type: none"> - Analysis of gender specific impacts and protection measures related to floods, droughts, diseases, and other environmental changes and disasters - Develop strategies to enhance women’s access to and control over natural resources, in order to reduce poverty, protect environmental resources, and ensure that women and poor communities can better cope with climate change - Identify women’s particular skills and capacities that lend themselves to mitigation and adaptation in climate change - Include women in decision – making of climate change adaptation at all levels - Conduct gender analysis to determine the roles and responsibilities of various players in fisheries

<p>Political:</p> <ul style="list-style-type: none"> - Low status of women in society - Decision making reserved for men <p>Economic</p> <ul style="list-style-type: none"> - Difficulties in accessing means of production for women - Limited income for women - Limited access to education and training - Inadequate information on women's rights - Shortage of reliable and sex disaggregated data both qualitative and quantitative <p>Health</p> <ul style="list-style-type: none"> - HIV and AIDS have significant impacts on land tenure systems including inheritance rights, shifts in ownership of tenure and distress sales. - Increase in the tradition custom of property grabbing for both men and women - Increased vulnerability and increased food insecurity among women headed households and girls 	<ul style="list-style-type: none"> - Effective communication strategies which are context specific - Promotion of Behavior Change Communication (BCC) strategies at all levels 	<ul style="list-style-type: none"> - To determine how individuals, households and others make a living and access to essential resources and services - Increase awareness on property rights among men and women not only promoting access to land and inputs - Adaptation of the gender concept in the local context - Enhanced investment in research - Revise/adopt laws aiming to improve women's status - Repackaging and dissemination of adopted laws - Setting up community watch-dogs - Increasing development of female leadership - Increased involvement of women in decision making bodies and structures - Enhance participation of women in training courses and organisational structures - Increased attention to girls education - Improve documentation - Undertake cross sectoral research at different levels (local, district and national) for networking and resource mobilization - More research to provide data that allows to better understand the situation on the ground - Enhance advocacy campaigns - Protect women and girls from Gender Based Violence (GBV) - Promote equal access to women and girls to information on HIV and AIDS
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B.3 Explain how cost-effectiveness is reflected in the project design:

30. Cost-effectiveness will be ensured through the following approaches:

- Close involvement of DoF staff in the PMU, which will limit the need for LDCF expenditure on salaries (in addition to its primary objective, which is to promote national ownership and capacity development);
- Close association and complementarity with the USAID-funded FISH project (a major source of co-financing for the project), which will allow LDCF resources to be focused, in geographic and thematic terms, in a cost-effective manner. The LDCF project will address aquaculture, and its climate-proofing and integration into resilient livelihood support systems, whereas the main focus of FISH will be on capture fisheries; and the LDCF project will have a more specific focus on promoting the status and climate resilience of chambo fisheries in Lake Malombe, given the high value of this species and its corresponding particular potential, if fisheries are restored, to contribute to the livelihoods of vulnerable local communities, while FISH will have a broader focus in terms of species;
- Emphasis on participatory co-management and governance, which will limit the need for capital and recurrent investment of Government resources due to the expected levels of buy-in and participation by local stakeholders.

31. The selected strategies for fisheries management and aquaculture were also identified as being more cost effective than the technical alternatives considered.

32. Cage or pen aquaculture was considered as a means to generate replacement food from the declining fishery. However, the performance to date of aquaculture across Malawi has been rather poor, and the resources needed to get it going would render it a costlier alternative to effective fishery and environmental management of the lake and fishery habitat. Pen culture would in fact hasten the decline of the fishery by impacting nearshore shallow water nursing grounds.

33. The project will explore resilient aquaculture as part of diversified farm production, but the expectation is that this will in no way replace the importance of the lake in providing fish to the people of the riparian communities who are dependent upon this. It may however provide some low risk supplemental income to families.

34. In the same vein, the replacement of fish with small livestock production would depend on their being feed resources available, and that the livestock would be more resilient than the fishery. In fact livestock in smallholdings is often very vulnerable to disease, drought and lack of adequate feeds, so it would also be unlikely to function as a full replacement for lost fishery services.

35. On the basis of the above comparisons, the conclusion is that effective management of the fishery is the most cost effective and sustainable approach.

Sustainability

36. Environmental sustainability is a central focus of the project, and will be ensured through the application of the Ecosystem Approach to Fisheries (EAF). This approach considers not only the sustainability of the fish populations themselves (through the strengthening of evidence-based planning and governance of offtake levels and gear) but also the ecological integrity of the ecosystem as a whole, including the restoration of key nurseries and habitat areas, the designation of no-take areas to allow population recovery, and the addressing of land-based threats such as pollution and sedimentation. Another key element of sustainability will be the focus of the project on developing capacities for adaptive management, through the effective flow of reliable and up to date information regarding the status of the ecosystem and its components into decision-making: this focus is particularly important in the case of this shallow lake, which is subject to wide seasonal and inter-annual fluctuations of water levels and quality.

37. The promotion of solar fish driers will reduce the risk of increases in fish offtake due to population recovery resulting in increases in deforestation to supply needs for fuelwood for the currently-used driers and smokers.

38. The sustainability of the management of water resources will be furthered through the integration, where possible, of fish farming into agricultural systems and infrastructure projects. This will allow stakeholders to take advantage of existing water management systems, such as irrigation reservoirs, for fish farming; while water from fish ponds will be available for irrigation use on farm, alongside other water management measures such as grey water filters and agroforestry systems.

39. Social sustainability will be ensured as follows:

- The strengthening of multi-stakeholder co-management structures as the cornerstone for sustainable fisheries and ecosystem management, allowing the needs and concerns of all relevant stakeholder groups to be aired and considered, including possible obstacles to social sustainability.
- The application of a highly participatory approach to the planning of ecosystem and fisheries management, and restoration activities, as proposed under Outputs 3.1.2 and 3.2.2, in order to ensure that they make provisions for issues with potential implications for social sustainability, and are “owned” by all major stakeholder groups.
- Participatory development and collaborative application of norms and regulations on resource management, in order to ensure that they receive social backing.

- Participatory approaches to the development of technologies and management strategies, featuring leadership by the farmers/fishers themselves, or at least their full involvement in the processes. This will maximize the probability of compatibility with other elements of stakeholders’ complex livelihood support strategies, as well as with cultural norms, and will ensure their ownership of the practices. A focus on experimental “action learning” will furthermore allow stakeholders to adapt the practices in the future, thereby ensuring their continued relevance and sustainability in the face of changing circumstances.
- Economic sustainability will be ensured by developing technical and business-management capacities among aquaculture producers, under Output 3.3.3: this will include aspects of post-harvest care, marketing, producer clustering (in order to improve access to affordable inputs and services, and markets) and technical support aimed at optimising the efficiency of input use (for example by reducing mortality rates and therefore cost of fry, and improving feed inputs).

Potential for scaling up

40. Overall, project activities will be scaled up through integration with the entire DoF system and staff, as well as with national development programmes run by NGOs, government and partner agencies. By focusing on food security we can ensure that the integration of climate resilient fisheries investments in the future will broaden food security opportunities in Malawi. A natural resource, traditionally a significant contributor to Malawian diets, will be promoted to a more prominent position in national food security policies in the future. Focusing on technical capacity support at this stage is a critical foundation for future up-scaling of the work.

41. Up-scaling of lessons learned to a regional level can be envisaged, informing climate resilience building in the fisheries sector throughout the African Great Lakes region, and especially amongst the three countries that border Lake Malawi, namely Malawi, Mozambique and Tanzania.

C. DESCRIBE THE BUDGETED M&E PLAN

42. Monitoring and evaluation of progress in achieving project results and objectives will be done based on the targets and indicators established in the Project Results Framework (Annex A). The project Monitoring and Evaluation Plan has been budgeted at USD 108,000 (see below). Monitoring and evaluation activities will follow FAO and GEF monitoring and evaluation policies and guidelines. The monitoring and evaluation system will also facilitate learning and replication of project results and lessons in relation to integrated management of natural resources.

Summary of main monitoring and evaluation activities

Type of M&E Activity	Responsible Parties	Time-frame	Indicative budget
Inception Workshop	PMU, supported by the FAO LTO, BH, and the FAO GEF Coordination Unit	Within two months of project start up	National workshop \$5,000, local workshops \$5,000
Project Inception Report	PMU, cleared by FAO LTO, BH, and the FAO GEF Coordination Unit	Immediately after workshop	\$102,857 of CTA salary assigned to Component 4
Project day to day monitoring	PMU, participating executing partners and other relevant institutions.	Continually	
Supervision visits and rating of progress in PPRs and PIRs	PMU, FAO Malawi, FAO LTO and FAO GEF Coordination Unit	Annual or as required	\$ 60,000 to NPC salary assigned to Component 4
Project Progress Reports	BH with support from PMU and Project Coordinator with inputs from other partners	Six-monthly	\$180,000 of M&E specialist salary assigned to

Type of M&E Activity	Responsible Parties	Time-frame	Indicative budget
Project Implementation Review report	BH with inputs provided by the CTA and Project Coordinator. PIRs cleared and submitted by the FAO GEF Coordination Unit to the GEF Secretariat	Annual	Component 4 FAO costs covered by agency fee
Co-financing Reports	PMU	Annual	
Technical reports	PMU, /LTO	As appropriate	
Terminal Report	PMU, BH, LTO, TCSR report Unit	At least two months before the end date of the GCP Agreement	
Mid-term Evaluation/Review	External Consultant, in consultation with the project team including the FAO GEF Coordination Unit, the LTO, and other partners	At mid-point of project implementation	\$40,000
Final evaluation	External Consultant, FAO independent Evaluation Office in consultation with the project team including the FAO GEF Coordination Unit, the LTO, and other partners	At the end of project implementation	\$50,000
Terminal Report	PMU, LTO, TCSR Report Unit	At least two months before the end date of the Execution Agreement	\$8,000
Total			\$108,000 (excl. salaries indicated above)

43. For full-sized projects, an independent Mid-Term Review/Evaluation will be undertaken at project mid-term to review progress and effectiveness of implementation in terms of achieving the project objectives, outcomes and outputs. Mid-term Reviews are encouraged for medium sized projects. Findings and recommendations of this review/evaluation will be instrumental for bringing improvement in the overall project design and execution strategy for the remaining period of the project's term. FAO will arrange for the mid-term review/evaluation in consultation with the project partners. The evaluation will, inter alia:

- review the effectiveness, efficiency and timeliness of project implementation;
- analyze effectiveness of partnership arrangements;
- identify issues requiring decisions and remedial actions;
- propose any mid-course corrections and/or adjustments to the implementation strategy as necessary; and
- highlight technical achievements and lessons learned derived from project design, implementation and management.

44. It is recommended that an independent Final Evaluation (FE) be carried out three months prior to the terminal review meeting of the project partners. The FE will aim to identify the project impacts and sustainability of project results and the degree of achievement of long-term results. This evaluation will

also have the purpose of indicating future actions needed to sustain project results and disseminate products and best-practices within the country and to neighbouring countries.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

- A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Dr Aloysius M. Kamperewera	Director and OFP	ENVIRONMENTAL AFFAIRS	12/18/2012

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.					
Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Gustavo Merino Director, Investment Centre Division Technical Cooperation and Programme Management. FAO Viale delle Terme di Caracalla 00153, Rome, Italy		12 August 2016	Ms Florence Marie Rolle FAO Representative Malawi	+265 1 773 925	Florence.Rolle@fao.org
Jeffrey Griffin Senior Coordinator, FAO GEF Coordination Unit. Investment Centre Division.				+3906 57055680	GEF-Coordination-Unit@fao.org

ANNEX A:PROJECT RESULTS FRAMEWORK

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
Project Objective: To improve the resilience of fishing communities around Lake Malombe to the effects of climate change	Indicator O.1: Vulnerability and risk perception index score , disaggregated by gender (1. Extreme, 2. High, 3. Medium, 4. Low or 5. No Vulnerability) (AMAT indicator 1.2.14) <i>Objectively verifiable definitions and survey methodology to be developed and applied at project start</i>	Initial survey from two villages during PPG phase suggests rating of “1. Extreme Vulnerability” for both men and women. <i>Full baseline survey to be carried out at project start</i>	“2. High” vulnerability and risk perceptions for both men and women in all sites	“3. Medium” vulnerability and risk perceptions for both men and women in all sites	Gender-sensitive village level surveys by the project (definitions and methodologies to be developed at project start)	Complementary livelihood support elements (e.g. cash cropping and off-farm employment), not directly addressed by the project, continue to be viable Climatic trends and natural disasters remain within the coping range on the basis of which the resilience strategies are designed
	Indicator O.2: % increase in income generation in targeted area due to adaptation measures (AMAT indicator 1.2.10)	0%	10% increase in average household income, including poorest, more vulnerable and female-headed households due to adaptation measures	10% increase in average household income, including poorest, more vulnerable and female-headed households due to adaptation measures	Gender-sensitive village level surveys by the project (definitions and methodologies to be developed at project start)	Political and social conditions remain stable
	Indicator O.3: Food consumption of target households (including poorest, more vulnerable and female-headed households), in terms of total quantities, protein content and intra-family distribution	<i>Baseline survey to be carried out at project start</i>	Food consumption in all households in target communities (including poorest, more vulnerable and female-headed households) maintained at baseline levels	Food consumption in all households in target communities (including poorest, more vulnerable and female-headed households) maintained at baseline levels	Gender-sensitive village level surveys by the project (definitions and methodologies to be developed at project start)	
Component 1: Strengthening access to information and knowledge regarding climate change and its implications.						
Outcome 1.1: Enhanced access to and use of information on climate trends, extreme events and resource status, necessary for the formulation and implementation of effective and timely resilience and management measures	Outcome Indicator 1.1.1: Numbers of key actors with access to relevant and understandable information required for the formulation and implementation of resilience and management measures, on: <ul style="list-style-type: none"> - Climate trends and vulnerability levels - Social conditions and social implications of vulnerability - Trends in fisheries and related natural resources 	PPG survey results suggest that local communities have basic understanding of climate change concepts gained through radio, print media and community meetings. Baseline survey to be carried out at project start	Actors with access to information: Nationwide: <ul style="list-style-type: none"> - 40% of DoF staff in 28 Districts In project area: <ul style="list-style-type: none"> - 40% of staff in Magochi district authority - Leaders of 2 Traditional Authorities (TA) 	Actors with access to information: Nationwide: <ul style="list-style-type: none"> - 80% of DoF staff in 28 Districts - In project area: <ul style="list-style-type: none"> - 80% of staff in Magochi district authority 	Interviews with actors	Continued receptivity on the part of stakeholders, including policy makers, to receiving and responding to information inputs Continued commitment to collaboration between stakeholders (particularly GoM and

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
	- Resilience options and their effectiveness		- Leaders of 15 BVCs	- Leaders of 3 Traditional Authorities (TA) - Leaders of 29 BVCs -		research institutions) in information generation and management
	<u>Outcome Indicator 1.1.2:</u> Numbers and types of key decision-making, planning and regulatory instruments in the project area, related to CC resilience in fishing communities that are based on reliable information on the above parameters	No significant incorporation of reliable information	50% of: - Limits on fishing practices and gear - District and community level development plans and strategies in the project area - Resilience and restoration plans and strategies (both aquatic and terrestrial)	- All limits on fishing practices and gear - All district and community level development plans and strategies in the project area - All resilience and restoration plans and strategies (both aquatic and terrestrial)	Interviews with entities responsible Review of instruments	
Outputs: 1.1.1: Detailed Vulnerability and Disaster Risk Assessments (VDRA) of 47 fishing communities around Lake Malombe 1.1.2: Information resources on ecological parameters determining management and resilience options in and around Lake Malombe 1.1.3: Climate and environmental monitoring and early warning (EWS) systems 1.1.4: Strengthened fisheries monitoring system 1.1.5: Mechanisms for dissemination and use of knowledge in adaptive management						
Component 2: Creating an enabling environment for the promotion of climate change resilience among fishing communities						
Outcome 2.1: Climate change resilience mainstreamed into key policy and planning instruments of relevance to fisheries and fishing communities	<u>Outcome Indicator 2.1.1:</u> Degree of reference to climate change considerations as related to fisheries in key policy and planning instruments	- National Climate Change Policy and Disaster Risk Management Policy are currently in draft form - MGDS and NAPA are predominantly agriculture-oriented - ASWAp does not make specific reference of CC issues of relevance to fisheries	- Inclusion of specific reference to CC issues in the fisheries sector in the National Climate Change Policy and Disaster Risk Management Policy, and reflected in the mechanisms charged with their oversight. - Increased emphasis on the fisheries sector in the provisions related to	- Inclusion of specific reference to CC issues in the fisheries sector in the National Climate Change Policy and Disaster Risk Management Policy, and reflected in the mechanisms charged with their oversight. - Increased emphasis on the fisheries sector in the provisions related to	Review of policy and planning instruments	Continued receptivity on the part of stakeholders, including policy makers, to receiving and responding to information inputs Continued commitment to collaboration between stakeholders (particularly GoM and research institutions)

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
			CC in the MGDS and NAPA. - Improved reflection of CC issues of relevance to fisheries in ASWAp implementation.	CC in the MGDS and NAPA. - Improved reflection of CC issues of relevance to fisheries in ASWAp implementation.		in information generation and management Existence of sufficient budgetary flexibility to allow provisions to be made for climate resilience
	<u>Outcome Indicator 2.1.2:</u> Degree of consideration of climate resilience in local commune plans and district level plans and budgets <i>Relates to AMAT indicator 1.1.1.1: Development frameworks (local/district level) that include specific budgets for adaptation actions</i>	No integration of fisheries-related) adaptation action in Mangochi district plan or local level development plans, or Area Development Plans of traditional authorities (TAs) or village clusters (VDCs)	A detailed strategy of how to integrate with ongoing local level development and Area Development Plans in place and commitments from relevant political leadership pledged	Climate resilience provided for explicitly, with corresponding budget allocation, in: - 1 District Development Plan - Area Development Plans of 3 TAs (Chimwala, Chowe, Mponda) - Village Development Plans of 45 VDCs	Review of plans and budget allocations	
	Outputs: 2.1.1. Think tank on climate change in the fisheries and aquaculture sector with an integrated vision and incorporating results of CC and fisheries monitoring systems 2.1.2. Policy review document 2.1.3. A policy influencing strategy for mainstreaming climate resilient fisheries and aquaculture, developed and implemented. 2.1.4 Policy guidance materials 2.1.5. Guidelines/Code of Conduct for responsible CC-resilient aquaculture developments in riparian areas in Malawi					
Outcome 2.2 Strengthened capacities of fisheries professionals and other relevant stakeholders to address climate resilience building in fisheries sector	<u>Outcome Indicator 2.2.1:</u> Number of members of targeted institutions applying increased knowledge and awareness in support of resilience measures (AMAT indicator 2.2.1.) Target institutions: - DoF HQ - District Fisheries Office in Mangochi - 4 DoF sub-stations - 5 other districts along Lake Malawi	No institution is fully aware of climate risks to the fisheries sector and none have the capacity to deal with these risks. <i>Baseline to be developed through Knowledge, Attitudes and Practice (KAP) survey at project start</i>	25% of members of all target institutions have increased KAP score <i>Target to be confirmed once KAP methodology and baseline are developed at project start.</i>	50% of members of all target institutions have increased KAP score - <i>Target to be confirmed once KAP methodology and baseline are developed at project start.</i>	KAP surveys	Availability of staff for capacity development activities Adequate baseline educational levels to allow effective participation in capacity development Existence of sufficient budgetary flexibility

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
	<ul style="list-style-type: none"> - 2 Aquaculture Research Stations - Fisheries college, Mangochi - 2 Fisheries Research Stations: Monkey Bay, Senga Bay) - 27 BVCs, 47 Villages, 3 Tas and Mangochi District 					to allow for increases in assignments to DoF
	<p>Outcome Indicator 2.2.2: Levels of recurrent budget assigned to and executed by district fisheries offices (cost centres 052 Mangochi, 053 Div South, 054 Fisheries North and 055 Regional Centre) in accordance with provisions of resource management and restoration plans</p>	<p>In 2013/14 FY:</p> <ul style="list-style-type: none"> - K56,502,845 (USD81,423) approved - K27,570,103 (USD39,730) disbursed - K25,097,695 (USD36,167) spent 	<ul style="list-style-type: none"> - 15% increase in approved amount (to USD93,636) - 20% increase in disbursed amount (to USD47,675) - 25% increase in spent amount (to USD45,208) 	<ul style="list-style-type: none"> - 30% increase in approved amount (to USD105,849) - 40% increase in disbursed amount (to USD55,621) - 50% increase in spent amount (to USD54,250) 	Budgetary records of DoF	Existence of institutional culture, systems and baseline capacities within DoF allowing capacities to be applied effectively and budgetary execution to be improved.
	<p>Outputs:</p> <p>2.2.1 Capacity development programme for staff of key institutions in relation to climate change preparedness and resilience building</p> <p>2.2.2 Improved physical capacities for DoF to sustain the resilience strategies</p>					
<p>Outcome 2.3 Strengthened awareness of climate change issues and responses of relevance to the fisheries sector and fishing communities</p>	<p>Outcome Indicator 2.3.1: Numbers of people in key fisheries value chain target groups aware of fisheries resilience issues</p>	<p>To be determined through baseline surveys</p>	<ul style="list-style-type: none"> - 25% of supermarket consumers purchasing fish from Lake Malombe - 30% of traders in fish from Lake Malombe - 40% of fishers on Lake Malombe 	<ul style="list-style-type: none"> - 50% of supermarket consumers purchasing fish from Lake Malombe - 60% of traders in fish from Lake Malombe - 75% of fishers on Lake Malombe 	Awareness surveys among supermarket consumers, traders and fishers in Lake Malombe	Receptivity of actors to messages regarding fisheries resilience
	<p>Outputs:</p> <p>2.3.1 National “Chambo” campaign, supporting behaviour change and motivation, rolled out</p>					
<p>Component 3: Strengthening capacities at local level to increase the resilience of fishing communities to climate change</p>						
<p>Outcome 3.1: Adaptive co-management and resource governance systems in support of climate-resilient capture fisheries</p>	<p>Outcome Indicator 3.1.1: Numbers and types of stakeholders considering that they are satisfactorily represented in co-management structures</p>	<p>To be determined through baseline surveys</p>	<p>50% of people (men and women) in all major stakeholder groups</p>	<p>80% of people (men and women) in all major stakeholder groups</p>	Reviews of attendance sheets and minutes in meetings, stakeholder surveys, focus groups	Social and political conditions remain stable and peaceful
	<p>Outcome Indicator 3.1.2: Percentage implementation of provisions and targets of</p>	N/A	<p>30% implementation of resource management plans</p>	<p>70% implementation of resource management plans</p>	Physical inspections of implementation, focus groups with stakeholders	Openness among stakeholders to collaboration in governance systems

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
	participatory resource management plan(s)					
	<u>Outcome Indicator 3.1.3:</u> Percentage of fishers complying with norms and regulations for resource co-management	N/A	40% of all categories of fishers	80% of all categories of fishers	Inspections/monitoring of gear and fishing practices	
	<u>Outcome Indicator 3.1.4:</u> Degree of satisfaction among different stakeholder groups with co-management and governance frameworks	To be determined through baseline surveys	40% in all stakeholder groups are satisfied	75% in all stakeholder groups are satisfied	Stakeholder surveys	
	<u>Output Indicator 3.1.5:</u> Area excluded from fishing	80ha in existing National Park (100m from land)	3,000ha additional no-take area	6,000ha additional no-take area	Reports of local governance structures	
	Outputs: 3.1.1: Multi-stakeholder co-management structures 3.1.2: Participatory resource management plan(s) 3.1.3: Norms and regulations for resource co-management 3.1.4: Enforcement mechanisms for resource co-management					
Outcome 3.2: Fish stocks and habitats restored through EAFA approaches	<u>Outcome Indicator 3.2.1:</u> Area of EAFA -based Chambo nursery habitat rehabilitated	0 ha	ha	10ha covered by seine prevention objects (SPOs) Planting of 40ha of aquatic vegetation	Project (GIS) mapping and monitoring exercises under outcome 3 Responsible: DoF – Research Unit Monkey Bay	Continued low levels of social conflict
	<u>Outcome Indicator 3.2.2:</u> Representation of higher value species (chambo) in populations	Approximately 2% is chambo	5%	9% of catch is chambo	DoF population monitoring programme under Activity 3.2.3.4	
	<u>Outcome Indicator 3.2.3:</u> Proportion of kasawala (immature chambo i.e. less than 15 cm) in monitoring catches (as an indicator of rebuilding the chambo stocks)	Approximately 2%	20%	50%	DoF population monitoring programme under Activity 3.2.3.4	
	Outputs: 3.2.1: A verified and updated restoration plan for Lake Malombe, including risk assessment 3.2.2: Restoration programme 3.2.3: Restocking programme for healthy native chambo					

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
Outcome 3.3: Aquaculture is climate-proofed and able to contribute to diverse and resilient livelihood strategies of the most vulnerable sectors of the population	<u>Outcome Indicator 3.3.1:</u> Numbers of aquaculture ponds with climate resilience measures in place (e.g. deepening, reduced seepage measures, location relative to water availability)	None	200 ponds with climate resilience measure	500 ponds with climate resilience measure	Pond inspections	Receptiveness of producers
	Outputs: 3.3.1: Aquaculture resilience plan developed, implemented and underpinned through on-going research and impact tracking programme 3.3.2: Action learning and knowledge generation programme 3.3.3: Capacity development programme for resilient aquaculture 3.3.4: Impact tracking programme					
Outcome 3.4: Local people have access to diverse, pro-poor farming systems as a central element of resilient rural livelihoods	<u>Outcome Indicator 3.4.1:</u> Numbers and total area of farms integrating aquaculture and efficient water management into diverse portfolio of CC resilience measures			1,500 households	Farm inspections	Receptiveness of producers
	Outputs: 3.4.1: Participatory extension programmes 3.4.2 Solar driers					

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Responses to GEF Secretariat Comments

Question	Comment	Response
6. Is (are) the baseline project(s) , including problem(s) that the baseline project(s) seek/s to address, sufficiently described and based on sound data and assumptions?	The re-submission clarifies how the baseline initiatives relate to the indicative co-financing figures and sources provided in Table C. Section A.1.2 of the PIF also elaborates on the baseline scenario as it relates to hydro-meteorological monitoring and early warning systems in the pilot areas. The PIF provides additional information on baseline investments in food security and rural development; as well as the potential for private sector engagement; and should further explore opportunities for enhanced coordination and additional co-financing by CEO Endorsement.	Additional opportunities for coordination and co-financing have been explored during the PPG phase and information on these is presented in Sections 3.1.2, 3.5.1 and 3.5.2 of the Project Document. Please note that the committed co-financing is now USD12,120,000, compared with the USD4,480,000 indicated in the PIF.
12. Is the project consistent and properly coordinated with other related initiatives in the country or in the region?	The Shire Natural Ecosystems Management Project has been identified among the projects and programs with which coordination and coherence will be sought. Coordination arrangements and complementarities with the initiatives listed in Section A.4 of the PIF should be specified by CEO Endorsement.	Coordination arrangements and complementarities with the initiatives identified in the PIF, and other identified during the PPG phase, are detailed in sections 3.1.2, 3.5.1 and 3.5.2 of the Project Document

Response to USA GEF Council Member Comment

Comment	Response
We encourage the FAO to facilitate coordination and information and knowledge exchange between the project and relevant USAID initiatives, including the forthcoming Fisheries Integration of Society and Habitats (FISH) program. USAID’s FISH program will have an integrated focus on climate change adaptation and biodiversity conservation. There is great potential for complementarity with FAO’s proposed program.	<p>The two projects will complement each other as follows (please see Box 3 of the Project Document):</p> <ul style="list-style-type: none"> - The FISH project is implemented through a non-Governmental consortium of partners under contract to USAID, whereas the LDCF will be directly executed by the Department of Fisheries of GoM (with support from FAO as GEF Implementing Agency); the latter will therefore have a stronger focus on developing institutional capacities within the government to sustain the proposed model of CC resilience. - As it is executed by Government, the LDCF project will have the potential to exercise direct policy influence in a way that FISH will not be able to; it will therefore function as a direct channel into policy of the lessons and messages generated by FISH. - The two projects will work at different levels in geographical terms: FISH will cover four lakes, whereas the LDCF project will focus only on Lake Malombe, allowing more detailed site-specific lessons to be generated that will feed into the FISH project.

Comment	Response
	<ul style="list-style-type: none"> - The LDCF project will address aquaculture, and its climate-proofing and integration into resilient livelihood support systems, whereas the main focus of FISH will be on capture fisheries. - The LDCF project will have a more specific focus on promoting the status and climate resilience of chambo fisheries in Lake Malombe, given the high value of this species and its corresponding particular potential, if fisheries are restored, to contribute to the livelihoods of vulnerable local communities; FISH will have a broader focus in terms of species. - The FISH project will invest strongly in the generation of technical information to guide fisheries management; while the LDCF project will support a limited number of highly applied studies of direct relevance to CCA, it will principally complement FISH by developing capacities in GoM and others for managing and applying the resulting information in adaptive management. The LDCF project will utilise the Knowledge Management System and digital repository created by FISH to source and disseminate information on CC resilience and other technical messages on fisheries and aquaculture. - The Fisheries Science and Technology Advisory Panel (FSTAP) established by FISH will advise on a wide range of fisheries science issues of interest; the 'think tank' proposed under the LDCF project will be a coordination and advisory platform where all fisheries and aquaculture climate change-related projects within the fisheries sector will share experiences, challenges and lessons. <p>It is foreseen that FISH will be invited to participate as an <i>ex officio</i> member of the Project Steering Committee, in addition to the regular interchanges that will occur at both central and local levels between the staff of the two projects.</p>

No comments were received from STAP.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS³

A. PROVIDE DETAILED FUNDING AMOUNT OF THE PPG ACTIVITIES FINANCING STATUS IN THE TABLE BELOW:

PPG GRANT APPROVED AT PIF:			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF/NPIF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Activity 1: Stakeholder Consultation	9,703.00	9,467.00	236.00
Activity 2: Elaborate component 1 "Mainstreaming climate change adaptation into fisheries sector policies and capacity building of key fisheries actors"(to underpin all components but mainly components 1 and 2)	27,406.00	48,384.00	-20,978.00
Activity 3: Identification of good practice for strengthening local level adaptive capacity and the early warning systems (to support component 2 and 3)	37,110.00	18,854.17	18,255.83
Activity 4: Elaborate Component 4: Monitoring and Evaluation and dissemination of best practices and lessons learned.	9,703.00	4,084.76	5,618.24
Activity 5: Preparation of full project document	36,078.00	39,153.07	-3,075.07
Total	120,000.00	119,943.00	57.00

³ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent funds, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for activities.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

NA

FAO/GEF PROJECT DOCUMENT ANNOTATED TEMPLATE

PROJECT TITLE:	BUILDING CLIMATE CHANGE RESILIENCE IN THE FISHERIES SECTOR IN MALAWI
FAO Project symbol:	GCP /MLW/053/LDF
GEF Project ID:	5328
Recipient Country(ies):	Malawi
Executing partners:	Department of Fisheries, Ministry of Agriculture, Irrigation and Water Development
Expected EOD (Starting Date):	January 2017
Expected NTE (End Date):	December 2021
Contribution to FAO's Strategic Framework:	<ul style="list-style-type: none"> • Strategic objective/Organizational Result: Strategic Objective S02: "Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner". Outcome 2.1: Producers and natural resource managers adopt practices that increase and improve agricultural sector production in a sustainable manner. • SO5: "Increase the resilience of livelihoods to threats and crises". Outcome 5.3: Countries apply prevention and impact mitigation measures that reduce risks for agriculture, food and nutrition • Regional Result/Priority Area: Priority 2: "Promote Sustainable Use and Management of Natural Resources" • CPF Priority 3: Support to policy and programmatic action on sustainable natural resources management and climate change in the context of national food security • CPF Outcome 3- Sustainable land and fisheries management strengthened at both policy and field levels in the context of efforts to improve national food security.
Contribution to Climate Change Adaptation Strategy Strategic Objectives:	<p>CCA-1: Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level</p> <p>CCA-2: Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level.</p>

Environmental and Social Risk Classification	Low
Financing Plan:	
LDCF allocation:	5,460,000 USD
Co-financing:	
DoF	1,500,000 USD
DCCMS	300,000 USD
FISH	5,500,000 USD
FAO (TCP)	470,000 USD
FAO (in kind)	100,000 USD
LUANAR	750,000 USD
MoAIWD	1,500,000 USD
UNDP	2,000,000 USD
Sub-total co-financing:	12,120,000 USD
Total budget:	17,580,000 USD

Executive Summary

In Malawi, the fisheries sector contributes approximately 4% to national GDP. The fisheries sector is of great importance to Malawi's economy as a source of employment, food, rural income, export, import substitution and biodiversity. The sector directly employs nearly 59,873 fishers and indirectly over 500,000 people who are involved in fish processing, fish marketing, boat building and engine repair. Furthermore, nearly 1.6 million people in lakeside communities derive their livelihood from the fishing industry (GoM, 2013). The Fisheries sector comprises two subsectors; (i) capture fisheries, which is dominant and to a lesser extent (ii) aquaculture.

Inland fisheries and ecosystems are vulnerable to climate change impacts. Numerous aspects of fish life cycles, habitat suitability, species-specific biological and ecological reactions to temperature changes can significantly impact the performance of this economic sector, and biodiversity. Climate change is modifying the distribution of fresh water species. In general warm and cold-water species are being displaced and they are experiencing changes in the size and productivity of their habitats. Temperature changes also affect fish physiological processes, resulting in both positive and negative effects on fisheries and aquaculture. Seasonality of particular biological processes such as reproduction, food webs, diseases and invasiveness of species are affected. Overexploited fisheries resources may not be able to cope with the additional impacts. What this means for the Lake Malawi ecosystem and the fisheries and aquaculture sector is currently not fully understood – and certainly not sufficiently integrated into national approaches and management in the fisheries sector. Climate change related impacts on local communities and the economy per se are not well understood and considered in decision-making and sector and development planning.

Therefore this project aims to build resilience in the beleaguered fisheries sector especially among the riparian communities of Lake Malombe. The waters of Lake Malombe, connected to Lake Malawi in the north by the Upper Shire River, are heavily overfished. Combined with overfishing are the added pressures of climate change on local communities, making this project a matter of urgency.

Several baseline investments are in place, focusing on fisheries sector investments by the Department of Fisheries and LUANAR, investments into national climate change responses through the Environmental Affairs Department, the Department on Climate Change and Meteorology, as well as the Ministry of Finance, Economic Planning and Development. An FAO funded TCP and the USAID funded FISH projects provide specific project co-financing.

The LDCF project invests in strategic and additional activities, building on the baseline and addressing the climate related threats to the fisheries sector. It is composed of three technical components. Component 1 seeks to strengthen access to information and knowledge regarding climate change and its implications, in order to ensure a sound technical basis for policy work and field level activities under the following components; Component 2 aims to create a favourable enabling environment of policies, plans, regulatory instruments and capacities for the promotion of climate change resilience among fishing communities; and Component 3 will focus on strengthening capacities at local level to increase the resilience of fishing communities to climate change, through a combination of community-based management and governance of capture fisheries in Lake Malombe, ecosystem restoration and management, climate-proofing of aquaculture and support to the integration of sustainable water and fish management into the livelihood and farming systems of the poor. Component 4 will focus on monitoring and evaluation and adaptive learning.

Expected outcomes include the following:

- 1.1: Enhanced access to and use of information on climate trends, extreme events and resource status, necessary for the formulation and implementation of effective and timely resilience and management measures for the fisheries sector
- 2.1: CC resilience mainstreamed into key policy and planning instruments of relevance to fisheries and fishing communities
- 2.2 Strengthened capacities of fisheries professionals and other relevant stakeholders to address climate resilience building in the fisheries sector
- 2.3 Strengthened awareness of climate change issues and responses of relevance to the fisheries sector and fishing communities
- 3.1: Adaptive co-management and resource governance systems in support of climate-resilient capture fisheries
- 3.2: Fish stocks and habitats restored through EAFA approaches,
- 3.3: Aquaculture is climate-proofed and able to contribute to diverse and resilient livelihood strategies of the most vulnerable sectors of the population
- 3.4: Local people have access to diverse, pro-poor farming systems as a central element of resilient rural livelihoods
- 4.1 Project implementation is based on results-based management and application of lessons learned and good practices in current and future interventions.

The overall resources required for this project amount to USD 17,580,000. Of this, USD 5,460,000 are requested from the LDCF, while USD 12,120,000 in co-financing have been committed.

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ACRONYMS

AAP	Africa Adaptation Programme
ACP	Africa, Caribbean and Pacific
AgrTT	Agriculture Technology Transfer
ASWAp	Agricultural Sector Wide Approach
BVC	Beach Village Committee
CADECOM	Catholic Development Commission in Malawi
CARLA	Climate Adaptation for Rural Livelihoods in Agriculture
CCNRE	Cabinet Committee on Natural Resources and Environment
CCP	Climate Change Programme
CRSP	Chambo Restoration Strategic Plan
DCCMS	Department of Climate Change and Meteorological Services
DoF	Department of Fisheries
DPP	National Planning Department, Office of the Prime Minister
EAFA	Ecosystem Approach to Fisheries and Aquaculture
EbA	Ecosystem-based Adaptation
EbM	Ecosystem-based Management
EPA	Economic Partnership Agreement
EWS	Early Warning System
FAO	Food and Agriculture Organization of the United Nations
FASC	Fisheries and Aquaculture Support Committee
FCMA	Fisheries Conservation and Management Act
FCR	Food Conversion Ratio
FISH	Fisheries Integration of Society and Habitats
FRU	Fisheries Research Unit
GBI	Green Belt Initiative
GEB	Global Environmental Benefits
GEF	Global Environment Facility
GIZ	Gesellschaft für Internationale Zusammenarbeit
GoM	Government of Malawi
HSSP	Health Sector Strategic Plan
IFFN	Innovation Fish Farmers Network
IUCN	International Union for Conservation of Nature
LDCF	Least Developed Countries Fund
LMNP	Lake Malawi National Park
MAFS	Ministry of Agriculture and Food Security
MDGS II	Malawi Growth and Development Strategy II
MLBP	Malawi Lake Basin Project
MoIAWD	Ministry of Irrigation, Agriculture and Water Development
Mt	Metric tonne
NAC	National Aquaculture Centre
NAPA	National Adaptation Programs of Action
NASP	National Aquaculture Strategic Plan
NGO	Non Governmental Organisation
PCANR	Parliamentary Committee on Agriculture and Natural Resources
PFM	Participatory Fisheries Management
SADC	Southern Africa Development Community
TA	Traditional Authority
UNFCCC	United Nations Framework Convention on Climate Change

VMS	Vessel Monitoring System
VRA	Vulnerability Assessment
WHO	World Health Organization
WMO	World Meteorological Organization

most densely populated and least developed countries with an HDI ranking of 174 out of 187 countries worldwide. There is a population density of 158 persons per km² (World Bank 2010 data). 20% of the population lives in urban areas with a 5.3% rate of urbanization.

4. Poverty in Malawi is widespread and severe - nearly 60% of Malawians lived below the poverty line in 2000. During the 1990s poverty levels remained largely unchanged, while urban poverty increased. With a Gini co-efficient of 0,62 Malawi has one of the highest income distribution disparities in the world. As a consequence of poverty, most social indicators are very low compared to the rest of Africa. Only one in three children completes five years of education and less than one percent attains a desirable level of literacy.

5. Life expectancy at birth in the 2010-2015 period is 55.2 years for women and 54.9 years for men (having fallen recently as a result of AIDS-related deaths), and the infant mortality rate is 86.1 per 1,000 births¹. Malnutrition is widespread with nearly 49 percent of children stunted. Overall, social indicators are worse in rural areas than urban areas. The female fertility rate is 6,7, which is very high. The maternal mortality rate in year 2000 was 1 120 deaths per 100,000 live births, a rise from 620 in 1990. In 1998, only 45 percent of the population that year had access to clean water.

6. A number of aspects of poverty are of particular significance for fishing communities in Malawi, including (as confirmed by PPG studies) those in the target area of Lake Malombe. These include the remoteness of their communities from public services and markets, poor coverage of social services, low levels of education and health (including high incidence of HIV/AIDS, limited livelihood options, youth unemployment, child labour (for example as fishing crew members), limited recognition of the roles played by women in the sector, and social conflicts (for example between small- and large-scale operators).

7. The economy of Malawi is predominantly agricultural, with about 80% of the population living in rural areas. Agricultural activity represents approximately one-third of GDP and 90% of export revenues. The most important export crop is tobacco, accounting for more than half of all exports. Other agricultural revenue streams include cotton, corn, maize, potatoes, cassava, sorghum, rice, pulses, tea, groundnuts, macadamia nuts, cattle and goats. Traditionally Malawi has been self-sufficient in its staple food, maize (corn), and during the 1980s it exported substantial quantities to its drought-stricken neighbours. Nearly 90% of the population engages in subsistence farming.

8. Of the 9.4 million hectares of land in Malawi, 32% is considered suitable for cultivation and in 1992, 49% of land was under cultivation, meaning that 17% of cultivated land was marginal or unsuitable land. This means that Malawi has possibly run out of arable land and the populations' increased requirements for food and cash are being met by expansion of agriculture into unsuitable land in many areas of the country, rather than by increasing productivity. Mean holding size has been decreasing over the years due to population growth. Each half-hectare must produce approximately 2 tonnes of maize to feed a family of five with the balance being sold for household upkeep. The present yield is 0.8 tonnes per hectare².

¹ <http://data.un.org/CountryProfile.aspx?crName=malawi>

² ADVERSE IMPACTS OF CLIMATE CHANGE AND DEVELOPMENT CHALLENGES: INTEGRATING ADAPTATION IN POLICY AND DEVELOPMENT IN MALAWI. JOHANNES CHIGWADA PROGRAMME MANAGER ZERO REGIONAL ENVIRONMENT ORGANISATION, HARARE, ZIMBABWE. <http://pubs.iied.org/pdfs/10013IIED.pdf>

9. Overall the fisheries sector contributes around 4% to GDP³. Despite the declining per capita access to fish, fish stocks of Malawi account for an estimated 28% of total animal protein consumed in Malawi (Jamu and Chimatiro, 2005), one of the highest dependencies on fish for animal protein in the Southern Africa. This is particularly true for poorer Malawians, for whom fish may be the only regularly available source of animal protein. The demand for fish in Malawi is very high, as a result all fish that is caught is consumed locally. Because fish is on high demand, it is easily traded in both rural and urban communities. Overall, Malawians today find it more difficult and more expensive to obtain fish than ever before (PIAD, 2006)⁴.

10. Malawi's climate is geographically extremely variable, locally influenced by topography and the greater Lake Malawi/Niassa ecosystems. A cool, dry winter season is evident from May to August with mean temperatures varying between 17 and 27 degrees Celsius, with temperatures falling between 4 and 10 degrees Celsius. In addition, frost may occur in isolated areas in June and July. A hot, dry season lasts from September to October with average temperatures varying between 25 and 37 degrees Celsius. With an average of 1600mm of rainfall annually, the coast of Lake Malawi receives the highest amounts of average rainfall in the country; in the rest of the country rainfall ranges between 750 and 1000mm annually. In Malawi rainfall varies considerably both seasonally and from year to year. Malawi has one of the most erratic rainfall patterns in Africa (GFDRR et al., 2009⁵), which influences flood and drought risks. The inter-annual variability of rainfall in Malawi is strongly influenced by Indian Ocean Sea Surface Temperatures, which are themselves very changeable due to variations in the patterns of planetary atmospheric and oceanic circulations. The most well documented cause of this variability is the El Nino Southern Oscillation (ENSO) whose amplitude and frequency has tended to increase since the mid-1970s (Junk, 2002)⁶.

1.1.2 The target area: Lake Malombe

11. Consultations and site visits during the PPG phase of this project have led to focusing project activities on Lake Malombe for the following reasons:

- Clear systems boundaries exist for a restocking and EbA rehabilitation approach;
- The funding amounts and available baseline/co-financing available through this GEF/FAO supported intervention can make a visible and lasting impact on the area;
- Lake Malombe can serve as a good demonstration and learning model for later upscaling and replication in other locations of the greater Lake Malawi area;
- Climate Change (CC) resilience building for communities is an urgent priority, which has been identified in the NAPA, EAFA and other subsequent planning documents of the Government of Malawi; and
- The USAID supported FISH project which will involve capacity building on fishery and climate change related issues in nearby areas of Lake Malawi provides a strong foundation with dedicated co-financing to this LDCF project; the more specific focus of this project on Lake Malombe reflects the more specific information that emerged

³ <http://acpfish2-eu.org/index.php?page=malawi>

⁴ Modelling And Forecasting Small Haplochromine Species (Kambuzi) Production In Malaŵi – A Stochastic Model Approach
Wales Singini, Emmanuel Kaunda, Victor Kasulo, Wilson Jere. INTERNATIONAL JOURNAL OF SCIENTIFIC & TECHNOLOGY RESEARCH VOLUME 1, ISSUE 9, OCTOBER 2012

⁵ Global Facility for Disaster Reduction and Recovery, the (GFDRR); International Food Policy Research Institute (IFPRI); RMSI Pvt Ltd. (RMSI); World Bank, the (WB). 2009. Economic vulnerability and disaster risk assessment in Malawi and Mozambique. Available: <http://preventionweb.net/go/15520> [Accessed 15 August 2015].

⁶ Junk, J.W. 2002. Long term environmental trends and future of tropical wetland. Journal of Environmental Conservation 29 (4):414-435. Foundation for Environmental Conservation

during the PPG phase on the plans and geographical focus of the FISH project, and how to ensure that the two projects complement each other (see also Box 3 in Section 1.2.7. for explanation of how the projects will be complement each other).

12. Lake Malombe (390 km²) has been identified as one of ten hotspot areas for fisheries management in Malawi by the Department of Fisheries (DoF). From initial consultations and based on prioritization by the DoF this area is vulnerable to climate change impacts and forms a useful “learning” laboratory for demonstration activities on the ground. This geographical area is directly affected by threats, ranging from overfishing to climate change, that the National Adaptation Programs of Action (NAPA) seeks to address.

13. Lake Malombe is a permanent floodplain lake in the course of the Shire River, and forms part of the Lake Malawi complex. It lies between latitude 14°21’ to 14°45’ south and longitudes 35°10’ to 35°20’ East, in the southern district of Mangochi. It is part of the Great Rift Valley system, and is the third largest lake in Malawi, 30km in length and 15km in width, with a total area of 420 km², an average depth of around 2-2.5m and a maximum depth of 7m. It lies in a broken depression running northwest from Lake Chilwa to Lake Malawi, parallel to the Shire Rift Valley.

14. Lake Malombe is fed by water from Lake Malawi via a 19km stretch of the Upper Shire River. As such it shares some of the unique characteristics of the larger lake’s aquatic ecology, including a high level of fish biodiversity, genetic plasticity and endemism. However, it differs in some important respects, in that Lake Malombe is shallow, turbid and nutrient-rich, with shelving vegetated shores without the many rock outcrops so characteristic of Lake Malawi (Hara, 1999). Fish diversity is lower in Lake Malombe but biomass and productivity are higher, due in part to the fact that it is further enriched by inflowing streams from highly populated catchment areas and by recycling of nutrients in sediments as a result of the shallowness of the lake (Njaya, 1998).

15. Except for areas of submerged vegetation and Typha swamps found around the in- and outflow of the Shire River, it is a fairly featureless open water body. Small-scale fishing only started in the 1960s after the destruction of a large crocodile population (Tarbit, 1972; Tweddle, Alimoso and Sodzabanja, 1994). Dense weed beds, reported on already in the 1940s, and lakeshore reeds were cleared in the 1970s and 1980s to facilitate seining. Currently few weed beds occur in the lake (Weyl pers. obs.). The lake is fully mixed, is fairly turbid with an average visibility of 2.4 m.

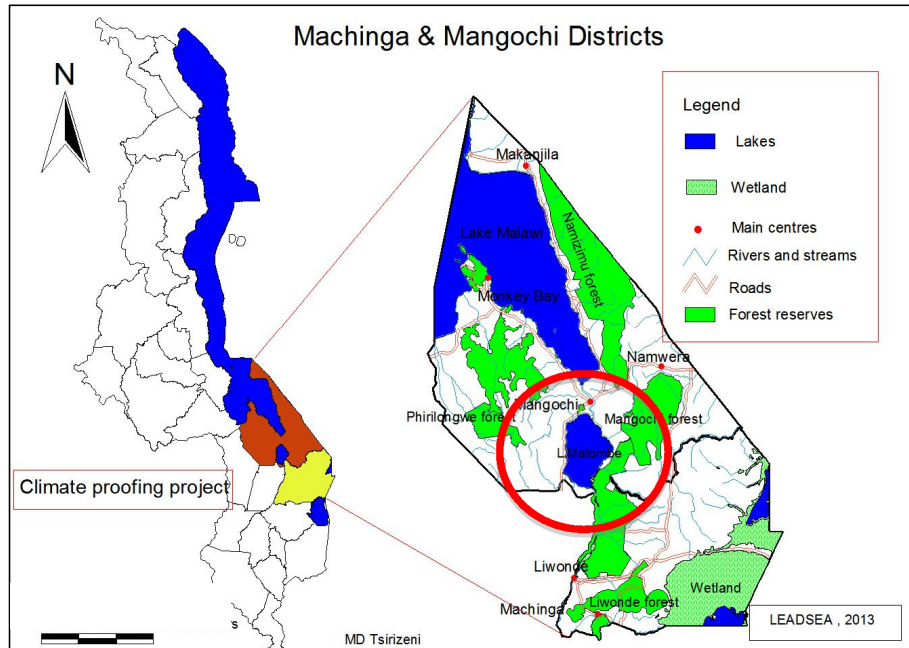
16. In common with other shallow but potentially very productive lakes in Central Africa, including Lakes Chilwa, Chiuta and Mweru Wa Ntipa, the water in Lake Malombe disappears completely from time to time. Between 1915 and 1924, for example, the lake dried up entirely⁷ and between 1917 and 1937 the water connection between Lake Malawi and Lake Malombe was cut off, and the lake dried up on several occasions during this period. Average annual water levels in the Upper Shire River near Mangochi decreased by almost 1.5m between 1980 and 1985, peaked in 1988 and continued to decline since then by almost 2.5m reaching its lowest level in 1997, with an overall drop in average water levels of 3.5 m over 17 years, or 21 cm per year. Seasonal fluctuations vary around 90 cm per year with highest levels in April-May and lowest in November-December. Between years seasonal levels may vary between 20 and 45 cm during draw down, and much more during water level rises: in

⁷ <http://www.fao.org/docrep/005/y4593e/y4593e06.htm>

November and December minimum and maximum recorded levels could differ by up to 1m presumably depending on the onset of rains⁸.

17. Lake Malombe is bordered by two districts, Mangochi and Machinga. While the area that belongs to Machinga district is largely a declared Protected Area, most of the villages and communities are situated within Mangochi district. The project will mostly work with the District governance structures in Mangochi and the communities around the lake. While some work will include Machinga District, the descriptions in this section focus on Mangochi.

Figure 2 Location of Lake Malombe as part of the greater Lake Malawi ecosystem, linked through the Upper Shire River



18. On the west bank side, the lake is bordered by the Mpiri Piri hills, which lie within 3-7km from the lake, while on the east side it is bordered by the Mangochi hills. On the Southeast banks is the Liwonde National Park. The fishing villages are thus confined within narrow strips of land along the lake on both sides making the population densities very high and the amount of farming land within the village areas very little. This is especially so on the west bank where the population density averages over 500/km² (Bell and Donda, 1993). On the west bank is the main road from Lake Malawi and Mangochi Township to the urban centres of Zomba, Blantyre and Lilongwe. The east bank is very difficult to access. This is especially so in the rainy season as the area then can be reached only through a dirt road that branches off from the Mangochi-Namwera road.

19. The distribution of the population around the lake is indicated by a census conducted by the Ministry of Agriculture in 1998 (Liwonde, 1998) (see paragraph 20 below for more recent population data for Mangochi District. The 1998 census showed that 8,396 "farm families" existed in the villages on the west bank while another 2,657 families were to be found on the east bank. Using five persons per household, which is the national average household size, the

⁸ Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003.

population in the fishing villages was at that time estimated at 42,000 people for the west bank and 13 300 for the east bank. The annual rate of population growth in Mangochi district was reported to have been 1.7% per year in the period 1987–1998 (Malawi Government, 1999:19)⁹.

20. **Mangochi District Profile:** Mangochi, on which the project will primarily focus, is one of 28 districts in Malawi and has roughly 958,000 inhabitants¹⁰ or 5.4% of Malawi's 17.9 million people¹¹. According to the 2008 National Population and Housing Census¹², the population growth rate of Mangochi district is at 3.15%, higher than the national growth rate of 2.8%. Approximately 37% of the population falls within the 20-55 year age group bracket and 60% of those are aged between 0-19. The district's population density is similar to the average population density in Malawi. Population density is highest in TA Chowe and lowest in STA Mangochi.

21. The district is composed of 12 Traditional Authorities (TAs), of which three are situated along Lake Malombe, namely TA Chimwala, TA Mponda and TA Chowe. It is noted that the Traditional Authority (TA) of Liwonde in Machinga District is responsible for the area bordering the Lake, as well as the area that is covered by the EPA Mbonechera.

22. The area surrounding Lake Malombe is densely settled by a population who are primarily of Yao tribe: most fishers (77.5%) belong to this tribe¹³, which originated from an area east of the Rovuma River in Mozambique, immigrated into the area in the 19th century and has dominated the local political structures in the area since the 1860s. The economic tradition of the Yao is one of trade, developed through their long contacts and relations with Arab traders on the East Coast of Africa. The contact with Arabs also greatly influenced the Yao to adopt Islam (Rangeley, 1970): approximately 70% of the population are Muslims (90% in Makanjira), 30% Christians (the exact opposite is true for Malawi as a whole). A few fishers of Chewa, Lomwe and Nyanja tribe are also found operating in the lake. The area falls into areas of two Traditional Authorities or Chiefs Mponda and Chowe¹⁴.

23. Most of the people in the area lack formal education. This might be because of poverty. The children too are involved in activities that would bring food for survival and therefore might not have time to go to school. Consequently, a large number of fisher-entrepreneurs (45%) lack formal education, but most of them have basic knowledge of reading, writing in vernacular language and calculation¹⁵.

24. The average number of children per family is 6. This is higher than the national average of 5 (National Statistical Office, 1999). Besides, a family is also expected to help other members of their extended families. Therefore it is not uncommon to have a household with over 10 members. Most of the fishers are married to more than one wife. This might be

⁹ The "Lords of Malombe:; An Analysis of Fishery development and Changes in Fishing Effort on Lake Malombe, Malawi. M. Hara and E. Jul-Larsen. In: Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003.

¹⁰ <http://countrymeters.info/en/Malawi>

¹¹ <https://www.cia.gov/library/publications/the-world-factbook/geos/mi.html>

¹² National Statistics Office, Projected Population Based on 2008 Malawi Population and Housing Census and Mangochi District Council.

¹³ Bell, 1998

¹⁴ Small Scale Fisheries of Malawi: An Outline of Lake Malombe Fisheries George MATIYA and Yoshikazu WAKABAYASHI. Mem. Fac. Agr., Ehime Univ., 50: 3-9 (2005)

¹⁵ Matiya, 1998

because of Islam, which allows polygamy, is the dominant religion in the area or because of poverty fishers are seen as better off and can marry to more than one wife.

25. Currently, according to the Health Sector Strategic Plan 2011 to 2016 (HSSP), Mangochi District ranks the fourth lowest in Malawi concerning access to health services. Furthermore, Mangochi is one of nine districts where access to health services decreased in the period 1999 to 2011. Populations living less than 8 km from health facility are considered to have acceptable access to health services. A total 27% of Mangochi's population lives more than 8 km from a health facility, up from 24% in 1999 (HSSP).

1.1.3 Characteristics of Lake Malawi

26. Given its ecological and productive linkages with Lake Malombe, the characteristics of Lake Malawi (Figure 1) are also of importance for the project. Lake Malawi lies between 9° 30'S and 14° 30'S in the western arm of the East African rift valley and is the southernmost of the African rift lakes. It is the third largest lake in Africa with an approximate length of 550 km, a total surface area of 28,000 km², a volume of 8,400 km³, mean width of 50-60 km, an average depth of 292 m and maximum recorded depth of 700m.

27. The lake has a catchment area that covers around 130,000 km² and includes much of Malawi, the north-western corner of Mozambique and the south-western corner of the Tanzania (Chafota *et al.* 2005). It was formed millions of years ago as a part of the development of the Great Rift Valley system of Africa and is called an 'ancient' lake: it has more endemic fish species than any other lake in the world (at least 650-700 species of cichlid fishes and over 1,000 fish species in total), and high biological significance (Chafota *et al.* 2005; Patterson and Kachinjika 1995; Turner *et al.* 2001).

28. Below 250m the lake is homothermal at about 22.5°C and is anoxic. Above this level, there is a seasonal cycle with the development of a marked thermocline. By May the upper 60 m is homothermal at about 27°C. During the dry, windy cool season the epilimnion cools but only in exceptional years approaches a homothermal condition. Complete mixing has never been observed. In the shallower southeast arm the surface temperature may fall to 21.0°C as the result of inshore chilling; this cool water flows northward as a profile-bound density current and appears to maintain the stability of the stratification (Chafota *et al.* 2005; Chidammodzi 2013).

29. The lake is of significant importance to Malawi's economy mainly in terms of its fisheries productivity and to some extent as a destination for tourists. Notable facts about the fisheries are that the lake is the source of 60% of the total animal protein supply in the country with over 70% of Malawi's population depending on Lake Malawi and its catchment for their daily survival needs and livelihoods (Chafota *et al.* 2005). The Lake Malawi-Shire River water system is a strategic water resource for hydro-electric power generation, irrigated agriculture, navigation and fisheries for Malawi (Chidammodzi 2013).

30. Between 1996 and 2012, lake levels recorded in the southern Lake Malawi at Monkey bay ranged from 643.9m to 646.5m¹⁶. The highest water levels of over 646.m were recorded in 2002 and 2009/10. The lake registered lowest level of less than 643.9m in 1997 and this was just after a prolonged drought from 1994 to 1996, which also caused a recession on Lake Chilwa¹⁷.

¹⁶ Ngochera (2013)

¹⁷ Njaya *et al.* 1996; 2009

31. The southern part of Lake Malawi is composed of South West Arm (SWA) and South East Arm) both being the most productive fishing areas mainly for Chambo (*Oreochromis* spp. and other cichlids. The area lies between longitude 34°5' to 35°5' latitude 13°5' to 14°5' S and comprises more than 10% of the total surface area of the lake (28,800 km²) (Kanyerere 2010). The SEA is 80 km long, 30 km wide and has a maximum depth of 20m and its surface area is 302 km². Because of its shallowness, the SEA is the most productive part of Lake Malawi and accounts for 60% of the annual fish landings on the lake. The SEA falls within two sub-drainage basins that include the Southwest Lakeshore and Lisangadzi River Basins. The Lisangadzi River sub-basin is part of the Southern Lakeshore River Basins in the western part of the SEA covering an area of 1,259 km². It consists of the Lisangadzi River system only.

32. The South East Lakeshore River sub-basin is located in the eastern part of the SEA and forms part of the Eastern Lakeshore River Basin, which extends to Mozambique. The river sub-basin in Malawi occupies 1,540 km² and contains main rivers that include Lusalumwe, Lungwena, Lugola and Lilole. Three major geomorphological units are recognized in surrounding areas of the SEA, the plateau, escarpments and lakeshore. The North-west Namizimu Escarpment plateau zones that start south of Makanjila form a narrow strip of land, which runs parallel to the eastern shore of Lake Malawi¹⁸.

33. The South West Arm (SWA) is the second major fishing ground for fishers in the southern Lake Malawi. It is approximately 50 km long, 30 km wide and a maximum depth of 140 m. It is covered by reeds and has extensive marshes and small lagoons located along the shoreline, particularly the south coast. Bwanje River flows into the lake at the south-most tip of the SWA. The northeast coast is characterised by rocks and steep slopes of the Nankumba Peninsula and the northwest coast has extensive sandy beaches with few minor rocky outcrops. Linthipe is the largest river in the area that flows into the lake just opposite the Maleri Islands. There are major islands including Thumbi West, Maleri Islands and several reefs and small inshore islets¹⁹.

1.1.4 Capture fisheries in Malawi

34. The fisheries sector is of great importance to Malawi's economy as a source of employment, food, rural income, export, import substitution and biodiversity. Lake Malawi and Lake Chilwa provide most of the fish for the region and a significant quota goes to bordering nations. For many Malawians, fish is the most important source of protein. Dried fish is not only consumed locally, but also exported to neighbouring countries. Most fishing is done on a small scale by hand, and a few commercial fishing boats operate on Lake Malawi. The sector directly employs nearly 59,873 fishers and indirectly over 500,000 people who are involved in fish processing, fish marketing, boat building and engine repair. Furthermore, nearly 1.6 million people in lakeside communities derive their livelihood from the fishing industry (GoM, 2013).

35. The main fishing areas in the country include Lake Malawi with a surface area of 29,000km², Lake Chilwa (2,000km² depending on the season), Lake Malombe (390km²), Lake Chiuta (about 200km²), and the Lower Shire River system.

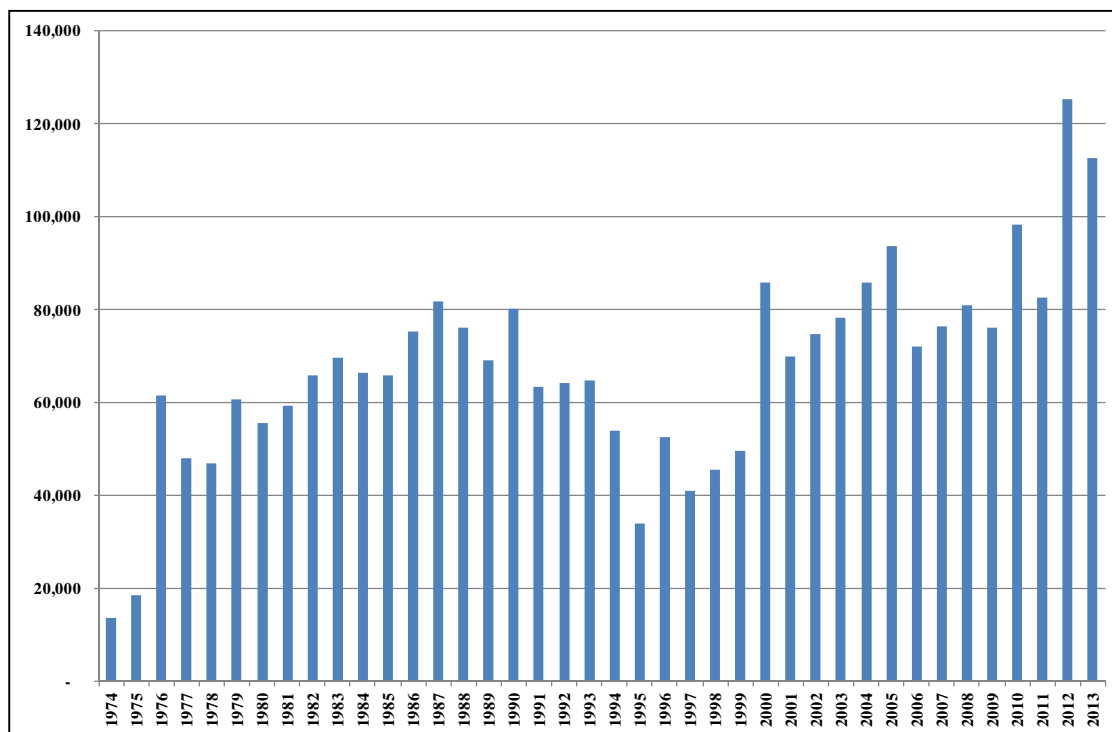
36. Fish production in the country varies annually. The catch and effort data collection system established and introduced into Malawi by Food and Agriculture Organisation (FAO) shows

¹⁸ Chafota *et al.* (2005)

¹⁹ Kanyerere 2010)

that production of less than 15,000 tonnes was recorded between 1964 and 1974. The catches increased to around 80,000 tonnes in the 1980s and then declined to less than 40,000 tonnes in the mid-1990s. However, dominance of *usipa* catches (estimated to account for over 60%) has been observed from 2000 to 2013. Fish catches in 2013 was estimated at around 110,000 tonnes (Figure 3) of which 90% was landed by the small-scale fishers.

Figure 3 National fish landings from 1974 to 2013



37. On Lake Malombe (the target area of the project), more than 4,000 fishermen are dependent on fisheries, and 409,000 people living in 48 villages near the lake shore depend directly on food from the lake²⁰. In Mangochi district there are 2,143 fishermen with 15,262 crew members owning 11,901 sets of fishing gear²¹. Data from 1999, however, suggested that only 2% of the families on the west bank and less 1% of those on the east bank were owners of fishing units: on the west bank, fishers represented no more than approximately 4% of the total population while they constituted less than 2% on the east bank, suggesting that most people living around the lake fisheries was, at least at that time, neither the only nor the most important economic activity²².

38. Currently, the main fish landings from the lake are estimated to be between 5,000 and 5,500 tonnes annually (10-15% of national harvest), this is down drastically from 12,500 tonnes annually in the 1980s.

²⁰ A total population of 377,600 in 2012 with an increase of 2.7% per year

²¹ For extra detail please refer to Appendix 1 showing the 2013/2014 Annual Frame Survey Data for Mangochi.

²² The "Lords of Malombe"; An Analysis of Fishery development and Changes in Fishing Effort on Lake Malombe, Malawi. M. Hara and E. Jul-Larsen. In: Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003.

39. The species composition of the total catches in Lake Malombe is dominated by three species of tilapiine cichlid (*Oreochromis* spp.), locally known as *chambo*. All are mouth brooders, maturing at about 30 cm. Other species appearing in commercial catches are mainly catfish like *Clarias gariepinus*, *Bagrus meridionalis* (locally called *kampango*) and certain cyprinids like *Engraulicypris sardella* (locally known as *usipa*)²³.

40. The fish stocks in Lake Malawi are highly diverse with species number ranging from 500 to 1,000, of which only a few dominate the catches. While fish species such as *usipa*, *utaka*, *kampango*, *ncheni*, *mbaba* and *kambuzi* are widely caught in Lake Malawi, only *kambuzi*, *chambo*, *usipa* and *makumba* are common in Lake Malombe and Upper Shire. Lakes Chilwa and Chiuta are major sources for *matemba*, *mlamba*, *makumba* and *chambo*, and in Lower Shire fishers exploit *mphende* and *mlamba*. Three indigenous species of *chambo*, the preferred table fish from the greater Lake Malawi area, are: *O. lidole* (endemic to Malawi and on IUCN red listing of endangered species), *O. squamipinnis* and *O. karongae*. Some researchers also include *makumba* (*O. shiranus shiranus*) in the *chambo* group.

41. Lake Malawi supports a highly diverse capture fishery that can be grouped into large-scale commercial, small-scale commercial and subsistence, and are characterised by various fishing methods ranging from stern to hook and line fishing. The number of fishing vessels on Lake Malawi is estimated at 15,961 fishing vessels.

42. The sub-sector is largely artisanal in nature: the small-scale sector produces 90% of the annual fish production. The small-scale fishery in Lake Malawi is characterised by low levels of capital, low technologies and high labour input. The artisanal fishing sector (see Box 1) comprises small-scale ventures that support village economies: the fishing gear used includes gill nets (*ngongongo*), lift nets (*chilimira*), seine nets (*nkacha* and *kandwindwi*), fish traps, handlines and longlines, and the fishing vessels range from planked boats with or without engines (of up to 25hp) to dugout canoes²⁴. The *nkacha* fishery takes 85% of landings (between 2,500-4,500 tonnes annually since 1989) and targets the *kambuzi* species (various *Lethrinops* species). Previously *nkacha* nets were illegal, but more recently they have been allowed only on Lake Malombe; by the time the restocking activities foreseen under the project start, it is expected that they will be completely banned.

Box 1. Current and past fishing gear used on Lakes Malawi and Malombe²⁵

Gillnets are used as stationary nets and as open water seines; they are on average 750 m long with varying mesh sizes. *Nkacha* nets are open water purse seines operated from two planked boats by seven crewmembers using it in day and night shifts. The nets are around 150 m long with a mesh size of 14 mm. Before the collapse of the *Oreochromis* fishery on Lake Malombe, two other gear types were important as well, both beach seines: large *chambo* seines with a headline length ranging from 50 m up to 1 800 m (mean around 800 m) and a depth of 5–20 m required the labour of 10 to 30 people to operate, and *Kambuzi* seines, which were nets around 200 m in

²³ Bio-Economics of Common Resource Overexploitation: Case of Lake Malombe *Chambo* (*Oreochromis* spp. Cichlidae) Fishery in Malawi. Francis Maguza-Tembo, Aquaculture and Fisheries Science Dept. Bunda College of Agriculture, P.O. Box 219, Lilongwe. <http://www.eldis.org/go/home&id=56727&type=Document#.VqaZJSqLTIU>

²⁴ Weyl, O.L.F., T.E. Nyasulu and B. Rusuwa, 2005. Assessment of catch, effort and species changes in the pair-trawl fishery of southern Lake Malawi, Malawi, Africa. Fisheries Management and Ecology, 2005, 12, 395–402.

Weyl, O.L.F., A.J. Booth, K.R. Mwakiyongo, D.S. Mandere, 2005. Management recommendations for *Copadichromis chrysonotus* (Pisces: Cichlidae) in Lake Malombe, Malawi, based on per-recruit analysis. Fisheries Research 71 (2005) 165–173.

²⁵ Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003.

length (range 50–700 m), with a depth of 2–12 m, a mesh size of 15 mm and requiring 6 to 20 people to operate. These expensive large seines were sometimes operated in pairs or in combination with a larger *chambo* seine, where the second net was pulled around the first to catch fish escaping from it, a fishing method called Chalira. The large *chambo* seines disappeared shortly after the collapse of the *Oreochromis* fishery, while most small-meshed *kambuzi* seines presently have been converted into purse seines.

43. Large-scale mechanised commercial fishery is confined to the southern part of Lake Malawi, and is largely carried out by medium stern and pair trawlers. This sector contributes about 8% of the capture fishery landings.

1.1.5 Aquaculture

44. There are three main aquaculture systems in Malawi: pond-based, cage farming and recirculation system. The aquaculture sub-sector has potential for substantial increase in fish supply. Enhanced aquaculture production especially at commercial level would improve fish protein intake and has potential to contribute to generation of wealth and employment in the country through fish exports. Many parts of the country have seen the initiation of small-scale village aquaculture for nutrition and small-scale commercial aquaculture operations, as well as the development of cage culture in Lake Malawi.

45. The Presidential Initiative on Aquaculture Development (PIAD), which was officially launched in 2006, brought in a new dimension to commercialise aquaculture for increased economic gains for both the farmers and the country as a whole through increased supply of farmed fish. Under the programme, there has been promotion of constructing large ponds of over 400m² in surface area and establishment of two fish farming schemes in Mchinji and Chikhwawa. The private sector participation has also been promoted to produce fish to supplement fish caught from lakes to meet the growing domestic demand.

46. The annual fish harvest from aquaculture, which is mainly composed of tilapia (Chambo and Makumba) and catfish (Mlamba) has been increasing mainly from less than 700 tonnes in 2006 to 3,600 tonnes by 2013. Cage culture of *O. shiranus* is relatively a new fish farming technology in the country, as it was introduced in the country around 2004. While pond-based culture is widely adopted, cage farming has been practised at commercial level to produce tilapia from cages for domestic market. A recent study conducted in 2010 shows that that Lake Malawi has vast area suitable for cage farming.

47. In the vicinity of Lake Malombe, both small-scale and large-scale fish farming are practised. A total of 390 fish farmers, owning 596 fishponds covering an area of 124,783m² (12.48 ha) perform small-scale fish farming in Mangochi district. Only one large-scale commercial aquaculture operator is situated in the district, the Malawi Development Company (Maldeco), producing its own fingerlings and feed. Maldeco has a production target of 3,000 tonnes per annum of *O. shiranus* but is currently producing 750 tonnes of fish from 48 salmon-type cages in the South-East arm of Lake Malawi as well as from fishponds. Maldeco indicated that they would not continue cage culture as theft is a major problem: they find that their investment into pond aquaculture is more profitable and the fish can be better protected against theft. Recent modifications to tenure legislation in fact provide greater rights to fish farmers, enabling them to combat theft more effectively.

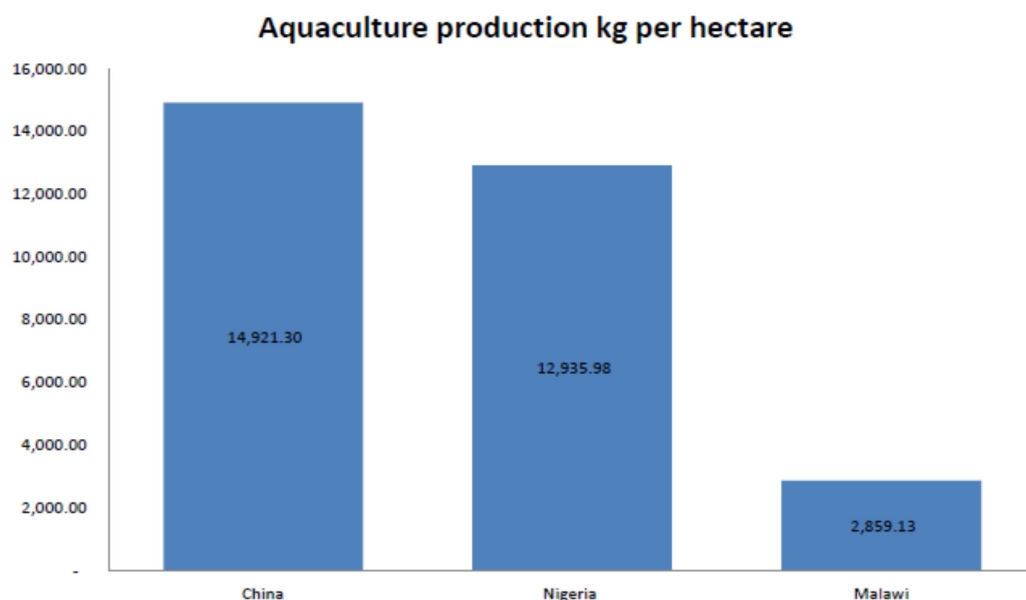
48. There have been fish farming projects around Lake Malombe in the past. For example, in Chapola village, women were engaged in the Malawi Lake Basin Project (MLBP) in 2007, which

helped them to construct an aquaculture pond to reduce pressure on fisheries. The MLBP trained the women in fish farming however the farming did not succeed for various reasons; it became difficult to organize the farmers, there was no access to fingerlings to stock the ponds, site selection was poor, and the farmers lacked access to suitable technologies. In Chapola there is a willingness to start fish farming to supplement income from the lake. The inhabitants have land which can retain water throughout the year, but difficulties include poor extension services and the limited value chain.

49. Theft was reported to be a major problem to both cage culture on Lake Malawi and aquaculture production on land in the Mangochi area. Maldeco had to invest in major security interventions and local women traders reported that they or a family member had to sleep at their stalls to protect their goods from thieves. This was seen as a major societal issue, which poses additional economic challenges in terms of the fisheries and aquaculture value chains.

50. Aquaculture in Malawi lags significantly behind that in other African countries and especially behind Asian countries, in terms of productivity and profitability (see Figure 4). Recent advances with technical aspects such as feed quality, however, have resulted in significant improvements, with productivity reaching up to around 6,000kg/ha compared to the 2012 figure of around 2,800kg/ha shown in Figure 4.

Figure 4 Comparison of productivity of aquaculture in China, Nigeria and Malawi, 2012²⁶



1.1.6 Processing and value chains

51. **Fish Processing, preservation on ice and fresh sales:** Fresh fish is either sold directly for consumption or kept on ice. Mangochi district registers two ice plants, which produce ice for local traders and fishermen and are used in fish preservation. The commercial ice plant outlet in Mangochi town serves almost the entire district and has a daily capacity to produce 200 blocks of 40 litres, and sells about 15 blocks of ice a day.

²⁶ Aquaculture in Africa – Unlocking the Potential. AU-IBAR Aquaculture Think Tank Meeting Cairo, 7th February, 2016. John Linton, Natural Resources Institute, University of Greenwich (DFID/Africa, Britain , China (ABC) Cooperation Programme)

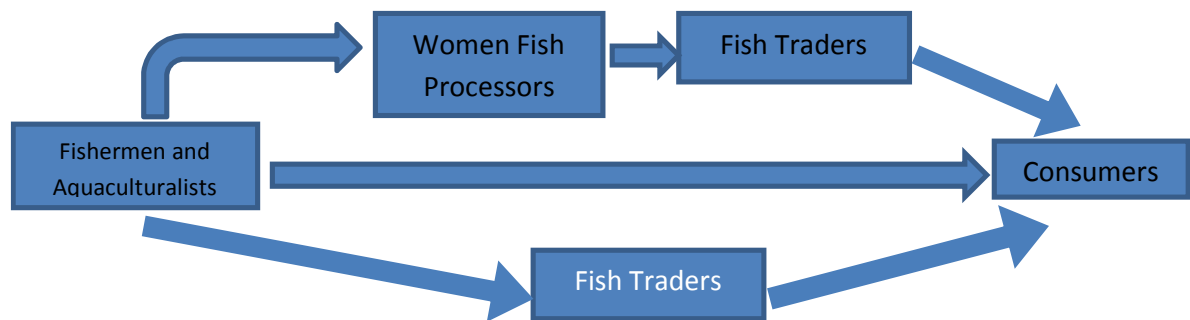
52. **Fish Processing- Drying and Smoking:** a number of technologies are being applied by fish processors and fish traders. Fish are processed either in a dried, smoked or fried stage. Fish is a fast and highly perishable commodity. From a pricing perspective, fresh fish fetches higher returns per unit fresh weight compared to processed fish.

53. The use of kilns for smoking fish is common, and the high consumption of wood poses a considerable threat to environmental sustainability, affecting the vegetation around the lake and contributing to problems of soil erosion and the siltation of fish nursery areas (see section 1.2.1). Kilns also generate health problems in the form of respiratory illnesses due to smoke exposure. Additionally, the increasing prices for firewood affect fish prices and profit margins for fish processors and traders. The DoF’s research team at Monkey Bay is investigating experimental low cost solar fish dryers, a technology still under research in Malawi and successful elsewhere.

54. **Fish preservation.** The Department of Fisheries in Malawi reports that up to 40% of the fish caught from Lake Malawi is lost. This means that there is a problem with the current methods of trying to preserve fish. The current method of drying fish has been identified as one of the sources of the problem. Presently, fish is dried on open space and this takes long, exposes the fish to dust, insects, and bacteria²⁷. Fisheries Research Unit (FRU) has undertaken experiments to dry fish in greenhouse like structures where the temperature increases rapidly, by which fish are dried and protected from vermin.

55. **Further down the value chain: Fish processing and marketing in Mangochi area:** The Diagram below represents the basic fisheries value chain for the Mangochi area and forms the foundation for analysing primary and secondary stakeholders for this project, as well as project strategies. It is noted that the initial scoping and vulnerability study conducted during the PPG phase for this project had a broader outlook and did not specifically focus on Lake Malombe only. A detailed value chain for fisheries and aquaculture for Lake Malombe specifically will be developed during the project implementation.

Figure 5 Fish value chain in the study area



56. The fisheries value chain for Mangochi indicates that aside from fishermen and aquaculturalists (fish farmers), fish processors and fish traders are key links before fish reaches the end user. The end users or consumers are also diversified, with some consumers located on site (locally, often for household consumption) and others further away, including

²⁷ <https://fishdryermalawi.wordpress.com/solar-tent-dryers-to-improve-fish-processing-on-lake-malawi/>

significant commercial users. A suite of other fisheries related professions exist such as net makers, gear repairmen and mechanical engineers, amongst others.

57. **Pricing and marketing:** the fish are sold directly by the fishermen to processors and traders, both to residents and people coming from larger towns, including from across the border with Mozambique. The more lucrative markets in the larger towns are looking for larger fresh table fish, especially chambo, while the locally available fish is composed of other species. The western side of Lake Malombe benefits from good access roads, and structured market facilities to which fishermen have access: a road network connects most of the important beach landing sites along the lake to the main road. Prices vary widely in the various markets along the Lake: local traders mentioned that pricing and marketing remain a challenge, due in part to limited access to information on prices and market trends.

1.1.7 Socioeconomic differentiation of fishers in the project area

58. The fishermen in the Mangochi area can be divided into the following groups: fishery entrepreneurs, who own fishing equipment and are regarded as the decision makers in the fishery; the much larger group of crew members, who are employed to operate or to assist in the operation of the fishing units; and small-scale gillnet fishers using rudimentary equipment. The entrepreneurs represent the elite of the social profile in the area: only a couple of hundred individuals, out of a total population of more than 50 000, find the means to invest in a fishing unit.

59. The emergence of “big time” capitalist fishermen who employed labour on a regular basis and invested in imported nets and boats, first in the southeast arm of Lake Malawi but also in Lake Malombe, dates from the 1950s: under this commercial orientation, group ownership of equipment was abandoned and instead nets and boats became private property of owners most of whom left the day-to-day control of the fishing to a son while they supervised the drying and selling of fish on shore. These entrepreneurs represent the elite of the social profile in the area: only a couple of hundred individuals, out of a total population of more than 50 000, find the means to invest in a fishing unit. In contrast to the situation in Lake Malawi, those who invested in fishing gear in Lake Malombe were primarily labour migrants originally from Mangochi District itself, even if some local businessmen and retired civil servants also emerged among them.²⁸.

60. The collapse of the fisheries in the 1990s affected this situation, resulting in a reduction in levels of investment and effort under the control of these fishery entrepreneurs. Growth in their investment in fishing gear was also constrained by declines in opportunities for generating capital, for example through labour migration; this has also resulted in general social changes in the Upper Shire area. Throughout the 1990s, all the sources for accumulation of external funds became more difficult to access: legal labour migration to destinations outside Malawi was no longer an option, even though various types of “informal” and very risky travels to the neighbouring countries were reported to continue to help potential newcomers. It also proved difficult for gear owners to ensure the continued flow of externally

²⁸ The “Lords of Malombe:; An Analysis of Fishery development and Changes in Fishing Effort on Lake Malombe, Malawi. M. Hara and E. Jul-Larsen. In: Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003.

generated wealth that is necessary to maintain their savings and investments, due to unclear rules and norms regulating the life of extended families and social security networks²⁹.

61. The status of gear owners has also been undermined by changes their power relations with their crews: despite their seeming economic power, their ability to control the crews is often restricted. In some cases, crews are able to mobilize general support among the population preventing the owner's possibilities to employ new crews, or they organize and manipulate boycotts of specific owners who they claim are engaging in practices thought to be inconsistent with agreed norms and practices. Increased power among the crews – mainly used to struggle against the owners – seem to have effectively prevented recruitment of new groups of owners³⁰.

62. There are two major trends that were reported during the project preparation. Firstly, it was reported that both fisherman-entrepreneurs (and some crew) would come from communities further afield and no longer mainly from the local villages, and secondly a high level of child labour, partially linked to drug use and trade, was reported. Whether these records are representative for the Lake Malombe system needs to be verified, however, these trends would be in line with similar observations from elsewhere in the fisheries and aquaculture sectors^{31, 32}.

1.1.8 Fisheries governance:

63. Fisheries in Lake Malombe are in theory an open-access common property resource. Before a person becomes a fisher he/she must get permission from local leaders; however, nobody has ever been denied access to the fishery. There is no control system that would reserve specified lake areas for certain fishing villages: any fisher is entitled to fish everywhere in the Lake, and as a result half of the fishers move between beaches in search for better fish catches³³. Any fisher must register and pay an annual license fee for his fishing net. Usually this is after been granted permission to operate on a particular beach by a local leader in the area. The license fees are paid at the nearest Fisheries Office. The licensing fee varies according to the type of net used (Table 1). The license describes the gear to be used and the beach that the fisher would land. It should be noted that the license fee is paid for the net used and not the boat. This is because normally some fishers share boats. It must be said that the license fees have not controlled the number of fishers, as the amounts paid are very low.

64. In practice, the increasing dominance of fishing-entrepreneurs in Lake Malombe meant that by the end of the 1970s the fishery had to a large extent lost its role as a "commons", and came to be controlled by these actors who had the financial capacity to invest in equipment, at the expense of those who were unable to follow suit in the race for new and more effective fishing gear. The new and extended fishing units required an extensive use of labour, but the people recruited to work as crews were often different from those who had just lost their access rights due to lack of investment capability³⁴.

65. In accordance with the National Fisheries and Aquaculture Policy of 2001 (see section 1.1.11), power has been given to local communities to jointly manage fisheries resources with

²⁹ Idem.

³⁰ Idem.

³¹ Report on FAO workshop on Child labour and Fisheries: <http://www.fao.org/docrep/013/i1813e/i1813e00.pdf>

³² Child Labour in the Fishing Industry in Uganda: <http://www.dol.gov/ilab/reports/pdf/2011CLFishingUganda.pdf>

³³ Matiya and Wakabayishi, op. cit.

³⁴ Hara and Jul-Larsen, cp. cit.

government. In this case the government and the local communities have powers to make regulations regarding management of fisheries in a specific water body. So far, over 300 Beach Village Committees (BVCs) have been formed in the country: these are structures for the representation of fishing communities in the management of fisheries resources within their respective jurisdictions local level, and are formed on all major beaches. The geographical area as well as number of fishers per group depends on the number of fishers at a beach and distance between beaches. The main role of BVC is to organize fishers and making sure rules and regulations are complied with as well as controlling the number of gears on a beach.

66. Traditional leaders have also championed fish resource management in various areas, for example on Mbenji Island located in central Lake Malawi, Salima where Chief Makanjila regulates entry into the Mbenji fishery on an annual basis and the closed season for the fishing area is from December to April longer than the fishing regulation enforced by the Department of Fisheries, which is from November to December.

67. In Lake Malombe, a co-management programme was introduced in 1993 in response to the lack of success of a Government controlled system³⁵. The initial objectives for the introduction of this co-management approach were to promote recovery of the fisheries of Lake Malombe and Upper Shire to a level that could sustain an annual catch of 10,000 tons, by articulating the views of the fishing communities in fisheries management. To this end a total of 31 BVCs, composed of both gear owners and non-fishers, were formed around Lake Malombe and Upper Shire River. This Participatory Fisheries Management (PFM) programme involved a large number of external collaborators, including numerous international agencies (GTZ and the ODA, amongst others), and many internal, governmental collaborators (including various ministries, the commercial Bank of Malawi, the Malawi Rural Finance Company, the Malawi Broadcasting Corporation and others) until 1999, when most of them had been phased out leaving only the GTZ to support the programme.

68. The PFM programme at Lake Malombe was successful in achieving community participation in formulating new fisheries regulations as follows:

- A minimum mesh size of $\frac{3}{4}$ inch for Nkacha and Kambuzi seines. Adoption rate for $\frac{3}{4}$ inch increased from 17% in 1994 to 60% in 1995 and to 85% in 1996.
- A minimum mesh size of 3 inches for Chambo seines and gill nets.
- A maximum head line length of 250 m for Nkacha, 500 m for Kambuzi and 1, 000 m for chambo nets.
- Adoption of a three-month closed season.

69. The proposed gear regulations were published as amendments to the Fisheries Act in the Malawi Gazette Supplement on 28 June 1996.

70. Despite these investments, evaluation studies and assessments have indicated numerous shortfalls in the PFM programme, including conflicts between the local leaders and the BVCs, limited sanctions imposed by the BVCs on illegal fishers, failure by the Fisheries Department to meet its expected obligations such as revenue sharing and corruption tendencies among the BVCs and local leaders. In some cases, the need for PFM was perceived from outside, and BVCs were thus perceived as institutions of the state³⁶ working on behalf of the state, with the result that their members expected payment by the Fisheries Department. The BVCs have

³⁵ Lessons Leant from the Implementation of Participatory Fisheries Management in Malawi: Prepared by: Emmanuel K. W. Kaunda in consultation with the Malawi Fisheries Department September 2003

³⁶ Kaunda et. al. 2003

also been subject to abuse and manipulation or control by local elites, who have extracted money from fishermen regardless or not whether they are violating regulations, or have enabled those with connections to the BVC and Fisheries Department to evade punishment for infractions.

1.1.9 Other livelihood support options

71. To diversify risk most fishers they also invest outside their fishing businesses, but in 2003 fishing was found to be the main cash income source for 80% of them. Almost all fisher-entrepreneurs (86%) reported owning agricultural land with the main crops being maize and rice, which are grown along the lake's marshy shores during the dry season. Almost all fishers own livestock, mainly poultry and goats.

1.1.10 Institutional Framework

72. **The Department of Fisheries under the Ministry of Agriculture, Irrigation and Water Development (MAIWD)** is mandated, under the Fisheries Act (cap 66.05) 1949, revised in 1965, 1973 and 1997³⁷ to ensure that the exploitation of Malawi's fish stocks does not lead to resource depletion or extinction but to sustainable utilization of the fish resource for the benefit of the present and future generations. Therefore, under the above Act, the Mandate of the Department of Fisheries is "to protect and conserve the national fish heritage of Malawi through appropriate control mechanisms." The mission of DoF is "to promote sustainable fisheries production and development by the fishermen by providing conducive framework conditions and excellent services in order to achieve food and nutrition security, poverty reduction and economic growth". The DoF is responsible for the effective implementation of the Fisheries and Aquaculture Policy and related strategies (see below).

73. The Department of Fisheries at the central level is mandated to undertake fisheries management in both lacustrine and riverine systems. The Fisheries Conservation and Management Act (FCMA) outlines functions and responsibilities of the Minister responsible for agriculture, although many of the responsibilities are delegated to the Director of Fisheries. Under the existing system, the central government controls policy, planning, implementation of the Act and monitoring and evaluation.

74. The DoF has responsibility for planning, managing and developing the fisheries industry in Malawi. Its key functions in this regards are:

- To conduct fisheries extension and training services.
- To plan and develop fisheries projects, programmes and activities.
- To carry out research programmes in both capture and aquaculture fisheries.
- To provide general administrative and support services
- Law enforcement.

75. The Department is organized into the following Divisions:

- **Fisheries Extension and Training Division:** Responsible for provision of extension and training services in Fisheries Resource Management.
- **Fisheries Planning and Development Division:** Responsible for the provision of Fisheries Planning and Development Services.

³⁷ The Act has been reviewed and an amended Fisheries and Aquaculture Bill has been drafted (2013), however has not been enacted. It is not clear at this point, if the new Policy would give rise to a further revision and amendment of the Act.

- **Research Division:** Responsible for the provision of research services in both capture and aquaculture fisheries.
- **General Administrative Support Division:** Responsible for the provision of General Administrative Support Services in Human Resource Management, Accounting and Office Services.

76. The formal DoF programme includes policy review and research. DoF is represented on the multi-sectoral platforms on CC that CCP is coordinating and has ensured that fisheries are included as part of the national CC plans such as the NAPA and NAPA follow-up. Relevant multi-stakeholder platforms have been set up to facilitate research, and evidence-based policy discussions as well as decision-making at policy level by the program.

77. A fisheries district office is situated in Mangochi and extension officers are based in Chimwala, Chapola, Kadewere and Upper Shire sub-entities. The DoF research institute at Monkey Bay is the unit responsible for research and innovation within DoF and the team undertakes research on demand and depending on resource availability.

78. The **Ministry of Natural Resources, Energy and Mining (MNREM)** has the mandate to protect and foster management, development and sustainable utilization of natural resources and environment. This mandate is implemented through **Environmental Affairs Department (EAD)** and **Climate Change, Meteorological Services Department (CCMSD)**, and **Forestry Department (FD)**. The ministry is also responsible for coordination of all institutions that are responsible for the flow of simplified environment and climate change technical information from national to local levels. Through the EAD, the Ministry is the technical lead on climate change in Malawi. The Environmental Affairs Department (EAD) is responsible for coordinating environmental activities in the country to promote the sustainable utilization of the environment and natural resources. The EAD's long-term vision is *to provide excellent services in cross-sectoral coordination, monitoring, overseeing compliance, and facilitating integration of environmental concerns into sectoral policies, plans and programs to ensure sustainable development*. The Department has district offices including Mangochi that coordinate implementation of environmental and natural resources programmes at district level. The **Environmental District Officers** are supported by the **District Environment Subcommittee (DESC)** in coordinating and implementing annual planned environmental activities.

79. **Department of Climate Change and Meteorology Services (DCCMS)** (Ministry of Natural Resources, Energy and Mining). DCCMS is in the process of establishing and improving existing climate monitoring and early warning systems in collaboration with other government institutions (and with support from GEF and the Green Climate Fund). Their work focuses on Flood Forecasting and Warning Systems for the lower Shire in collaboration with the Water Department, establishing Early Warning Systems for Food Security in collaboration with the Ministry of Agriculture, Irrigation and Water Development, piloting a Tropical Cyclone Monitoring and Early Warning System in collaboration with the Commission for Disaster Preparedness, Relief and Rehabilitation and finally integrating with a regional Drought Monitoring and Early Warning System in collaboration with the SADC Drought Monitoring Center. DCCMS is providing a clearing house mechanism for all climate change related work in Malawi and facilitates multi-stakeholder coordination. Similarly, DCCMS, Department of Water and LEAD (with World fish and Forestry Research Institute as Partners) have upgraded the weather, river and water monitoring instrumentation in the Lake Chilwa basin with funding from the Royal Norwegian Embassy (RNE) and the Ecosystems for Poverty alleviation (ESPA) through the Lake Chilwa basin climate change adaptation programme

(www.lakechilwaproject.mw) and Attaining Sustainable services from ecosystems through trade off scenarios (ww.espa-assests.org) respectively. Regular policy briefs are produced and some are published in the national Daily newspapers based on monitoring to highlight the risk of floods and droughts. For example, a policy brief in 2012 accurately predicted the Lake Chilwa recession of 2013 where the Lake lost 80% of its water. Consequently, fishery and associated businesses collapse was predicted in a policy brief. Another policy brief by LEAD was published in the Nation Newspaper under a project funded by IDRC which looked at environment and Climate change issues in Lake Malombe and surrounding areas. The Lake Chilwa Basin Climate Change adaptation programme is one of 10 case studies published by UNEP in 2013 and one of 8 published in 2015 on innovative case studies in Africa implementing Ecosystem based adaptation to food security (www.AFSAC2.org)

80. The **Ministry of Finance, Economic Planning and Development (MoFEP&D)** is entrusted with the task of streamlining climate change in sectoral policies as well as the Malawi Growth and Development Strategy (MGDS).

81. The **Parliamentary Committee on Agriculture and Natural Resources (PCANR)** advises the government on agriculture including fisheries issues. This committee also keeps the Parliament informed of activities that government proposes to undertake to improve food and nutrition security.

82. Since 2007, some decentralized fisheries functions have been controlled by **Local Governments** through **District Councils**. The key functions include extension, inspection, aquaculture development and licensing of small-scale gears. At community level, there are **Beach Village Committees (BVCs)** and **Fisheries Associations (FAs)** for small-scale fisheries management and the **Fisheries Management Association of Malawi (FISAM)** for commercial operators. In aquaculture there is **Innovation Fish Farmers Network (IFFN)** that participates in decision making processes in aquaculture development.

1.1.11 Policy, Legislative and Planning Framework

Fisheries

83. **Malawi Growth and Development Strategy (2011-2016) (MGDS II)**. This is the second medium term national development strategy formulated to attain the country's long term development aspirations. It is the most important national policy that decisively sets out the development agenda for the country. The MGDS II is built on thematic areas, namely: Sustainable Economic Growth, Social Development, Social Support and Disaster Risk Management, Infrastructure Development, Governance and Gender and Capacity Development as an additional theme. From these themes, the MGDS II derives nine key priority areas. Key priority areas directly related to this project are: Agriculture and Food Security, Integrated Rural Development, Climate Change, Natural Resources and Environmental Management. The MGDS III development process will commence shortly.

84. The medium term outcome for the fisheries sector as stated in the MGDS is to *ensure sustained fish availability for food and nutrition security as well as income generation for small and large scale fisheries*. In order to achieve this outcome, the sector has identified strategies for development and management of the fisheries resources which include:

- (i) development of deep water fishing and fish farming;
- (ii) promoting the use of modern techniques of fishing and fish farming;
- (iii) capacity building through community training; and

(iv) enforcing legislation to ensure sustainable production of fish.

85. Notably, a number of fisheries specific activities have been or are being implemented under the MGDS II. Underpinning the Agriculture and Food Security priorities under the MGDS II is the **Agricultural Sector-Wide Approach (ASWAp)** whose focus is on improved agricultural productivity aimed at achieving food security, increased incomes and sustainable socio-economic growth and development. The fisheries sector's strategic outcome in the ASWAp is on ensuring sustainable fisheries resources and aquaculture production.

86. The ACP (Africa, Caribbean and Pacific) Fish II Programme in Malawi supported a detailed and participatory review of the policy. Additionally, the Southern Africa Development Community (SADC) Protocol on Fisheries includes an action plan which is fully considered in the revised policy. The SADC Protocol on Fisheries highlights issues on the management of shared resources, marketing, governance and cooperation between different stakeholders.

87. In order to accomplish its mandate, the fisheries sector has identified strategic outcomes as aligned to the **Ministry of Agriculture and Food Security Strategic Plan** whose focus is on improved agricultural productivity aimed at achieving food security, increased incomes and sustainable socio-economic growth and development. Thus the sector's strategic outcome is on *ensuring sustainable fisheries resources and aquaculture production*.

88. The principal statute governing fisheries management and fish farming development is the **Fisheries Conservation and Management Act (FCMA) of 1997** which has been under review since 2010. The statute regulates the utilization of fisheries and its preservation and also guides development of fish farming. Most importantly, the legal framework promotes community participation in the protection of fish, reflecting a gradual shift that has occurred in the fisheries management philosophy since the 1990s, from the conservation paradigm to the social/community paradigm that focuses on community involvement in the management of fisheries resources; it also provides for the establishment and operation of aquaculture.

89. Specifically, the FCMA contains provisions on vessel registration, issuance of permits and licenses to regulate fishing, prohibition of fishing measures, enforcement, monitoring compliance, designation of fishing districts, formation of management plans, seizure and retention of illegal fish, and administrative penalties.

90. The FCMA is implemented through the subsidiary legislation, the **Fisheries Conservation and Management Regulations (FCMR) 2000**. The subsidiary legislation provides specific regulations for the conservation and management of all the fisheries including the following:

- Licensing of fishing gears: Licenses are required to operate gillnets, chirimila (open water seines), beach seines and trawl nets on the lake.
- Mesh restrictions: Gillnets with meshes less than 95mm are prohibited in south east arm and those with less than 89mm in the area lying south of latitude 12° 15' of Lake Malawi. There is no mesh restriction for the rest of the lake lying north of latitude 12° 15' and regulations on length and depth sizes do not exist.
- Fish size limits: All species of Chambo and Mposa of less than 15cm and 30cm are prohibited to be landed by gillnet.

91. The **National Fisheries and Aquaculture Policy (NFAP)**, approved in 2001 to guide management of the fisheries and development of aquaculture, also included a section on community participation whereby the fishing community participates in the management of the fisheries resources by formulating and enforcing fishing regulations for improved

legitimacy. The primary objective of the NFAP is *to enhance the quality of life for fishing communities by increasing harvests within safe, sustainable yields* from the national waters of Lakes Malawi, Malombe, Chilwa, Chiuta, and Shire River and other smaller river systems and from small natural and man-made water bodies. Its secondary objective is to improve the efficiency of exploitation, processing and marketing of fish and fishery products. The policy has sub-policies in extension, research, participatory fisheries management, training, enforcement and riverine and floodplains.

92. The Government of Malawi has revised the National Fisheries and Aquaculture Policy of 2001 and is awaiting approval. The revised Policy is expected to effectively contribute to the sustainable economic growth of the country as outlined in the MGDS II as the policy focuses on the sustainable increase of fish production from capture fisheries and aquaculture; enhancing fish quality and value addition, promoting technology development and its transfer to users, enhancing capacity for the sectors development and promoting social development, decent employment and fisheries governance through participatory research management. The policy was reviewed to incorporate emerging issues such as cage culture development, Ecosystem Approaches in Fisheries and Aquaculture (EAFA), and climate change. It aims to increase the contribution of Aquaculture to Economic Growth, Poverty Alleviation and Food Security. Its main aquaculture objective includes promotion of sustainable aquaculture, emphasises coordination of the sub sector, promotion of commercial aquaculture and public/private partnership in aquaculture investment (Malawi Government 2011). Furthermore, the National Agriculture Policy (NAP) has undergone a revision process which is to be approved by the government soon.

93. Under the review process which has been on-going since 2010, a new policy objective is formulated which is to *promote applied research in fisheries and aquaculture and monitor the impact of pollution and environmental changes including climate change*. There are also policy statements that focus on climate change within the fisheries sector as follows:

- (i) vulnerability and risks of fishing and fish farming communities to climate change impacts is assessed;
- (ii) an analysis of socio-economic risks and vulnerabilities of fish farmers in an age- and gender-sensitive manner is carried out; and
- (iii) mitigation and adaptation measures of the impact of climate change to resource and livelihood of the resource users are identified and implemented.

94. Furthermore, the revised policy attempts to recognize the need to address weak social development and decent work within the fisheries sector. Implementation of the climate change activities are also highlighted in the draft Implementation, Monitoring and Evaluation Strategy as shown in Box 2.

Box 2: Proposed objective and strategies on climate change issues in the fisheries sector, in the revised Policy for Fisheries and Aquaculture

Policy Statement 2: An analysis of socio-economic risks and vulnerabilities of fish farmers in an age- and gender-sensitive manner is carried out.

Objective 2: To monitor and adapt to the impact of pollution and environmental changes, including the threat of climate change on fisheries and aquaculture.

Strategy 1: Improve monitoring of changes on the aquatic environment, including those of climate change.

Strategy 2: Provide suitable equipment and trained staff for aquatic environment monitoring.

Strategy 3:	Assess the effects of bottom trawling on the benthos of Lake Malawi.
Strategy 4:	Mitigate the effects of environmental and climatic changes on the aquatic environment.
Strategy 5:	Collaborate with other sectors to reduce deforestation resulting from fish processing.
Strategy 6:	Reduce pollution from fish processing facilities.

Activities:

- (a) Improve monitoring of changes on the aquatic environment, including those of climate change.
- (b) Provide suitable equipment and trained staff for aquatic environment monitoring.
- (c) Assess the effects of bottom trawling on the benthos of Lake Malawi.
- (d) Mitigate the effects of environmental and climatic changes on the aquatic environment.
- (e) Collaborate with other sectors to reduce deforestation resulting from fish processing.
- (f) Reduce pollution from fish processing facilities.

95. The **Implementation, Monitoring and Evaluation Strategy (IMES) (2016-2020)** has recently been developed. This is a work in progress, and will only be officially finalised once the new Policy for Fisheries and Aquaculture is approved by the Cabinet. Key priority areas, specific objectives and strategies to achieve them with, are elaborated upon. This is in line with policy and responsible institutions mandated to implement actions so as to achieve the agreed set and time bound targets. Priorities relevant to this project straddle all seven priority areas of the Policy (i) Capture Fisheries (ii) Aquaculture, (iii) Fish Quality and Value Addition, (iv) Governance, (v) Social Development and Decent Employment, (vi) Research and Information, and (vii) Capacity Development, but are most specifically articulated in terms of addressing climate change under priority 6, Objective 2: “To monitor and adapt to the impact of pollution and environmental changes, including the threat of climate change on fisheries and aquaculture”. At this point no specific budget is associated with the IMES, however it will certainly be included in DoF’s next Strategic Plan.

96. The **National Aquaculture Strategic Plan (NASP) (2006 – 2015)** was developed to implement the Chambo Restoration Strategic Plan (CRSP) (see below) through facilitating necessary institutional, legal and administrative changes in the aquaculture sub sector. The plan focuses on four thematic areas 1) integration of aquaculture into rural livelihoods, 2) enhancement of economic opportunities for commercial fish farmers, 3) competent local government, NGO and producer organisations, 4) capacity of the Department of Fisheries. At this point it is not clear if the NASP will be renewed, as the gist of it is included in the newly developed IMES.

97. The **Chambo Restoration Strategic Plan (CRSP: 2003-2015)** was part of the “National Save the Chambo Campaign” launched on 16th January 2003 by the Cabinet Committee on Natural Resources and Environment (CCNRE). The CRSP was developed as a specific strategy to save the endangered Lake Malawi *Nyasalapia* fish species (collectively known as chambo) comprising of *Oreochromis karongae*, *O. lidole* and *O. squamipinnis*. The plan aimed to restore the Chambo fisheries of Lakes Malawi and Malombe to their maximum sustainable yield by 2015 and supplement the fishery production by enhancing the Chambo production through aquaculture. The strategy targeted aquaculture production of 7,000 tonnes per year with 5,000 tonnes per year derived from the promotion of commercial aquaculture. The CRSP sets out technical priority interventions needed to restore the fishery for Chambo in Lake Malombe and the South East Arm of Lake Malawi. It is based on 60 years of science and over 10 years of Participatory Fisheries Management (PFM) experience. In 2015, the CRSP is still

scientifically, and managerially, important. In light of climate change challenges, it emerges as a recurring top priority in addressing weaknesses and threats to the fisheries sector. Though the implementation of the CSRP has been largely unsuccessfully, its priorities are included in the New Fisheries and Aquaculture Policy and IMES.

98. Management Plan for Fisheries and Aquaculture of Lake Malombe, South East Arm and Part of South-West Arm of Lake Malawi (September 2014), EAFA. In 2014, as the culmination of a series of stakeholder consultations and field work by DoF and FAO, a detailed fisheries and aquaculture management plan was developed for the project area. This management plan, although not specifically developed with climate change in mind, forms a useful technical baseline for the planning of the project interventions. Based on an ecosystem-approach to fisheries and aquaculture, important ecosystem-based adaptation options are already considered and promoted by the plan. The plan is currently not being implemented in detail or with dedicated resources, but is also reflected to some extent in the IMES.

99. Mangochi District Development Plan (DDP, 2011-2016). Development planning at the district level is considered to reflect bottom up identification of priorities, and the DDPs are derived from village level consultations through established governance structures. As the decentralisation process in Malawi is proving slow to implement effectively, there are observed bottlenecks at this time. The Mangochi DDP has identified key priorities on food security and nutrition as well as on natural resource degradation. The fisheries and forestry sectors have been singled out as priority areas. Climate change is recognised though not yet fully mainstreamed.

Climate change

100. The Government of Malawi signed the **United Nations Framework Convention on Climate Change** (UNFCCC) on June 10 1992 and ratified it on April 21 1994. It acceded to the **Kyoto Protocol** in 2013. The Department of Environmental Affairs (DEA) is designated as the national focal point for the UNFCCC. Malawi has completed and submitted a number of reports to the Convention, including Greenhouse Gas Inventories, National Communications and the National Adaptation Programme of Action (NAPA). The Government has also formulated various other measures to achieve specific requirements in the Agreements including preparation of various reports and plans such as the National Environmental Action Plan (NEAP) of 1994 and State of Environment and Outlook Reports, In the NEAP, the need for increased public environmental awareness and participation in environmental management was highlighted as a key priority to address the environmental problems.

101. In addition to the environmentally orientated policy instruments, such as the 1994 National Environmental Action Plan and the National Environmental Policy 1996, **the National Plan for Adaptation (NAPA)** stands out as the major policy instrument guiding climate change activities. Formulated in 2006, the NAPA identifies thirty priorities across eight different sectors. These are agriculture, water, human health, energy, fisheries, wildlife, forestry and gender. Out of the thirty priority areas, fifteen are considered as urgent in order to reduce the vulnerability to the adverse impacts of extreme weather events caused by climate change³⁸. These pressing priorities are meant to strengthen the resilience of local communities to adapt to the adverse effects of climate change. The priority areas cover a wide range of issues that if corrected have the potential to strengthen the capacity of communities to adapt to the adverse effects of climate change. For example, the NAPA outlines strategies for drought

³⁸ GoM, 2006

preparedness, water harvesting and storage, capacity building in adaptation to climate change and climate mitigation through the development of appropriate technologies including food storage systems and new agriculture practices (Mwase, et al., 2013).

102. A **National Climate Change Policy** has been drafted, and like the Fisheries and Aquaculture Policy, also awaits Cabinet approval (status November 2015). The overarching goal of the climate change policy is to create an environment for the development of a country-wide, coordinated and harmonized approach which attends to the needs and concerns of all sectors of society, while ensuring continued sustainable development. In this regard, the draft policy recognizes the need for cross-sector collaboration and as such the draft climate change policy is construed as “a country wide mechanism for harmonizing and enhancing the planning, development, coordination, financing and monitoring of climate change initiatives and programmes in Malawi”.

103. Despite the efforts and growing interest to address the environment and climate change issues, public awareness still remains low and significant gaps still remain in certain sectors of the national economy. Therefore, the **National Environment and Climate Change Communication Strategy (NECCCS)** was developed to increase public awareness and promote positive behavioural change for sustainable development. In terms of the fisheries issues, the NECCCS has highlighted the fisheries sector there is an activity that highlights the need for Department of Fisheries extension staff to be trained in environment and climate change alongside other ministries or departments such as Agriculture, Health, Forestry, Fisheries, Wildlife, and Community Development, to meet the objective: *to increase environment and climate change awareness in educational institutions and strategy, to promote popular participation in the implementation of the environment and climate change.*

104. As a follow-up to NAPA, the **Malawi Meteorological Policy** is in the early stages of drafting.

105. The climate change policy processes have proceeded alongside the development of the **Climate Change Investment Framework**. The overall idea of the climate change investment framework is to mainstream climate change in planning and budgeting across sectors that are highly vulnerable to the adverse effects of climate change. The draft climate change investment framework has therefore identified a set of programmes that will be mainstreamed in each sector. The corresponding amount of money will be spent over a five-year period. The expectation is that the investment framework will guide prioritization of activities across sectors, as well as guide the identification of gaps and direct the expenditure of the available resources accordingly. In the absence of an investment framework, most stakeholders argued that it is currently extremely difficult to track the magnitude of funding to the climate change interventions. The development of the climate change investment framework has been multisectoral. It has involved government agencies, development partners, civil society organizations, and private sector including banks. The investment framework defines the climate change expenditures in each sector with specific milestones. This will offer sectors the opportunity to obtain more resources, thus enabling them to prioritize their mandates. The investment framework will further offer an opportunity to harmonize interventions in order to ensure unity of direction and purpose in the sector, whilst avoiding climate perverse incentives and investments. The indications are that the climate change investment framework will be rolled out initially as a national climate change fund that will eventually evolve into a sector-wide approach.

106. Department of Climate Change and Meteorology Services (DCCMS) (Ministry of Natural Resources Energy and Mining) **programme**. DCCMS is in the process of establishing and improving existing climate monitoring and early warning systems in collaboration with other government institutions (and with support from GEF and the Green Climate Fund). Their work focuses on Flood Forecasting and Warning Systems for the lower Shire in collaboration with the Water Department, establishing Early Warning Systems for Food Security in collaboration with the Ministry of Agriculture and Food Security, piloting a Tropical Cyclone Monitoring and Early Warning System in collaboration with the Commission for Disaster Preparedness, Relief and Rehabilitation and finally integrating with a regional Drought Monitoring and Early Warning System in collaboration with the SADC Drought Monitoring Center. DCCMS is providing a clearing house mechanism for all climate change related work in Malawi and facilitates multi-stakeholder coordination. Similarly, DCCMS, Department of Water and LEAD (with World fish and Forestry Research Institute as Partners) have upgraded the weather, river and water monitoring instrumentation in the Lake Chilwa basin with funding from the Royal Norwegian Embassy (RNE) and the Ecosystems for Poverty alleviation (ESPA) through the Lake Chilwa basin climate change adaptation programme (www.lakechilwaproject.mw) and Attaining Sustainable services from ecosystems through trade off scenarios (www.espa-assests.org) respectively. Regular policy briefs are produced and some are published in the national Daily newspapers based on monitoring to highlight the risk of floods and droughts. For example, a policy brief in 2012 accurately predicted the Lake Chilwa recession of 2013 where the lake lost 80% of its water. Consequently, fishery and associated businesses collapse was predicted in a policy brief. Another policy brief by LEAD was published in the Nation Newspaper under a project funded by IDRC which looked at environment and Climate change issues in Lake Malombe and surrounding areas. The Lake Chilwa Basin Climate Change adaptation programme is one of 10 case studies published by UNEP in 2013 and one of 8 published in 2015 on innovative case studies in Africa implementing Ecosystem based adaptation to food security (www.AFSAC2.ORG)

1.1.12 Stakeholders

107. A wide range of stakeholders are involved directly or indirectly in determining the conditions and resilience of natural resources and fishing communities around Lake Malombe. These include the fishing communities themselves (primary stakeholders); actors involved in service and trade related to fisheries value chains (secondary stakeholders); and governmental and non-governmental support institutions (tertiary stakeholders). Examples of the major stakeholders in each of these categories, in relation to capture fisheries and aquaculture, are shown in Table 1. The primary stakeholders, and the socioeconomic differentiations between them, as described in section 1.1.7.

Table 1 Major stakeholder groups in capture fisheries³⁹

Capture fisheries	Aquaculture ⁴⁰
Primary stakeholders	
<ul style="list-style-type: none"> - Small-scale fishers - Large-scale fishers - Aquarium trade operators 	<ul style="list-style-type: none"> - Small-holder fish farmers - Commercial fish farmers
Secondary stakeholders	

³⁹ Njaya et al. (2006)

⁴⁰ Identified during preparation of the National Aquaculture Strategic Plan (NASP) with support from the Japanese International Cooperation Agency (JICA)

Capture fisheries	Aquaculture ⁴⁰
<ul style="list-style-type: none"> - Fish processors and traders - Consumers - Traditional leaders - Beach Village Committees - Fishers' Association of Malawi (FISAM) - NGOs e.g. Total Land Care and Wildlife and Environmental Society of Malawi (WESM) - Government (Department of Fisheries, Ministry of Finance, Local Government) <ul style="list-style-type: none"> - Private sector e.g. Maldeco, Mangochi Fish Farm Solace International - Transporters - Ice plant operators - Boat and engine spare/accessory importers - Boat builders and marine engineers 	<ul style="list-style-type: none"> - Consumers - Traditional leaders - Fish traders - Feed companies - NGOs e.g. Total Land Care and Wildlife and Environmental Society of Malawi (WESM) - Local Governments - Farmers' Organizations e.g. Innovative Fish Farmers Network (IFFN)
Tertiary stakeholders	
<ul style="list-style-type: none"> - Universities e.g. University of Malawi (UNIMA), Lilongwe University of Agriculture and Natural Resources (LUANAR) and Mzuzu University (MZUNI) - Collaborative Ministries e.g. Environmental Affairs, Water, Marine, Parks and Wildlife, Tourism (lodge owners), Health, Agriculture, Irrigation, Education (learners), Police, Justice - Donors - Micro-finance institutions (e.g. Opportunity International Bank of Malawi, Malawi Rural Finance Company (MRFC), Micro-Loan Finance - International research institutions 	<ul style="list-style-type: none"> - Universities e.g. University of Malawi (UNIMA), Lilongwe University of Agriculture and Natural Resources (LUANAR) and Mzuzu University (MZUNI) - Collaborative Ministries - Donors - International research institutions

Support institutions

108. The tertiary stakeholders of the project include academic and research institutions, collaborative ministries, donors and micro-loan financing agencies, which provide direct or indirect support to livelihoods and economic development activities related to the fisheries sector, or are involved in supporting the resilience of local communities to the effects of climate change. The majority of institutional actors in the aquaculture and fisheries innovation system in Malawi are multifunctional⁴¹, addressing issues including production, research and development, extension services and education and training. Functions that are addressed to a lesser degree include input supply, processing and marketing, financial support, and policy advocacy.

109. **Private sector actors**⁴²: there are some private sector actors that are engaged in the climate change within the agricultural sector. The main players include the Malawi Rural Finance Company (MRFC), Opportunity International Bank of Malawi (OIBM), New Building Society Bank (NBSB), National Insurance Company (NICO) and the National Association of Smallholders Farmers in Malawi (NASFAM). However, within the fisheries sector there is

⁴¹ Maguza-Tembo et al. (2009)

⁴² Chinsinga et al (2012)

potential that they can be linked to the aquaculture development. Some of the micro-financing institutions such as MRFC mainly provide loans to fishers and women groups.

110. **Research Institutions:** the main role of research institutions is to generate knowledge that feeds into the climate change and agriculture policy processes. Some of the most active research institutions include the Centre of Agriculture Research and Development (CARD) at Lilongwe University of Agriculture and Natural Resources (LUANAR), Centre for Social Research (CSR) and Leadership in Environment and Development (LEAD) Southern Africa, Fisheries Research Unit of the Department of Fisheries both, the Malawi Environmental and Endowment Trust (MEET), Coordination Unit for the Rehabilitation of the Environment and Chitedze Research Station in the Ministry of Agriculture, Irrigation and Water Development (MoAI&WD). However, the main concern is that the research institutions are unable to formulate demand driven and home grown research agenda. This is the case because research institutions lack adequate funding from the government. The authors further noted that the limited funding of the research institutions gives an opportunity for advancement of the agenda of the development partners in climate change research.

111. **Media**⁴³: the media (both print and electronic) play a vital role in the dissemination of climate change messages, as observed by most respondents involved in PPG studies. The media either publish or disseminate climate change messages on their own terms or they get contracted by various organizations. Several radio stations like Malawi Broadcasting Corporation (MBC) radio and television, Zodiak Broadcasting Station (ZBS) have climate change programmes that are either sponsored or not on climate change issues in the agricultural sector. There are also some community radio stations such as Chilunga radio that have special focus on climate change and natural resource management.

112. Newspapers like *Malawi News* and *The Nation* have some special feature articles or general news stories on climate change issues in the agricultural and natural resource sectors either through general news stories, feature articles and special supplements. Through these avenues the media plays a critical role in advancing specific agenda in the context of climate change.

113. **Other actors involved in climate change related programmes:** several non-governmental organisations (NGOs), civil society organisations (CSOs) and religious organisations are engaged in climate change message dissemination programmes and advocacy. Respondents in all the four target districts of the study highlighted critical roles that the organisations play in climate change civic education and training, adaptation strategies, and disaster and risk management. From experience, there are also advocacy groups like Centre for Environmental Policy and Advocacy (CEPA) and Coordination Unit for the Rehabilitation of the Environment (CURE) that champion review of policies to include climate change issues.

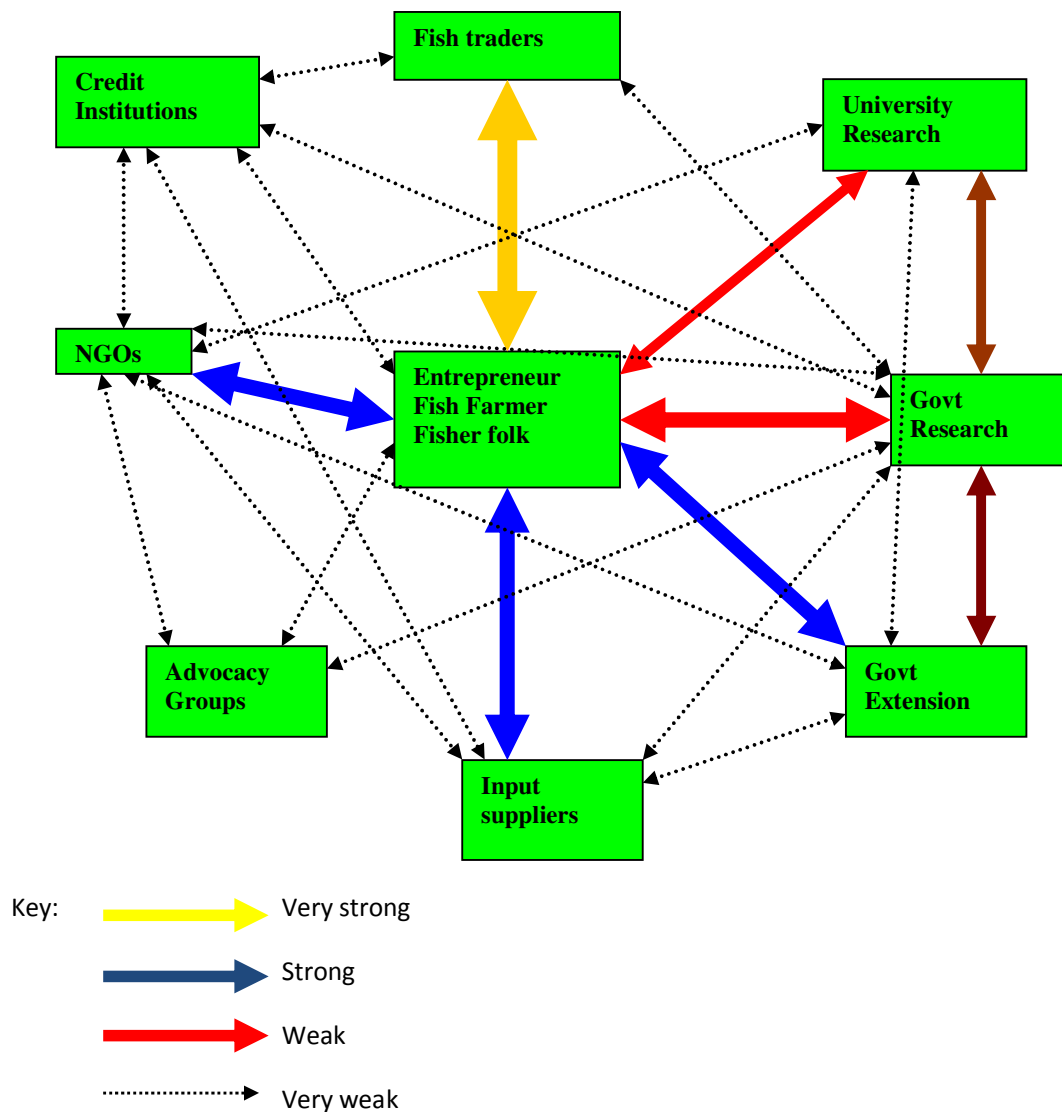
114. **Academic institutions:** For capacity building, the establishment of the Aquaculture and Fisheries Science Department at the University of Malawi's Bunda College of Agriculture, for capacity building in fisheries, should be seen as a significant investment towards closing the capacity gaps in the country and the region (Yaron et al. 2011). There is also Department of Fisheries at Mzuzu University which is also encouraging. However, issues of climate change are not adequately as it scored 3 out of 5 in terms of climate change coverage during this study. There is, therefore, a need to strengthen capacity of these training institutions by reviewing their curricula, procure necessary equipment and mobilise adequate financial resources to

⁴³ Chinsinga et al (2012)

ensure that there is adequate capacity of the fisheries sector to cope with droughts (GoM 2007).

115. A summarized analysis of linkages among key actors in fisheries and aquaculture is shown in Figure 6. There is a very strong linkage between fish traders and fishers or fish farmers while a strong linkage exists between the producers (fishers and farmers) and NGOs, input suppliers and government extension services. On the other hand, weak linkages are between the producers against research services. Very weak linkages are among the other actors themselves, such as research and university institutions against input suppliers and government extension services and credit institutions against input suppliers.

Figure 6 Linkages between and among stakeholders⁴⁴



⁴⁴ Adapted from Maguza-Tembo et al., 2009)

1.1.13 Gender aspects

116. 25% of Malawian households are led by women, many of who are dependent on fisheries-related activities for income and food security. Women play key roles in the fisheries and aquaculture value chains. While approximately 80% of the community attains its livelihood from fishing and related professions, the fishing professions, especially on the lakes, are largely male dominated. Most women are not allowed to participate in fishing harvest activities because of the nature of the work and because they do not have enough capital to get involved. They are, however, included in activities such as sales, marketing and processing to varying levels. Women reportedly make up the greater population of traders in the Mangochi area. Many of the women traders purchase their fish, including farmed fish, from Maldeco: this is seen as a significant source of feuding among women and fishermen, as the fishermen expressed their disappointment at the encroachment of their customers by Maldeco. A clear social and emotional dependency could be detected in the power relationships. Although women may not be involved in the fisheries on the Lake, they feel that they are influential and they claim to have noticed the change in the sizes of the fish caught in the lakes, leading to ever smaller fish caught due to the gears used. They recognize this to be a problem for fisheries sustainability.

117. Married men do not allow their wives to go to the beach due to perceptions that “immoral” behaviour there, meaning that women found near the beach are often labelled as prostitutes. Local villagers report that most fishermen come from far away areas without their wives and often engage with prostitutes, resulting in high levels of HIV/AIDS transmission. HIV/AIDS is a particular problem among women fish traders⁴⁵. Polygamy, especially common amongst the mostly Muslim population in the area, is a socio-economic factor that is affecting both women’s income and population size; “wealthy” fishermen with cash to hand marry young women who often bear children from an early age and with frequency.

118. Women in the project area are mostly involved in agricultural activities, which community members rely on as a coping strategy to offset low fishing yields. Most people in the area, and especially women, are involved in other income generating activities such as grocery ownership and selling and other retail activities to support their families.

119. Land owned under customary law covers 60% of the total land in the district. Under this system land is controlled and allocated by traditional leaders who are TAs, Village or Group Village Headpersons. The control of customary land in the district is passed from one generation to the next through the maternal lineage of the TAs, Group Village Heads’ families. Hence, women normally own land. Soil and land degradation are a common problem in the area, so harvests have been low. This is putting additional pressure on fisheries resources. Links between poor harvests and climate change have been observed by some of the women. Women consulted stated that they now depend more on agriculture for food despite their family income being based on fisheries.

⁴⁵ Kambewa, P., Nagoli, J., Hüsken, S.M.C. (2009). Vulnerability of female fish traders to HIV/AIDS along the fish market chain of the south eastern Arm of Lake Malawi. Analysis report. Regional Programme Fisheries and HIV/AIDS in Africa: Investing in Sustainable Solutions. The WorldFish Center. Project Report 1979.

1.2 THE CURRENT SITUATION

120. Food security in Malawi is critical and climate related pressures are challenging food production even further by adversely affecting the nutrition and health of Malawians, most notably the rural poor. Historically fish has made up a significant portion of local diets.

121. Fishing yields are likely to dip even further if climate related challenges are not met with an intelligent and timely response. Certain impacts of climate change lead to accelerated changes in the lake ecology. Some changes will lead to higher system productivity. For example, the warming of water can lead to an overall increased production of phytoplankton, and consequently fish, and certain fish species do grow faster with increased temperatures. Other impacts can be far less favourable, however: changes in water flow, turbidity, siltation rates, fluctuations in habitat and vegetation and inter alia breeding grounds can all lead to major system changes. On Lake Malawi, research has already demonstrated such changes and changes in species composition and dynamics are also predicted. In recent years there has been a higher yield of the species *usipa* (*Engraulicypris sardella*). The combination of fish species interaction and climate change may have played a role to that effect. The decrease in valuable chambo species has led to fishermen targeting *usipa*. There are indications that due to the targeting of predator species, the *usipa* filled a niche and has become abundant in Lake Malawi and is presently on the increase in Lake Malombe.

122. Lake Malombe is a heavily overfished ecosystem, where the use of beach seines has largely destroyed breeding habitats of the locally occurring Chambo species. Despite decades of investment into establishing co-management structures, management practices have not resulted in the rehabilitation of fish stocks, as there was no enforcement of fishery regulations. With the additional pressure that climate change puts on local communities, a new urgency exists to address fisheries and resilience issues around Lake Malombe.

1.2.1 “Business as Usual”

123. **Trends in fisheries:** Even without climate change, fishery resources in Malawi face severe pressures, with major implications for livelihood sustainability and food security. Although the last proper stock assessment was done a long time ago, the fisheries resources in Lake Malawi, particularly in the South-East arm of the lake, have been heavily pressured and eventually over-exploited for many years. From the 1970s to 2009, per capita consumption of fish in the country fell by more than 70% from 14kg per person per year to about 5.4 kg⁴⁶. This is far less than 13-15kg per capita supply recommended by World Health Organization (WHO).

124. A similar situation is found in the project’s target area, Lake Malombe: in the 1980s, when the fishery was near its peak, the lake produced over 12,000 tons of fish, representing approximately 17% of Malawi’s total production; however, the fishery has experienced a rapid decline in annual catches from about 12,000 tons in 1988 to around 3,700 tons in 1999 (Figure 7), despite fishing effort having increased markedly (from 472,425 net sets in 1983 to 1,368,993 in 1995), resulting in a sharp fall in Catch per Unit Effort (CPUE)^{47, 48}. The lake now contributes only 2-5% of the total national fish production⁴⁹.

⁴⁶ Banda et al., 2013; GoM, 2010

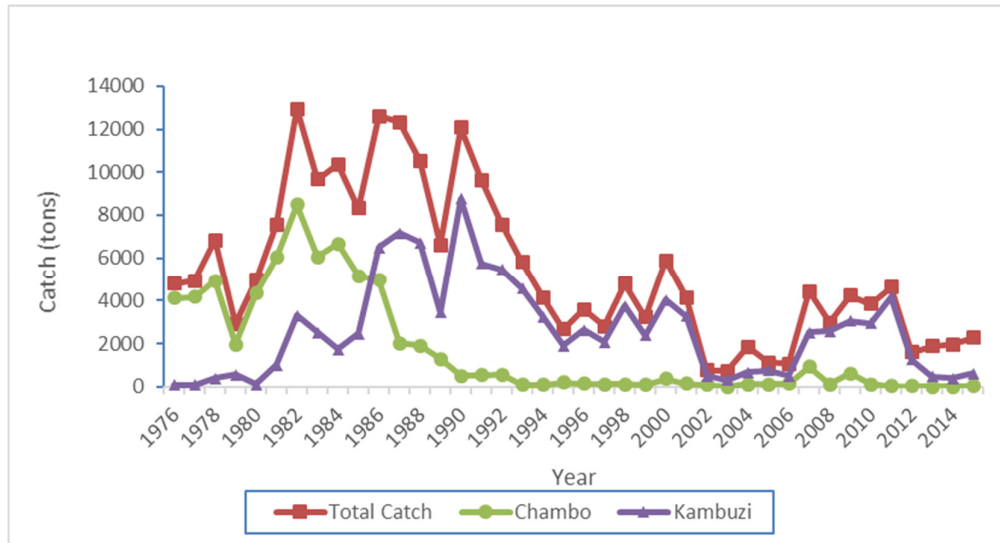
⁴⁷ Weyl, O.L.F , A.J. Ribbink and D. Tweddle (2010) Lake Malawi: fishes, fisheries, biodiversity, health and habitat, Aquatic Ecosystem Health & Management, 13:3, 241-254

⁴⁸ Bio-Economics of Common Resource Overexploitation: Case of Lake Malombe *Chambo* (*Oreochromis spp.* Cichlidae) Fishery in Malawi. Francis Maguza-Tembo, Aquaculture and Fisheries Science Dept. Bunda College of Agriculture, P.O. Box 219, Lilongwe. <http://www.eldis.org/go/home&id=56727&type=Document#.VqaZISqLTIU>

⁴⁹ Fisheries Department, 1999

125. Figure 7 also shows that fisheries in Lake Malombe have undergone dramatic changes in catch composition⁵⁰. Chambo (*Oreochromis* spp.) was the main species in the 1970s, increasing to a level of more than 6,000 tons of reported catches in the early 1980s and decreasing to very low levels of as low as 100 tons in the late 1980s and early 1990s; while *kambuzi* (*Lethrinops* spp.) became increasingly important and is currently the most important fishery in the lake⁵¹. This mirrors the situation on Lake Malawi: while the total annual fish catches there have been increasing for the past ten years (averaging 90,000 tonnes), over 60% of that constitutes usipa (*Engraulicypris sardella*). Catches for the commercially valuable species, *chambo* (*Oreochromis* spp) have remained low averaging 3,000 tonnes per annum since the 1990s from around 8,000 tonnes in the 1980s. Fisheries collapse on Lake Malombe is also reflected in changes in gear utilisation, with a sharp increase in the use of *chilimila* seines (Figure 9).

Figure 7 Total fish catch (*Oreochromis* spp. and *Lentrinops* spp.) from Lake Malombe (1976-2014)



⁵⁰ Weyl, et.al 1999

⁵¹ Small Scale Fisheries of Malawi: An Outline of Lake Malombe Fisheries George MATIYA and Yoshikazu WAKABAYASHI. Mem. Fac. Agr., Ehime Univ., 50: 3-9 (2005)

Figure 8 Total catch, effort and catch per unit effort in Lake Malombe, 1976-2014⁵²

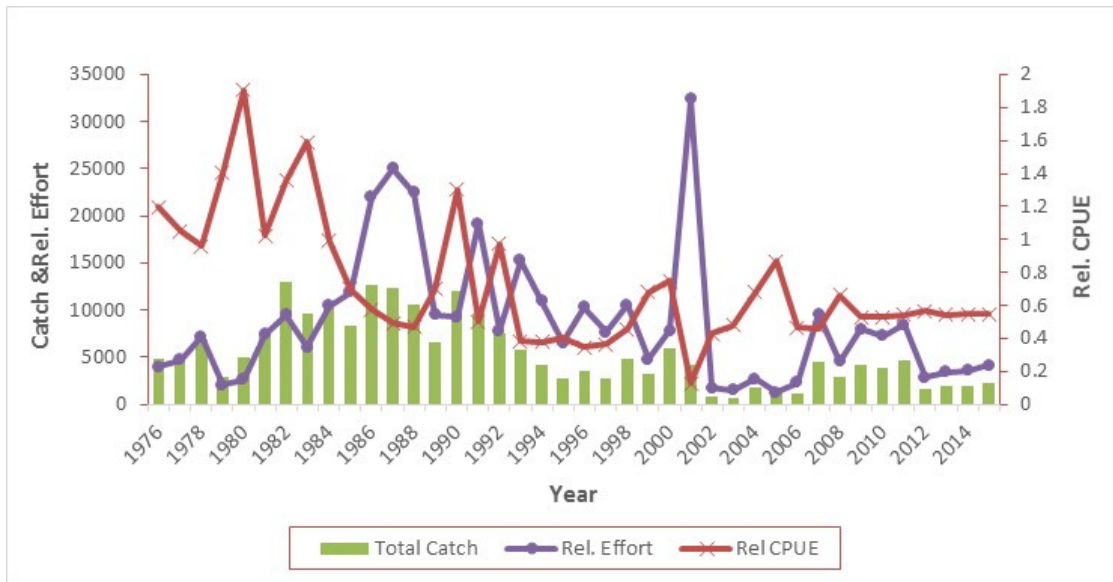
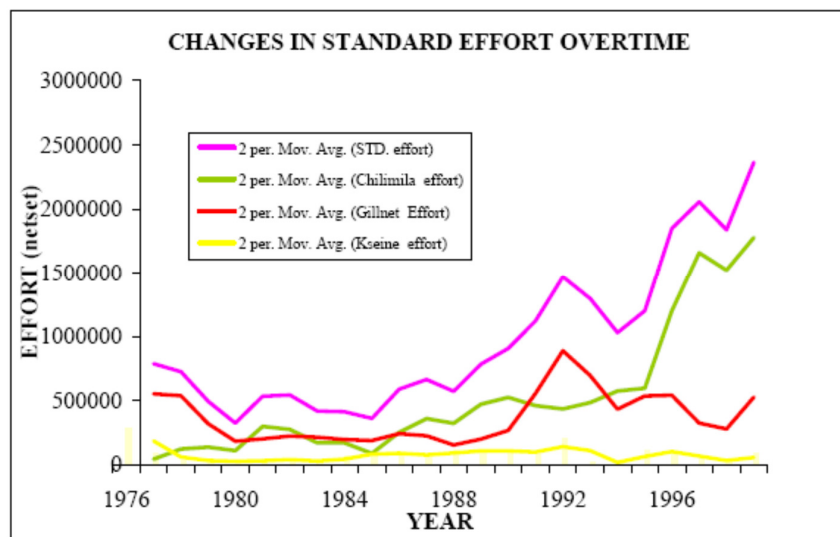


Figure 9 Changes in standard fishing effort over time on Lake Malombe, 1976-2000⁵³



126. The collapse of the fisheries in Lake Malombe represents a considerable loss in the income levels of the fishers and nutrition to the communities. The economic value of the lake, estimated in 1988 at MK42 million (USD0.396 million) in 1988, was reduced to about MK4 million (USD37,735) in 1996⁵⁴: this is due to a combination of falling overall catch levels (Figure 8) but also due to the substitution of the higher valued chambo (*Oreochromis* spp.) by the lower value kambuzi (*Lentrinops* spp.).

⁵² Government of Malawi 2014

⁵³ Idem

⁵⁴ Fisheries Department, 1999

127. **Causes:** Bioeconomic studies of the situation on Lake Malombe⁵⁵ confirm that the fishery has been overexploited: effort in the Chambo fishery would have to be reduced by about 159% to arrive at Maximum Economic Yield, and by approximately 87% to attain the Maximum Sustainable Yield. This overexploitation has come not as a result of economic factors such as increases in market prices for fish or decrease in the cost of effort.

128. An FAO study in the 1990s into the collapse of the fisheries⁵⁶ ruled out this resulting from recruitment overfishing caused by excessive fishing of the parent stock, as effort levels exploiting the parent stock were low compared to the years between 1976 and 1983, when catch levels were maintained. FAO concluded that excessive fishing of the 0+ and 1 year juveniles by small meshed beach seines and purse seines was responsible for the collapse: 70% of all *Oreochromis* spp. caught were taken by these gears. *Oreochromis* spp. that escaped was subsequently fished further away from the shore by gillnets: fishing mortality peaked at both sizes of around 10 cm (0+ and 1+ year of age) and 25 cm and larger (3+ year of age). This is a typical case of technical interaction between different fisheries: small meshed nets, in particular *kambuzi* seines and *nkacha* nets exploited the juvenile stages in the inshore area, while larger meshed gillnets nets exploited the three year and older fish.

129. Small meshed beach seines also were thought to harm *Oreochromis* spp. during breeding and brooding periods, as these seines were dragged through near-shore, underwater vegetation utilized as habitat by *Oreochromis*, destroying extensive under-water weed beds⁵⁷, uprooting plants and disturbing the sandy patches that are a preferred breeding ground for some Chambo species.

130. In short: *Oreochromis* stocks were thought to have collapsed by a combination both of excessive fishing of the juvenile stock, followed by a high but in itself not unsustainable fishing pressure on the parent stock. The collapse possibly was accelerated by destruction of *Oreochromis* nursery habitat, though the evidence is scant.

131. In the first half of the 20th century, fishing effort in Lake Malombe was mainly population-driven, and the development seems to have been fairly similar to what has been the case on many other southern African lakes. Since that time, however, the type of gear and their way of operation (fishing patterns) appear to have become more significant as causes of overexploitation of the lake's fisheries than demographic increase. Between the 1970s and the 1990s, only a limited increase in fishing effort in terms of people fishing was observed: apart from that, two of the four gears, decreased in numbers and activity over this period, while a third - *Nkacha* seines – did so since 1987; the number of *Nkacha* nets and its activity levels increased at the beginning of that period, but by the end of the 1990s was decreasing. In other words, Lake Malombe does not present a case of Malthusian overfishing (Pauly, 1994), but is a case of over-investment in a fishery; as such, the situation in Lake Malombe seems to date to have been fundamentally different from the mode of exploitation observed in the other lakes in the region.

132. This situation has also had significant implications in terms of the distribution of access to the lake's resources: investment-driven growth, controlled by actors with sufficient financial resources to invest in equipment such as chambo seine nets, has caused the gradual

⁵⁵ Idem

⁵⁶ FAO, (1993), Fisheries management in the South-East arm of Lake Malawi, the Upper Shire River and Lake Malombe, with particular reference to the fisheries on chambo (*Oreochromis* spp.), CIFA Technical Paper 21, FAO, Rome.

⁵⁷ Tweddle, Alimoso, and Sodzabanja, 1994

reduction in the population-driven growth on the lake. The increased efficiency of the chambo seine nets reduced the catch rates of the gillnets and other more conventional gear to a level where the operations of the latter became almost impossible. Thereby, a new group of “lords” managed to appropriate the access to the lake at the expense of other and less wealthy segments of the population. Investments in the Malombe fisheries have been strongly related to economic opportunities external to the fisheries, such as labour migration to countries abroad that facilitated accumulation of money and thereby initiated the investment processes. The flow of such externally generated wealth has been crucial to keep the investment level going; conversely, difficulties in retaining this required wealth, due to unclear rules and norms regulating the life of extended families and social security networks, have made it very difficult for people to make the savings required to keep a relatively capital-intensive operation going and have therefore constrained the development and maintenance of the scale of this sector⁵⁸.

133. Faced by a combination of reduced opportunities for capital generation and weakened power relations with crew members, one of the few possible responses from owners was to revert to less capital-intensive gears than the *nkacha* nets: less expensive gear usually can be operated by smaller and fewer crews and the gear owner thereby is better positioned to exercise effective control over his employees. The modest increase in numbers of gillnets, longlines, handlines and traps in the fishery in the late 1990s (Fisheries Department, 1999) may have been caused by such considerations, but the problem remains that the catch rates for these types of gear remain very low.

134. A number of other threats have contributed to the decline of fish populations in the lake, including the development of resorts and cottages along the shoreline, which have affected fish breeding habitat and led to the destruction of nests and eggs. Siltation, resulting from poor land management in the surrounding areas, has also affected fish breeding grounds, particularly the shallow areas favoured by chambo. Fisheries are also impacted by the application of some inappropriate traditional practices, such as the use by women of traps (locally known as *mbotola*) that cross rivers and target breeding stock of *mpasa*, and the use of poisonous plants (*katupe*) for catching fish.

1.2.2 Climate Change Trends⁵⁹

135. **Temperature:** the mean annual temperature for Malawi has increased by 0.9°C between 1960 and 2006, at an average rate of 0.21°C per decade. Likewise, the average number of ‘hot’ days per year in Malawi has increased by 30.5 between 1960 and 2003, and the average number of ‘hot’ nights per year has increased by 41 (an 11% increase) between 1960 and 2003. The above observations on past temperature trends in Malawi are in agreement with the climate projections based on General Circulation Models (GCM) used by the Intergovernmental Panel on Climate Change (IPCC). These have projected that the mean temperature in Malawi will increase by 1.1 to 3.0°C by 2060, and by 1.5 to 5.0°C by the year 2090. Projections indicate substantial increases in the frequency of days and nights that are

⁵⁸ The “Lords of Malombe: An Analysis of Fishery development and Changes in Fishing Effort on Lake Malombe, Malawi. M. Hara and E. Jul-Larsen. In: Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003.

⁵⁹ McSweeney, C., New, M. & Lizcano, G. 2010. UNDP Climate Change Country Profiles: Malawi. Available: <http://country-profiles.geog.ox.ac.uk/> [Accessed 17 August 2015]. McSweeney, C., New, M., Lizcano, G. & Lu, X. 2010. The UNDP Climate Change Country Profiles Improving the Accessibility of Observed and Projected Climate Information for Studies of Climate Change in Developing Countries. Bulletin of the American Meteorological Society, 91, 157-166

considered 'hot' in the current climate. All projections indicate decreases in the frequency of days and nights that are considered 'cold' in the current climate.

136. Future rainfall projections: the influences of ENSO on the climate of Malawi can be difficult to predict as it sits between two regions of opposing climatic response to El Niño. Eastern equatorial Africa tends to receive above average rainfall in El Niño conditions, whilst south-eastern Africa often experiences below average rainfall. The opposite response pattern occurs in La Niña episodes. The response of climate in each of these two regions, and the extent of the area affected, varies with each El Niño or La Niña event causing mixed responses in Malawi. The future projections indicate that the rainfall may reduce by 13% (more reduction in dry season) or increase by 32% (more rainfall during wet season), which means that the country will experience more frequent droughts and floods.

137. Climate and disaster risks and their impacts: Malawi is experiencing a variety of climatic hazards, which include intense rainfall, floods, seasonal droughts, multi-year droughts, dry spells, cold spells, strong winds, thunderstorms, landslides, hailstorms, mudslides and heat waves. According to the 2010 State of Environment and Outlook Report (SEOR)⁶⁰ and the National Disaster Risk Management policy⁶¹, the prevalence and intensity of these extreme weather events has been increasing, in light of climate change, population growth, urbanisation and environmental degradation. This is of major concern because of the far-reaching consequences of these events on food, water, health and energy. Malawi has experienced at least five major floods between 1980 and 2005 (1982/83, 1991/92, 200/2002 and 2003/04), and five significant drought years (1986/87, 1991/92, 1993/92, 2003/2004, 2004/2005)⁶². The combined effects of droughts and floods are estimated to reduce Malawi's GDP by about 1.7 % on average every year, with GDP declining by at least 9% during a severe 1-in-20 year drought⁶³.

138. Floods occur in southern Malawi, particularly in the Lower Shire River valley and the lakeshore areas of Lake Malawi, Lake Malombe and Lake Chilwa, as well as in the lower reaches of the Songwe River in the northern region. Between 1967 and 2003, 18 floods were recorded killing at least 570 people, rendering 132,000 homeless, and affecting a total of 1.8 million people⁶⁴. Flooding also damages property and infrastructure, impedes drainage of agricultural lands and causes crop damage. Floods cause annual loss of about 12% of maize production in the south, where about one-third of Malawi's maize is grown (World Bank and RMSI, 2009)⁶⁵. In the recent past, starting in late December 2012, heavy rains and storms led to flash floods causing loss of lives and destruction of infrastructure in many districts in Malawi. The Southern Region was the most affected. According to the Department of Disaster Management Affairs [DODMA], 12,877 households were affected by destruction of and damage to houses and crops, loss of livestock and contamination of water sources. The displaced families had taken refuge in makeshift camps, in school blocks and other public buildings exposing them to a higher risk of malaria.

⁶⁰ GoM 2010. Malawi, State of Environment and Outlook Report: Environment for Sustainable Economic Growth.

⁶¹ GoM 2015. Malawi, National Disaster Risk Management Policy.

⁶² Pauw, K. J., T., Bachu, M., Van Seventer, DE, 2011. The economic costs of extreme weather events: A hydro-meteorological CGE analysis for Malawi. *Environ. Dev. Econ*, 16(2), 177-198.

⁶³ Pauw et al op. Cit.; GFDRR et al. (2009)

⁶⁴ Global Facility for Disaster Reduction and Recovery, the (GFDRR); International Food Policy Research Institute (IFPRI); RMSI Pvt Ltd. (RMSI); World Bank, the (WB). 2009. Economic vulnerability and disaster risk assessment in Malawi and Mozambique. Available: <http://preventionweb.net/go/15520> [Accessed 15 August 2015].

⁶⁵ World Bank and RMSI (2009) Malawi: Economic Vulnerability and Disaster Risk Assessment report

139. According to the Malawi government's Climate Proofing project document⁶⁶ climate change effects are fast unfolding in Malawi. Drought destroys an average 4.6% of maize production each year in Malawi⁶⁷. Children, the elderly and female-headed households tend to suffer most from droughts through malnutrition and consequential high susceptibility to diseases, including HIV/AIDS. In addition, livestock and wild animals are adversely affected by drought. Urban households as well as those engaged in off-farm activities also suffer from droughts due to higher food prices and declining non-farm wages. Droughts result in reduced river-flow rates and sometimes the complete drying up of rivers. The water table also recedes, thereby affecting boreholes and wells, which are major sources of potable water in rural areas.

140. Both droughts and floods constitute a major obstacle for agriculture and food security in the country. Drought and flood events have resulted in low agricultural output, hence hunger, malnutrition and loss of human and animal life, as well as disruption of electricity, and many other socio-economic and industrial activities. These impacts have led to national disasters being declared every few years in the southern drainage of Lake Malawi as well as other vulnerable districts.

141. **Future climate hazards:** In the future, there is considerable uncertainty over the frequency and intensity of climate hazards in Southern Africa. There may be changes in the landfall patterns of tropical cyclones originating in the southwest Indian Ocean⁶⁸. Cyclones such as these led to flooding in the region in the 20th century. Projections from the IPCC 5th Assessment Report indicate both extremely low and extremely high rainfall may become more frequent in the coming decades although there remains much disagreement over this (ibid). While future projections of the frequency and intensity of extreme weather events in Southern Africa are uncertain, economic and social impacts of these events are likely to become greater.

1.2.3 Overall Livelihood Implications of Climate Change

142. With Malawi being one of the poorest countries in southern Africa, food insecurity is amongst the most pressing development issues for the country. Malnourishment, especially among under 5 year olds, is prevalent (42% MDG endline survey). Although major investments are being made into improving food security, several problems remain including that agricultural production both of crops and livestock can be water intense, meaning that water resources are under threat if not carefully managed⁶⁹.

143. Climate change risks projected for Malawi indicate that agricultural production, including crops and livestock, will be put under further pressure and that sustainable water management will become increasingly important to ensure long-term productivity. Extreme weather and climate events are continuously and increasingly putting the production systems, and the livelihoods of people, at risk. The catastrophic floods of 2015 in southern Malawi killed at least 170 people and displaced 27,000 households (approximately 135,000 people) and left many more without food security⁷⁰. In the last two decades, Malawi has experienced two

⁶⁶ GoM. 2013. Climate Proofing Local Development Gains in Mangochi and Machinga District (Draft 3 October 2013). LEAD/EAD/UNDP

⁶⁷ GFDRR et al., 2009

⁶⁸ Climate and Development Knowledge Network (CDKN). 2014. The IPCC's Fifth Assessment Report: What's in it for Africa.

⁶⁹ Source CIA World Factbook

⁷⁰ <http://www.dailymaverick.co.za/article/2015-01-19-from-drought-to-deluge-floods-devastate-malawi-and-mozambique> (accessed on 31 August 2015)

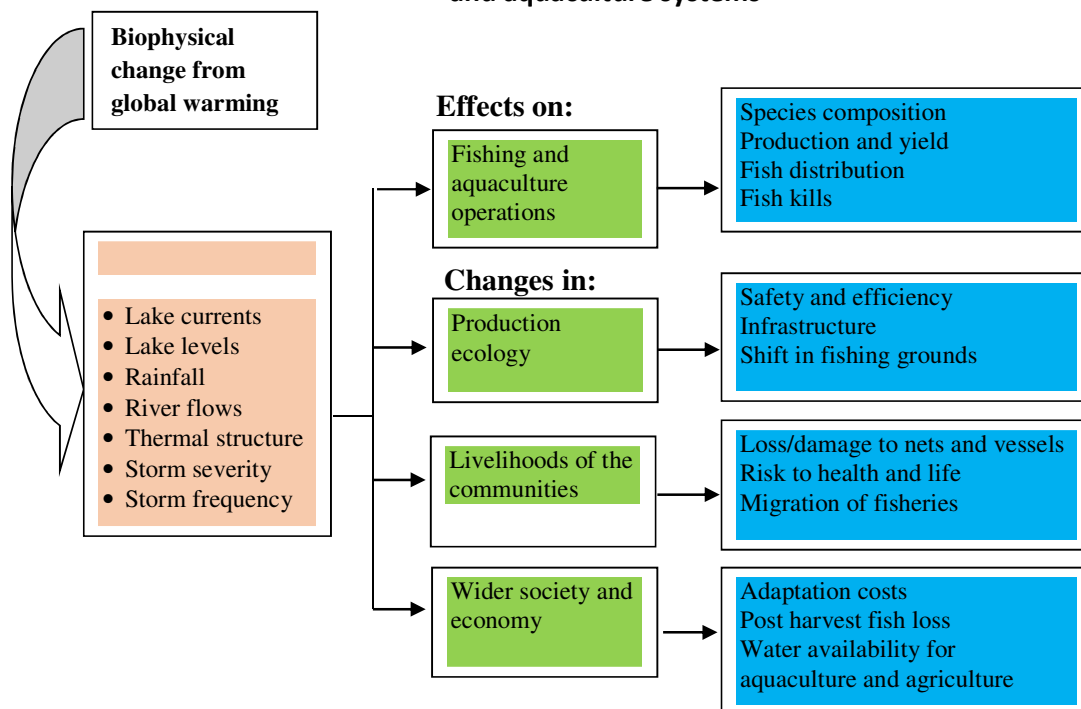
notable droughts; in the 2001/02, and 2004/05 rainy seasons⁷¹. The drought of 2001/02 affected 2,829,435 people⁷² and maize production alone was approximately 30% short of the estimated domestic demand. The 2004/05 drought plunged the country into one of the most severe food security crises in more than 60 years. At the peak of the crisis 30% of the population needed emergency food assistance and a total of 5,100,000 people, mostly farmers, women and children, were affected as a result of crop failure, insufficient water supply and malnutrition⁷³.

1.2.4 Climate Change Impacts on Fisheries and Fishers' Livelihoods

144. Worldwide, increasing seasonal and annual variability in rainfall and resulting flood and drought extremes are likely the most significant drivers of change in capture fisheries and aquaculture⁷⁴.

145. In this context, the vulnerability of fisheries and fishing communities depends on their exposure and sensitivity to change, but also on the capacity of individuals or systems to anticipate and adapt. It should be noted that vulnerability varies depending on capacity of communities, demographic groups or households (De Young et al. 2009). The authors further noted that generally, poorer and less empowered countries and marginalised groups or individuals are more vulnerable to climate impacts, and the vulnerability of fisheries is likely to be higher where they already suffer from overexploitation of fisheries resources or overcapacity within the fishing areas.

Figure 10 Conceptual framework of the climate change effects and impacts on fisheries and aquaculture systems⁷⁵



⁷¹ Nangoma, E., 2008. National Adaptation Strategy to Climate Change Impacts: A Case Study of Malawi, Human Development Report Office OCCASIONAL PAPER 2007/52.

⁷² World Bank, 2010

⁷³ Chabvungma S.D., J. Mawenda and G.Kambauwa, 2008. Drought conditions and management strategies in Malawi. Department of Climate Change and Meteorological Services, Lilongwe, Malawi

⁷⁴ World Fish 2007

⁷⁵ Adapted from Badjeck et al. (2010) and De Silva, et al (2009)

146. This situation is reflected at local level in the target locality of Lake Malombe, where climate change poses a range of direct and indirect threats to fisheries and fishers' livelihoods.

147. Temperature increases (see paragraph 135) have resulted in warming of the water column. In contrast to Lake Malawi, Lake Malombe is too shallow to face significant risk of associated upwellings of deep water and resulting fish kills; however, warming, while potentially leading to the accelerated growth of plankton and fish, is expected to lead to changes in species composition (of both plankton and fish), resulting in terms in modifications in the productivity of the lake and the economic viability of fisheries. In general, warm and cold-water species are being displaced and they are experiencing changes in the size and productivity of their habitats: increases in populations of lower value species (exacerbating the BAU trend) would further reduce the profitability of fishing. In consultations during the PPG phase, local stakeholders cited *mbaba*, *chambo*, *ntchila* and *sanjika* as species that have possibly been affected by climate change as their populations have decreased.

148. Temperature changes also affect fish physiological processes, resulting in both positive and negative effects on fisheries and aquaculture. Seasonality of particular biological processes such as reproduction, food webs, diseases and invasiveness of species are also likely to be affected.

149. Expected increases in rainfall variability (see paragraph 136) will increase variations in water levels in the lake. There is evidence of high levels of historical variability in water levels in the lake, dating from early in the 20th century, and both Lake Malombe and the nearby Lake Chilwa have at times dried up completely during extreme drought periods (see paragraph 16): and these variations are likely to become even more extreme and frequent, including also increases in the frequency of flooding events.

150. These variations in water level will have significant impacts on fisheries in the lake. Complete drying out results in complete "resets" for the aquatic ecosystems of the lake⁷⁶, until such time as refilling allows aquatic vegetation to recover and fish populations to be re-established through migration from neighbouring Lake Malawi. Historical research has shown that both increases and decreases in lake levels (even when they do not lead to complete drying) affect fish catch rates of most species, and with most types of fishing gear: increases in water level have a negative effect on catch rates with *kambuzi* seines, Chambo seines and *nkacha* nets, with a lag of one to three years: this is possibly explained by the fact that both *kambuzi* seines and *nkacha* nets target small species or juveniles of *Oreochromis* more effectively at periods of higher water levels resulting in lower recruitment a few years later, though it is not clear what could be the mechanism behind this. The exceptions are *Oreochromis* spp. caught by gillnets, where high water levels have a (expected) positive effect on catch rates four years later, and Cyprinidae caught by Chambo seines, with a positive effect three years later. Gillnets with the mesh sizes used in the lake catch three-year-old *Oreochromis* spp.: high minimum water levels give increased production three to four years later⁷⁷.

151. Other potential effects increased variability in lake water levels due to climate change include increased risk of water pollution from the newly inundated areas, in the form of

⁷⁶ <http://www.fao.org/docrep/005/y4593e/y4593e06.htm>

⁷⁷ Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003.

agricultural chemicals and domestic wastes, which have the potential to lead directly or indirectly to fish mortality; and negative effects on aquatic vegetation (with associated impacts on fish breeding and habitat) due to desiccation when lake levels drop for repeated or prolonged periods. Increased frequencies of flooding are also expected to result in growth in the numbers of snails, which may increase the incidence of Bilharzia disease in fishing communities, of which the snails are vectors.

152. During PPG consultations, fishers also cited increased occurrence of storms (associated with *mwera* or south-easterly winds, and *mpoto* or north-easterly winds) as a factor that constrained their fishing activities: they are reluctant to venture far from shore as they are concerned about the risk of capsizing and possibly drowning, which they described as becoming an increasingly common occurrence, especially for fishers operating with canoes or planked boats, and without life jackets.

153. Pond-based aquaculture is also vulnerable to the effects of climate change, in a number of ways including the following:

- Droughts, affecting the availability of water for fish farming (though temperature change may increase growth rates and higher production)
- Emergence and occurrence of fish diseases due to changing environmental conditions.
- Destruction of facilities during storms, leading to mortality and escape of fish, and loss of business.
- Limited supply of appropriate fish feed.

154. Baseline studies for the preparation of the GoM/LEAD/UNDP project “Climate Proofing Local Development Gain”⁷⁸ project preparation identified several vulnerabilities in relation to the fisheries and other related sectors which are in agreement with the climate change observation models described above. The main vulnerabilities identified around the southern tip of Lake Malawi, Lake Malombe and the upper Shire River basin include:

- Susceptibility to climate-related disasters such as floods, which heavily damaged infrastructure (roads, bridges, culverts, buildings, etc.) and gully erosion, especially in the areas of Mtakataka and Mbvumba;
- Massive soil erosion leading to siltation of rivers and shallow wells
- High rates of deforestation in the 90s (land use change from largely forest to cultivation of annual crops);
- Highly vulnerability to food insecurity, droughts and flash floods (the area west of Lake Malombe is a bare escarpment made susceptible to erosion through agricultural encroachment and the cutting of trees for domestic fuel-wood and fish smoking)

1.2.5 Gendered differences in vulnerability

155. Men and women from local communities, interviewed during the PPG phase, reported different priority issues of concern in terms of the impacts of climate change and climate-related disaster events.

Table 2. Gendered differences in concerns regarding climate change impacts

⁷⁸ GOM. 2013. Climate Proofing Local Development Gains in Mangochi and Machinga District (Draft 3 October 2013). LEAD/EAD/UNDP

Men	Women
<ul style="list-style-type: none"> - Business: business collapse as people fail to pay back loans, difficulty to do business, reduced access to business capital. - Productivity: reduced opportunity to do other work given the short term priority of looking for food for the family; failure to care for food gardens given the immediate priority of earning cash through piece; - Reduced fishing activity, leading to hunger and poverty, and high fish prices - Fatalities due to drowning during storm events, the collapse of buildings, or floods - Health problems: malaria, cholera and dysentery diseases, as well as HIV/AIDS due to poverty-related prostitution - Access to food: crop failure due to drought or floods as crops get washed away - Poverty due to lack of money or employment opportunities, - Fishing failure as fishing assets (gears and vessels) are damaged or destroyed - Other social problems: some men run away from their families, marriage/family problems, theft cases become common, working inconveniences as victims are mobilized into camps 	<ul style="list-style-type: none"> - Exclusion from decision-making processes and fishing due to cultural barriers - Prostitution since women go out looking for money hence promotes HIV/AIDS cases - Homelessness and hunger - Increase in casual labour - Women face tough times to take care of children, with difficulty in meeting some expected tasks like breastfeeding - Women and children suffer more as they remain at home while men migrate to other areas for safety - Divorce of marriages - No food as crops are washed away - Reduced income means failure to support families with food and women fail to service loans and sometimes their assets or property are forfeited - Reduced scale of business operations - Relocate to new areas with no access to credit - Hunt for food during hunger and look for a new settlement - Lack of school fees due to reduced fishing income - When there in an outbreak of a disease people fear to buy fish

1.2.6 Coping strategies at present

156. Local stakeholders involved in focus group discussions during the PPG phase indicated that they understood the term climate change in terms of variations in climatic factors. They also mentioned that they were aware about impacts of climate change on their livelihoods. Their main sources of information include mass media (radios), print media and meetings main religious ones. However, they lack capacity in terms of resources such as capital to deal with climate change related disasters.

157. Through PPG stakeholder consultations, disaster coping and adaptation mechanisms currently applied by local people were assessed by gender. Men indicated that during disasters, they resort to doing casual or piece work (*ganyu*), while women based on their available opportunities, start small business such as buying and selling any kind of food items they may get or make, such as fritters (*mandasi*).

158. In some areas, people receive relief support after disaster events, in the form of tents, food, kitchenware and clothes from the Government, non-governmental organisations (NGOs), civil society organisations, private sector and religious groups. Some indicated that they support each other by sharing food. However, they said that in order to avoid future recurrences of floods, they will resort to planting trees around their villages, migrate to upland areas which are not flood-prone, keep food, save money and constructing drains and storm bunds to divert water away from their houses.

159. Measures reported as being used for adapting to the impacts of climate change and strengthening resilience included:

- Diversification of skills and income-generating activities, as the basis for resilient livelihoods;
- Diversification of fishing practices
- Diversification of agricultural cropping practices
- Modification of agricultural practices, including the planting of early-maturing crops and the application of *dimba* (wetland) cultivation
- Application of local knowledge on weather trends when planning fishing

1.2.7 Baseline Initiatives

160. A diverse set of baseline initiatives relating to fisheries, aquaculture and climate change is underway in Malawi, of which a sub-set will be considered as co-financing for the project. These are implemented by Government, tertiary education institutions, local and international partners, including NGOs, and to some extent supported through development cooperation. The private sector is also investing, especially into the fisheries and aquaculture sectors. The most relevant baseline initiatives are described below.

161. Some of the previous strategies and measures applied to address the low chambo catches include introducing participatory fisheries management (popularly known as *Usodzi wa Lero*) in 1993⁷⁹, promoting the *Save the Chambo Campaign* in 2003 and subsequent development of the Chambo Restoration Strategic Plan (CRSP) in 2004⁸⁰. These efforts have mainly focused on the southern part of Lake Malawi which is most suitable chambo breeding. The on-going formulation of the Ecosystem Approach to Fisheries and Aquaculture (EAFA) for the southern Lake Malawi and Lake Malombe is broadly expected to address fisheries governance, socio-economic and environmental concerns including climate variability and change⁸¹.

Table 3: Relevant climate change-related projects nationwide

Name of Project/Activity	Objectives/Focus Area
Lower Shire	
Early Warning System (EWS) related work by GoM Department of Climate Change and Meteorology Services (DCCMS)	Establishing and improving existing climate monitoring and early warning systems in collaboration with other partners e.g. Water Department, Ministry of Agriculture, Irrigation and Water Development, Commission for Disaster Preparedness, Relief and Rehabilitation, and SADC Drought Monitoring Centre
National	
Climate change coordination related work by Department of Planning and Policy	Mainstreaming climate change in the national policy instruments and soliciting and coordinating CC investments and finance in Malawi
Climate Smart Agriculture by GoM/FAO/EU (01 Jan 2012 - 31 Dec 2014)	Aims to build the capacity to undertake and finance climate smart agriculture (CSA) through: <ul style="list-style-type: none"> - Building an evidence base for developing and implementing policies and investment for CSA; - Formulation of country-owned strategic frameworks and investment proposals for CSA; and

⁷⁹ Scholz et al. 1997

⁸⁰ GoM 2004; WorldFish 2004

⁸¹ Njaya 2013

Name of Project/Activity	Objectives/Focus Area
	- Building capacity for evidence-based planning, implementing and financing CSA including training of agricultural and CC policy-makers on issues of CSA
FAO Technical Cooperation Programme project, Implementation of the NAPA in the Fisheries Sector of Lake Malawi Basin (2014-2015)	Addressing elements of the NAPA priority projects 5, <i>“Improving climate monitoring to enhance Malawi’s early warning capability and decision making and sustainable utilization of Lake Malawi and lakeshore areas resources”</i> , and 1, <i>“Improving community resilience to climate change through the development of sustainable rural livelihoods”</i> with a focus on fisheries resources
University of Minnesota Large Lakes Observatory by University of Minnesota/GEF (2010 – 2013)	Conduct interdisciplinary research on water sustainability and climate in the Lake Malawi basin. Research involves examination of water use, food production, environment and climate in the basin in an effort to design more effective plans for improving livelihoods of local communities.
Agricultural Productivity Programme for Southern Africa (APPSA) by GoM at planning stage	Increasing productivity of maize, rice and legumes through the introduction of improved varieties and modern farming technologies.
Famine Early Warning Network – Malawi Food Security Outlook by USAID, UN WFP	EWS information system that focuses on agriculture.
Regional/national	
NEPAD-FAO Fish Programme (NFFP)	Strengthening regional capacities and efforts to develop and implement better governance systems, policy frameworks and instruments that enhance fishery and aquaculture contribution to economic growth, poverty reduction and food security in a sustainable and economically efficient manner.
Fish II Programme Africa by Caribbean-Pacific (2010-2014)	Support fisheries policy revision, enhance capacity in governance and fish value chain
District levels	
Improving Food Security and Nutrition Policies and Programmes Outreach (GoM/FAO/Flanders International Cooperation Agency): Kasungu and Mzimba districts)	To improve small scale irrigation, soil and water conservation, nutrition and health education and water and sanitation
Sustainable Water Usage in the Chinyanja Triangle Location Malawi (2010 – 2013) (Chinyanja Triangle)	To facilitate a shift from only improving aquaculture productivity to issues of water use and its governance beyond the farm level to ensure that innovative aquaculture developments fit into critical resource sustainability agendas
Building resilience to climate change impacts on the livelihoods of the fishing and fish farming communities in the Lower Shire River, Zambezi basin (2014/15) by UNEP (Nsanje district)	A pilot demonstration project that is focusing on fisheries governance, aquaculture, policy and gender analysis and publicity.

Table 4: Past and on-going projects related to climate change in the proposed project site (Mangochi)

Name of Project	Objective	Target Areas
Fisheries Integration of Society and Habitats (FISH) project (2014-2019)	To increase social, ecological, and economic resilience to climate change and improve biodiversity conservation within freshwater ecosystems through sustainable fisheries co-management	Southern lake Malawi, Lake Malombe, Lake Chiuta and Lake Chilwa
Cultivate Africa's Future (CultiAF) Project - a partnership between ACIAR, AIFSC and IDRC, together with Chancellor College of the University of Malawi, WorldFish, DoF Fisheries Research Unit and Peoples Trading Centre	To improve food security in Eastern and Southern Africa by funding applied research in agricultural development. In Malawi, the funds for supporting two projects which are titled: <i>Nsomba N'chuma</i> and <i>Improved Processing and Marketing of Healthy Fish Products in inland Fisheries in Malawi</i> are being implemented by	Regional/National
Ecosystem Approach to Fisheries and Aquaculture (EAFA) by GoM/FAO	To develop an EAFA plan for Mangochi fisheries	Mangochi
Integrated Landscape Management for food Security Enhancement	To build community and landscape capacity to produce diversified food through ecosystem based approach with the climate change context. The demonstration pilot will inform the ongoing revision of sectoral policies including water, irrigation, fisheries, meteorology and forestry	Group Village Head Changali, Mangochi

162. **Malawi Growth and Development Strategy (MGDS), 2011-2016.** Baseline investment into fish-based food security is estimated at MK5,809,000⁸². MGDS II is the second medium term national development strategy formulated to attain the country's long term development aspirations. It is the most important national policy that decisively sets out the development agenda for the country. MGDS II is built on thematic areas, namely: Sustainable Economic Growth, Social Development, Social Support and Disaster Risk Management, Infrastructure Development, Governance and Gender and Capacity Development as an additional theme. From these themes, the MGDS II derives nine key priority areas. Key priority areas directly related to this project are: Agriculture and Food Security, Integrated Rural Development, Climate Change, Natural Resources and Environmental Management. Explicit investments are being made under these priority areas (see Table 1), serving directly as a baseline to this project through, inter alia, sectoral plans and budgets (see on fisheries (DOF) and climate change (Table 3), below). The MGDS III development process will commence shortly.

Table 5: Additional baseline activities related to Climate Change and Natural Resources Management prioritised under MGDS II

Expected Outcome	Strategies	Constraints	Focus Actions and Activities
Increased livestock and fish production	Enhancing livestock and	Inadequate human and financial resources	Promote livestock re-stocking and farmer-to-farmer transfer systems

⁸² From MGDS II and includes livestock

fisheries productivity	Disease prevalence	Intensify farmer and staff training programs
	Inadequate support infrastructure	Intensify vaccination campaigns
	High cost exotic breeds	Develop support infrastructure
	Inadequate support services	Introduce improved, approved and registered exotic breeds of livestock with superior characteristics
	Lack of awareness	Recruit and train personnel
	Lack of fingerlings and feed	Promote village level fish farming schemes
		Provide fish fingerlings
		Facilitate local fish feed and fingerling production
		Increase use of modern technology by local communities and private sector for deep water fishing
	Provide fish landing facilities	

163. **Mangochi District Development Plan (DDP, 2011-2016).** Development planning at the district level is considered to reflect bottom up identification of priorities, and the DDPs are derived from village level consultations through established governance structures. As the decentralisation process in Malawi is proving slow to implement effectively, there are observed bottlenecks at this time. The Mangochi DDP has identified key priorities on food security and nutrition as well as on natural resource degradation. The fisheries and forestry sectors have been singled out as priority areas. Climate change is recognised though not yet fully mainstreamed.

164. **Department of Fisheries:** The annual budget of DoF in the 2013/14 financial year was US\$178,466, of which 11,591 was assigned to Mangochi district. Drawing from the significant baseline investments of DoF, and considering the continued financing of critical DoF inputs into the project delivery over the 5 year time frame, specific activities dedicated to this project amount to a DoF baseline/co-financing contribution of USD 1,500,000 to the LDCF project. The most significant contribution of DoF to the project, in operational terms, will be through the assignment of staff to fill key posts in the Project Management Unit (see Section 3), together with office space and other operational and logistical resources.

165. In addition to this baseline investment by Government (which is expected to be increased as a result of the policy influencing work proposed by the project), there is a significant amount of external funding that constitutes the baseline for the project, and will be considered as co-financing.

166. The **Fisheries Integration of Society and Habitats (FISH) Programme** (September 2014 until September 2019, USD 13.9 million) is financed by USAID and implemented by a consortium of eight partners led by Pact. USD5.5 million of the FISH programme funding is considered as baseline/cofinancing for this project, based on the degree of thematic and geographic overlap between the two project: these co-financing activities relate firstly to the overall knowledge base and policy context, and secondly to on the ground activities at the Mangochi District level and around Lake Malombe.

167. FISH supports the Government of Malawi’s efforts in fisheries biodiversity conservation and climate change adaptation, working closely with the Department of Fisheries (DoF). Its aim is to instil “*sustainable economic growth in threatened freshwater ecosystems & increased social, ecological & economic resilience*”. FISH will contribute to improved livelihoods of the shoreline and riparian communities and resource users. FISH is working with communities within a 10km radius around the four key lakes in southern Malawi, notably the South East Arm of Lake Malawi, Malombe, Chiuta and Chilwa.

168. The key issues addressed by FISH revolve around five aspects of fisheries in Malawi which are all relevant to this project:

- (1) Available science is not effectively used to inform management and decision-making
- (2) Low governance capacity and coordination at the district and community levels
- (3) Poor regulatory compliance
- (4) Lack of communication and coordination across stakeholder groups
- (5) Good practices are not brought to completion in a form that can be replicated and scaled-up

169. Currently studies are underway to: (a) Identify hotspots of anthropogenic threats to biodiversity, (b) Vulnerabilities to climate change, and (c) Other factors attributed to declining fisheries resources and (d) Those affecting fish value chains.

Table 6: Outputs and sub-outputs of FISH

Outputs	Sub-outputs
1. Utilization of science, analysis, and information for decision making increased.	1.1: Access to science, analysis, and information improved 1.2: Understanding of threats to biodiversity and options for conservation within freshwater ecosystems deepened 1.3: Understanding of effects of climate change on freshwater ecosystems and adaptation options for fisheries management strengthened
2. Enabling environment for conservation and management of freshwater ecosystems enhanced.	2.1: Legal framework for sustainable fisheries management and biodiversity conservation improved 2.2: Transparency, representation, and accountability in decision-making advanced 2.3: Institutional and community capacities for fisheries co-management and biodiversity conservation strengthened
3. Priority threats to freshwater ecosystem biodiversity reduced.	3.1: Improved natural resource management practices evaluated and promoted 3.2: Habitat restoration and riparian conservation measures stimulated and supported 3.3: Sustainable fishing practices evaluated and promoted
4. Adoption of climate change adaptation measures that support resilience of communities and freshwater ecosystems increased.	4.1: Ecosystem-based adaptation solutions identified, evaluated, and promoted 4.2: Alternative, scalable, and sustainable climate-resilient livelihood options stimulated, evaluated, and promoted

170. During the PPG phase, intensive discussions were held between the project formulation team (including DoF) and the implementation team of FISH, to identify areas of synergy and complementarity, and avoid duplication of efforts. The main conclusions from these

discussions, which took into account that at the time FISH had been under implementation for 17 months, are summarised in Box 3:

Box 3: Synergies and complementarity between the FISH and LDCF projects

- The FISH project is implemented through a non-Governmental consortium of partners under contract to USAID, whereas the LDCF will be directly executed by the Department of Fisheries of GoM (with support from FAO as GEF Implementing Agency); the latter will therefore have a stronger focus on developing institutional capacities within the government to sustain the proposed model of CC resilience.
- As it is executed by Government, the LDCF project will have the potential to exercise direct policy influence in a way that FISH will not be able to; it will therefore function as a direct channel into policy of the lessons and messages generated by FISH.
- The two projects will work at different levels in geographical terms: FISH will cover four lakes, whereas the LDCF project will focus only on Lake Malombe, allowing more detailed site-specific lessons to be generated that will feed into the FISH project.
- The LDCF project will address aquaculture, and its climate-proofing and integration into resilient livelihood support systems, whereas the main focus of FISH will be on capture fisheries.
- The LDCF project will have a more specific focus on promoting the status and climate resilience of chambo fisheries in Lake Malombe, given the high value of this species and its corresponding particular potential, if fisheries are restored, to contribute to the livelihoods of vulnerable local communities; FISH will have a broader focus in terms of species.
- The FISH project will invest strongly in the generation of technical information to guide fisheries management; while the LDCF project will support a limited number of highly applied studies of direct relevance to CCA, it will principally complement FISH by developing capacities in GoM and others for managing and applying the resulting information in adaptive management. The LDCF project will utilise the Knowledge Management System and digital repository created by FISH to source and disseminate information on CC resilience and other technical messages on fisheries and aquaculture.
- The Fisheries Science and Technology Advisory Panel (FSTAP) established by FISH will advise on a wide range of fisheries science issues of interest; the 'think tank' proposed under the LDCF project will be a coordination and advisory platform where all fisheries and aquaculture climate change-related projects within the fisheries sector will share experiences, challenges and lessons.

171. **DCCMS:** baseline/cofinancing from DCCMS is estimated at USD 300,000 over the life of the LDCF project. This includes investments into establishing a national climate monitoring and early warning system (EWS), as well as coordination of a clearing house mechanism for all climate change related work in Malawi and facilitating multi-stakeholder coordination in this regard.

172. **FAO TCP/MLW/3504.** This project was developed in order to fill gaps identified in the LDCF project, namely the need for the introduction and operation of a Vessel Monitoring System (VMS) in the South-East Arm (SEA) of Lake Malawi, and feasibility studies, required to generate baseline information for the LDCF project, including:

- Biological and ecological habitat assessment and mapping;
- Fish stock assessment;
- Detailed aquaculture feasibility study; and
- Strategic environmental assessment.

173. Due to changes in the geographical focus of the LDCF project during the PPG phase, limiting it to Lake Malombe, the elements of the TCP dealing with VMS on Lake Malawi are no longer relevant as baseline/co-financing. The total funding of the TCP now allocated as co-financing contribution to the LDCF project is around USD300,000.

174. The **LUANAR/ BUNDA College for Agriculture, Lilongwe** provides technical support and expertise especially on fisheries systems, management and aquaculture development: this will equate to a co-financing contribution to the LDCF project of USD750,000.

1.2.8 Remaining Barriers to Addressing Climate Change Vulnerabilities

175. Despite the significant baseline of investments set out above, a number of barriers remain to the sustainable reduction of fishing communities' vulnerabilities to the effects of climate change.

Barrier 1: Limited knowledge and understanding of climate risks associated with the fisheries sector

176. Abilities to formulate and apply appropriate and effective responses to the climate-related risks affecting fisheries and fishers' livelihoods are limited by inadequate access on the part of policy- and decision-makers to reliable and up to date information on the status of the natural resources in question, including trends in environmental factors and health indicators for the ecosystem and the fisheries system per se. Overall understanding of climate change risks for the fisheries sector, as well as its impact on the fisheries value chain and household economics, is disorganized and often limited. Climate change related work tends to be pursued only on an *ad hoc* basis as and when project funding becomes available.

177. Fisheries-dependent local fishing communities lack access to reliable early warnings of storm and flood events, tailored to their needs and conditions, that would allow them to formulate and apply appropriate preventative and adaptive measures: this poses a significant risk to the lives of fishermen on the Lakes and is one of the particular needs that is well captured by the NAPA.

178. These deficiencies exist despite the fact that fisheries are included as part of the national CC plans such as the NAPA and NAPA follow-up, and the formal DoF programme includes policy review and research. DoF is represented on the multi-sectoral platforms on CC that CCP is coordinating: relevant multi-stakeholder platforms have been set up to facilitate research, and evidence-based policy discussions as well as decision-making at policy level by the program; however, fisheries and aquaculture are not prominently addressed.

179. Capacity shortcomings are one of the main reasons for the limited number of research studies that have been undertaken in the area of fisheries, particularly in relation to the adverse effects of climatic change. The capacity in the country to study "resource responses" is low⁸³: so far, studies undertaken to understand the effects of climate change on fisheries have been anecdotal and no time series exist. Some of the bio-physical and chemical nutrient responses require modelling to be studied, but such skills are in short supply and there is need for specific training targeting methodological aspects in the sector.

180. Generally, research referring specifically to the target lake ecosystem and its functioning, especially in the context of climate change, is very rudimentary. The DoF maintains two research units, one based in Monkey Bay in Mangochi District (on the shores of the south end

⁸³ Msiska (2009)

of Lake Malawi), with a fairly strong staff complement, however operational capacities there for research and monitoring are low: the Monkey Bay Fisheries Research Unit is poorly equipped, the laboratories only hold basic research equipment, and overall funding for specific monitoring and research activities is lacking.

181. A compounding problem is that research results and other relevant information, for example, regarding which fisheries management and resilience strategies do or do not work, does not generally penetrate to District and local levels for incorporation in plans and actions related to fisheries and aquaculture.

Barrier 2: Inadequate Policy, Regulatory and Institutional Frameworks to Support CC-Resilience Strategies

Policy and Regulatory Weaknesses

182. Progress has been made in formulating CC-related policies at national level, however the draft National Climate Change Policy and Disaster Risk Management Policy⁸⁴ have both yet to be approved. Neither of these draft documents coherently and specifically highlight climate change issues in the fisheries sector. For example, in the draft National Climate Change Policy, adaptation and mitigation issues are mentioned in the agriculture, energy, industrial processes, waste management, forestry, water resources, and wildlife sectors, but not specifically in the fisheries sector.

183. Both the Malawi Growth and Development Strategy (MGDS) and the National Adaptation Programme of Action (NAPA) recognise the climate challenge as an integral part of the sustainable development agenda. The MGDS, launched in 2007, was designed as the overarching operational medium-term strategy for Malawi to attain the nation's Vision 2020 and Millennium Development Goals (MDGs) for the period 2006-2011, with the main aim to create wealth through sustainable economic growth and infrastructure development as a means of achieving poverty reduction. However, most of the strategies proposed are predominantly agricultural sector oriented.

184. Similarly, in the draft Disaster Risk Management Policy the fisheries sector is not highlighted. For example, in the proposed subcommittees of National Technical Committee that will set up to monitor and guide disaster risk management, its membership by sector includes the following: (i) agriculture and food security; (ii) health and nutrition; (iii) water and sanitation (iv) early warning; (v) response and recovery; (vi) search and rescue; and (vii) transport and logistics.

185. Through its own sector-specific investment framework, the Agricultural Sector Wide Approach (ASWAp) of the Ministry of Agriculture, Irrigation, and Water Development (MoAI&WD) promotes the implementation of climate smart agriculture as the best way to deal with the adverse effects of climate change in a predominantly agricultural economy. However, principles of climate smart agriculture do not seem to be being reflected in the implementation of the ASWAp⁸⁵. Funding levels for the Environmental Affairs Department (EAD) which is the focal point of climate change activities, is quite low to enable it to adequately fulfil this particular coordination role

186. The National Adaptation Programme of Action (NAPA) for climate change on fisheries was finalised in 2004 by a team of consultants to guide preparedness initiatives for responding to

⁸⁴ http://www.cepa.org.mw/publications_legislation

⁸⁵ Chinsinga et al. (2010)

climatic effects. Effects of droughts, flooding and agricultural performance on fisheries and the fisheries sector are some of the key aspects highlighted in the NAPA: there was, however, limited coverage of areas that are considered to be particularly affected by climate change. A major concern was the focusing of lake-wide monitoring on Lake Malawi only, leaving out other water bodies such as Lakes Chilwa, Chiuta, Malombe and the Lower Shire River systems, where fisheries contribute significantly to the livelihoods of the riparian communities and where vulnerability to climate change impacts is particularly high, with frequent occurrence of recessions and floods and prevalence of diseases such as cholera.

Table 7. Reflection of fisheries and vulnerability issues in key policy instruments

Criteria	NAPA	NC	MGDS	UNDAF	CAADP	Review 2011
Importance of sector noted	X	X	X			X
Specific vulnerabilities identified (of relevance to the sector)	X	X	X			X
Women/vulnerable groups identified	X	X				X
Specific actions proposed to address the vulnerabilities	X	X	X	X		X

Source: FAO/NFFP (2013)

187. So far there has also been limited integration of climate change risk mitigation or adaptation into policies, programmes and activities specific to the fisheries sector. While acknowledging challenges being experienced within the natural resources and environment, the current Fisheries Policy lacks a coherent area in relation to climate change issues within the sector.

188. The draft Implementation, Monitoring and Evaluation Strategy has a number of significant gaps in relation to climate change, including the following:

- (a) It is weak on building resilience within the fishing and fish farming communities.
- (b) Disaster risk management is not well elaborated as a key aspect to how putting in a place a responsive mechanism for the vulnerable areas.
- (c) Climate change issues appear to be specifically recognizing Lake Malawi leaving out other equally vulnerable ones such as Lakes Chilwa, Chiuta and Lower Shire fisheries (see strategy 3 in Box 2 above).
- (d) Activities on the early warning system are not strongly outlined in the Strategy
- (e) It only highlights roles of the forestry sector leaving out the roles of other sectors such as meteorology, disaster, water, environment, land resources, agriculture which impact on the aquatic environment (see strategy (e) in the Box above).
- (f) While monitoring (strategy a) and mitigation measures (strategy d) are mentioned, the adaptation strategies are not highlighted.

189. Furthermore, there is no specific Code of Conduct on climate resilient aquaculture development in Malawi. This makes any promotion of aquaculture vulnerable to climatic risks and may render development investments unsustainable.

190. At the local level, District by-laws on fisheries have still not been endorsed and ratified and, as such, management measures and regulations cannot be enforced.

Limited Institutional Capacities

191. Capacity at various levels including central and local governments, non-governmental organisations, private sector, research institutions and community is either weak or lacking. Response to disasters caused by climate-change related issues like floods varies between genders, localities and fishing grounds.

192. DoF is hampered by lack of manpower for extension services, data collection, stock assessment and surveillance, as well as enforcement and management, without fisheries conflicts and infractions with implications for resilience cannot be adequately addressed. Table 8 highlights key capacity gaps identified during the PPG phase.

Table 8 Capacity gaps and priority areas identified during the PPG phase⁸⁶

ISSUE	GAPS
Climate Change Education	<ul style="list-style-type: none"> • Insufficient learning materials/tools on climate change • Inexperienced educators in the field of climate change
Climate change Research	<ul style="list-style-type: none"> • Inadequate climate change risk assessment methods • Lack of proper equipment to gather real-time meteorological information along the lakeshore. • Modeling climate change effects on aquatic life i.e. plankton and fisheries • Lack of technical capacity i.e. computational limitations to handle the output global models • Lack of coordination among research groups – different researchers working individually to serve the interests of their organisations • Limited participatory action research (PAR) in climate change research and development • Limited knowledge of levels of greenhouse gases
Climate Training and Capacity Building	<ul style="list-style-type: none"> • Scarcity of experience and financial capacity of governments in managing climate change studies • Mobilization of the academia to include climate change and or meteorology in their curriculum • Shortage of technical equipment and laboratory, facilities as well as the lack of skill of the staff to carry out necessary analyses • Lack on trained manpower - Shortage of well trained staff that are conversant with climate change science and dynamics of the climate system as most National Universities do not offer such courses at graduate or post-graduate level
Climate Change Communication and awareness	<ul style="list-style-type: none"> • No proper sharing mechanism for climate change data. Organizations collecting climate change data have no user-friendly platform for data integration and sharing • Limited information on the effect of climate change on fisheries

193. **Departmental staffing levels:** based on the recent functional review that was approved by the Government in 2013, The Department of Fisheries has an authorized establishment of 665 posts across the country. By end of the 2013-2014 Fiscal Year, a total of 526 posts were filled thereby representing a vacancy rate of 20.9%. Women representation was at 11% of the workforce which is quite low. Table 9 presents a summary of the staffing levels of the Department.

⁸⁶ Njaya 2015: Climate Change Adaptation in the Fisheries Sector in Malawi: Policy and Institutional Analysis and Capacity Assessment

Table 9 Staffing level of the Department of Fisheries as at 30th June 2014⁸⁷

Grade	Authorised posts	Male	Female	Filled posts	Vacancy Rate (%)
D	1	1	0	1	0
E	8	3	0	3	62.5
F	15	8	2	10	33.3
G	23	13	2	15	34.8
H	2	0	0	0	100
I	59	34	4	38	35.6
J	17	6	2	8	52.9
K	63	32	7	39	38.1
L	33	17	9	26	21.2
M	179	92	33	125	30.2
N	45	38	1	39	13.3
O	22	13	6	19	13.6
P	110	90	9	99	10.0
Q	2	1	0	1	50.0
R	86	98	5	103	-
TOTAL	665	446	75	526	20.9

Source: Department of Fisheries Annual Report (2014/15 FY)

194. In the case of Mangochi Region, the vacancy rate is about 38% (Table 10). Several vacancies are being filled up at both district and national levels following the functional review exercise that the Department of Fisheries completed and was approved in 2013. The highest vacancy rate is registered in the Enforcement Services (43%) followed by Extension Services (40%). The lowest vacancy rate of 30% was in the Management and Support services.

Table 10 Vacancy rate for Mangochi District Fisheries Office as of 12 March 2015

Name of Post	Grade	Authorised posts	Posts Filled	Vacant Posts	Vacancy %
<i>Sub-Programme 02 - Management and Support Services</i>					
Principal Fisheries Officer	G	1	1	0	0
Senior Ass Accountant	J	1	0	1	100
Ass Human Res Man Officer	K	1	1	0	0
Senior Accounts Assistant	L	2	0	2	100
Accounts Assistant	M	1	1	0	0
Clerical Officer	M	2	2	0	0
Copy Typist	M	2	1	1	50
Drivers	N	2	1	1	50
PBX Operator	O	3	3	0	0
Messenger	P	1	0	1	100
Security Guard	P	3	3	0	0
Boatman	Q	1	1	0	0
Total		20	14	6	30
<i>Sub-Programme 10 - Extension Services</i>					
Fisheries Extension Officer	I	1	0	1	100
Senior Assis Fisheries Officer	J	1	0	1	100
Ass Fisheries Ext Officer	K	2	1	1	50

⁸⁷ Idem

Assistant Statistician	K	1	1	0	0
Senior Fish Marketing Ass	L	1	1	0	0
Fish Marketing Assistant	M	2	0	2	100
Fisheries Assistant		6	1	5	83
Fisheries Extension Assistant	M	7	7	0	0
Fish Master	M	1	0	1	100
Marine Attendant	N	2	1	1	50
Head Fish Scout	O	2	1	1	50
Fish Scout	P	14	11	3	21
Total		40	24	16	40
Programme 14 - Extension Services: Sub-Programme 08 - Enforcement Services					
Senior Ass Fisheries Officer	J	1	0	1	100
Ass Fisheries Officer	K	1	0	1	100
Senior Technical Assistant	L	1	1	0	0
Fisheries Assistant	M	4	3	1	25
Total		7	4	3	43

195. This situation is exacerbated by high levels of staff turn-over, mainly at professional level: between 1995 and 2014 the 25 staff members including researchers had resigned from their work within the department of Fisheries. The majority of the staff members joined universities after the introduction of fisheries and aquaculture programmes.

196. Although not as yet objectively quantified, a further limitation lies in the technical knowledge of staff in DoF and other institutions regarding climate change issues. This is largely due to the limited emphasis that is placed on climate change issues in the curricula of institutions of higher learning and training in the country, such as Mzuzu University (MZUNI), from where many DoF technical staff come. Furthermore, there are limited opportunities for staff to update their technical knowledge due to the limited availability of user-friendly publication materials on relevant CC-related issues.

Limited financial resources

197. In 2003 the Chambo Restoration Strategic Plan (CRSP) was prepared and included in policy priorities of the Department of Fisheries, but subsequently no dedicated funding could be mobilized to advance on the CRSP. In the 2013-2014 Financial Year (FY2013-14), the Department of Fisheries had a total approved budget of MWK 123,845,711.61 (around USD178,466) for all its 6 Cost Centres (see Table 11). The very low level of this budget allocation is compounded by a limited capacity to execute the available resources, as shown by the fact that only 56% of this approved budget was actually disbursed and 91% of that (51% of the approved amount) was actually spent.

Table 11 Financial status by Cost Center of Department of Fisheries during FY2013-14 (Malawi Kwacha – MWK)

Cost Center	Approved	Disbursed		Spent	
		Amount	% of approved	Amount	% of disbursed
051 - Fisheries Hqs	49,060,099	20,380,382	41.54	16,664,615	81.77
052 - Mangochi	8,043,550	5,911,882	73.50	5,911,882	100.00
053 - Div South	18,115,262	7,072,231	39.04	6,994,081	98.89
054 – Fisheries North	14,022,863	7,811,904	55.71	7,811,812	100.00
055 – Regional Centre	16,321,170	6,774,086	41.50	4,379,920	64.66

062 - MCF	18,282,768	21,802,053	119.25	21,801,953	100.00
TOTAL (MWK)	123,845,712	69,752,538	56.32	63,564,263	91.13
TOTAL (USD)	178,466	100,516		91,598	

198. Cost Centre (CC) 051 is responsible for general administration and support services; CC052 and CC055 for capture fisheries research; CC053 and 054 for aquaculture research and finally 062 for training. The total of MWK 27.6 million allocated to various research activities in both capture fisheries and aquaculture was not adequate even for just lake-wide monitoring as highlighted in the NAPA.

199. The approved budget for Mangochi District Fisheries Office for the past five Financial Years has ranged from K7.6 to K10.8 million (0 12). Actual disbursement ranged from 70% in 201/14 to 100% in 2010/11 and 2012/13 Financial Years. The main activities implemented by the district include the following:

- Fish catch data collection: done on a monthly basis
- Licensing: during specified periods depending on resource availability
- Enforcement: mainly during closed season
- Extension: done throughout the whole year
- Aquaculture: during the whole year
- Frame survey: between September and October
- Supervision at all levels

Table 12 Approved and disbursed amount for Mangochi District (2010/11-2013/14/ FY

Financial Year	Approved Budget (MWK)	Actually Disbursed (MWK)	% of Approved Amount
2010/2011	7,557,095	7,553,956	100
2011/2012	7,557,095	6,797,869	90
2012/2013	7,557,095	7,557,095	100
2013/2014	8,690,659	6,088,728	70
2014/2015	10,745,048		

Source: Mangochi District Office

200. The limited availability of financial resources to support fisheries resilience is on one side due to the overall economic situation of the country, and consequently overall limited availability of recurrent budget; this is exacerbated by the limited reflection in policy instruments, and therefore in specific budgetary allocations, of the priority accorded to these issues by the Department of Fisheries.

Barrier 3: Inadequate Capacities and Resources at Local Level to Sustain CC-Resilience Strategies

Dysfunctional co-management and related law enforcement arrangements

201. DoF has implemented a community-based approach to co-management of fisheries resources, including in the Lake Malombe area, in the past: this has involved the implementation of specific community-support interventions, including on the management of resources, harvest processing and access to markets, covering a full production chain of the sector for artisanal fisheries. Relevant legislation is in place guiding fisheries related regulations on net type and size, seasonal fishing incl. closed seasons, allowed catch sizes etc.; however, surveillance and enforcement approaches are ineffective and dysfunctional at this

time. By-laws have been partially developed on district and sub-district levels, but have not come into force in most areas.

202. Governance challenges either through the co-management arrangements or decentralised structures have been highlighted in various reports (Hara et al 2002; Donda 2001; Njaya 2002 and 2007; Njaya et al 2012). There are attributable to a number of factors including:

- Limited participation of the fishers in user representation committees (Beach Village Committees or BVCs);
- BVCs having limited accountability to the fishing communities;
- Lack of clear roles of each actor (fishers, traditional leaders and DoF);
- Lack of embeddedness of the user committees or structures in decentralised structures such as Village Development Committees (VDCs), Area Development Committees (ADCs) and District Councils (DCs);
- Lack of incentives in form of district fees to sustain activities of the BVCs
- Inadequate power for the BVCs to sanction offenders;
- Weak capacity in DoF and district councils to support BVC activities, especially enforcement patrols.

203. Additionally, the lack of approved by-laws with management plans and agreements has contributed to weak BVCs, as there are no monitoring tools to guide implementation of the agreed plans. The existing decentralisation framework for popular community participation is only partially being implemented, as all fisheries staff are largely accountable to DoF and not to district authorities, while in an ideal situation they would be fully accountable to the Ministry of Local Government and the role of DoF would be limited to policy directions.

204. In consultations carried out during the PPG phase, over 80% (N=121) of the respondents reported that BVCs were weak and lacked support from DoF. A study by Njaya and Banda (2005) indicated that only 30% of the fisher respondents (N=158) were involved in formulating management measures for southern Lake Malawi. In terms of access controls, about 95% of the respondents in all the villages stated that chiefs control use of beaches through delegation of their powers to the beach chairs or *ndunas* (advisers to the chiefs). This shows that the responsibility in controlling who lands on the beach is bestowed on the traditional leaders and not the BVCs.

Limited technical capacities for the formulation and implementation of livelihood resilience strategies

205. As explained in Sections 1.1 and 1.2.1, people in the fishing communities targeted by the project currently have low levels of livelihood resilience due to their dependence on a limited range of livelihood support options: the individual elements are typically vulnerable to the impacts of climate change, and they have limited fall-back options in the event of their failure.

206. Aquaculture has potential as an alternative source of income for local communities who are land secure and have adequate capital for investment and whose livelihoods are affected by the decline of capture fisheries and land-based production systems, phenomena which are exacerbated by the additional stresses imposed by climate change.

207. Until recently, experiences with aquaculture in the country have been generally disappointing, with low levels of productivity and profitability (see Figure 4 in Section 1.1.5 above). Recent results give more scope for optimism, showing the potential for productivity

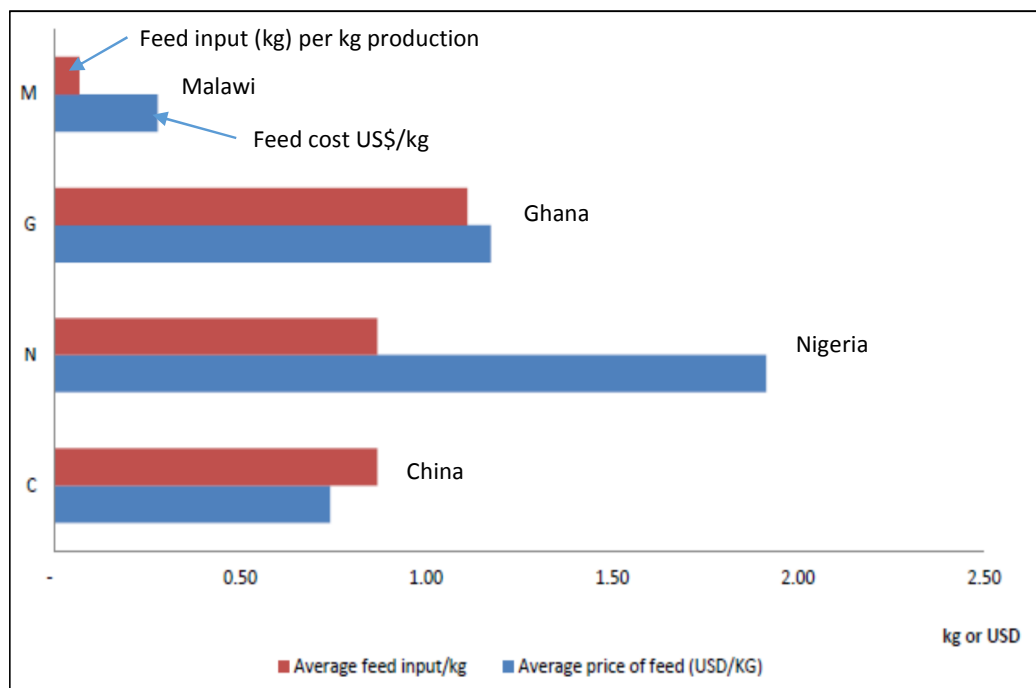
in Malawi to be more than doubled through changes such as improvements in the quality of feed, but this potential has yet to be realised to any significant degree at field level. Poor performance to date has been due to a combination of factors including inadequate technical practices and poor market linkages.

208. To date, profitability has been constrained in part by the need for high levels of expenditure on fingerlings, due to high mortality rates (in the order of 74% compared to between 12 and 21% in China, Nigeria and Ghana). At the same time, productivity has been constrained by the tendency of many producers to invest little in quantity and quality of feed (see Figure 11); although recent improvements have significantly increased productivity in some cases. The resulting cost structure, dominated on the one hand by high levels of investment in fingerlings due to high mortality rates, and on the other by low levels of investment in feed, is shown in Figure 12.

Table 13 Comparison of fingerling costs in China, Nigeria, Ghana and Malawi⁸⁸

	China	Nigeria	Ghana	Malawi
No. of fingerling needed per kg production@100% survival rate	1.6	0.7	1.94	15.38
Fingerling unit price	\$0.03	\$0.06	\$0.05	\$0.02
Fingerling price/kg output (theoretical)	\$0.048	\$0.042	\$0.097	\$0.31
Actual fingerling cost/kg output	\$0.06	\$0.04	\$0.16	\$1.02

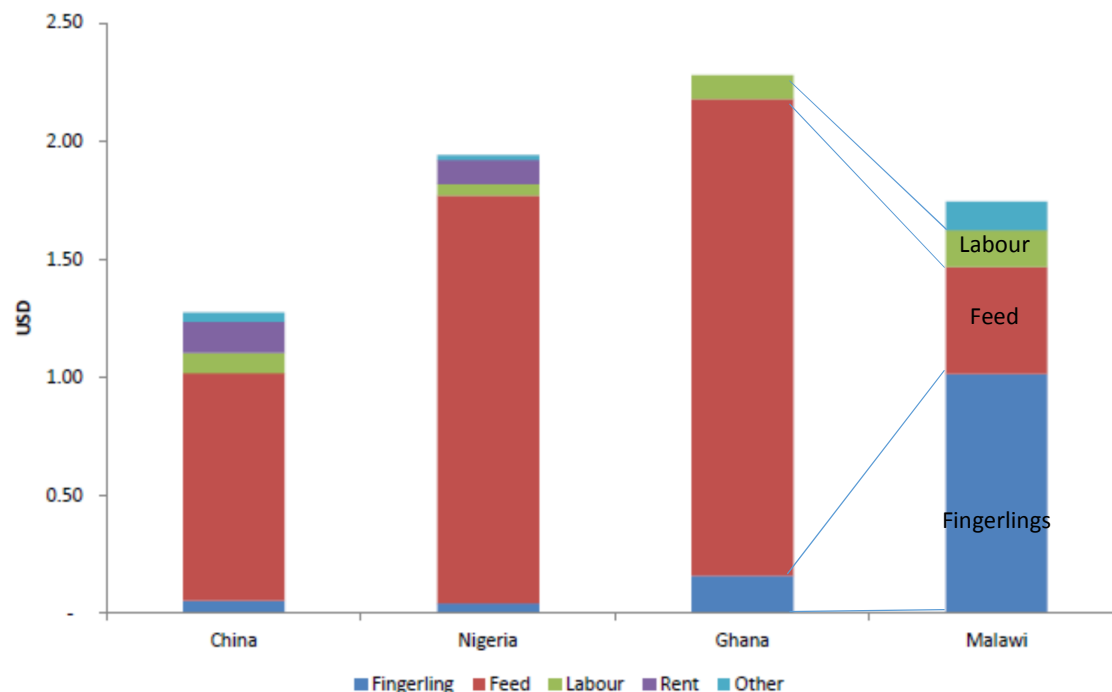
Figure 11 Comparison of investments in aquaculture feed in Malawi, Ghana, Nigeria and China⁸⁹



⁸⁸ Aquaculture in Africa – Unlocking the Potential. AU-IBAR Aquaculture Think Tank Meeting Cairo, 7th February, 2016. John Linton, Natural Resources Institute, University of Greenwich (DFID/Africa, Britain , China (ABC) Cooperation Programme)

⁸⁹ Idem

Figure 12 Comparison of cost structures of aquaculture between China, Nigeria, Ghana and Malawi⁹⁰



209. These constraints that have faced aquaculture to date, and limited its potential to contribute to local livelihoods, are largely due to inadequate technical knowledge on the part of producers; this in turn has resulted from limited human, technical and financial capacities in DoF for carrying out aquaculture, and also to the limited flow of technical information from national academic and research entities.

210. Past failures in promoting aquaculture as a stand-alone enterprise have also been due to a mismatch between the technologies promoted and the access of producers to the human and financial resources required or their successful application⁹¹. Under these conditions, its potential as a resilience alternative is therefore likely to be limited to those actors with relatively high investment capacity, who are typically the least vulnerable to climate change, thereby perpetuating the social inequities that have to date characterised the capture fisheries sector.

211. In addition to these (surmountable) problems with aquaculture to date, its dependability as a CC-resilience option, to compensate for the decline in existing income from capture fisheries and agriculture, is limited by the fact that little attention has been given to date to ensuring that it is itself climate-resilient: this means that promoting it as a CC-resilience option may simply result in exposing producers to new risks.

212. The promotion of other productive options as livelihood support and resilience initiatives has typically focused on a limited range of alternatives, with a relatively narrow technical focus: the result is that livelihoods have failed to be adequately diversified (a necessary aspect of resilience), and the practices that have been promoted have in some cases failed to integrate well into the complex social and productive conditions of existing farming and

⁹⁰ Idem

⁹¹ IFAD/CGIAR Working Paper AAS-2013-03

livelihood systems. A recent survey into the impacts of training on integrated agriculture and aquaculture in Malawi found, for example, that “the training contents were always restricted to technical aspects in aquaculture and none included information to provide a holistic understanding of the aquatic ecosystem and embrace farmers as partners in technology development. Indigenous knowledge of the farming community was not taken into consideration during designing of training and was not supported with management tools for own assessment of the status of their aquaculture practices and to facilitate own decision-making.”⁹²

⁹² <http://www.aqua.stir.ac.uk/development/malawi/output6>

1.3 THE GEF ALTERNATIVE

1.3.1 *Development objective, project objective, outcomes and outputs*

213. The project objective is *to improve the resilience of fishing communities around Lake Malombe to climate change.*

214. To achieve this objective, the project has been structured into four components:

- **Component 1:** Strengthening knowledge, information supply and awareness regarding climate change and its implications.
- **Component 2:** Creating a favourable enabling environment of policies, plans and regulatory instruments for the promotion of climate change resilience in the fisheries sector
- **Component 3:** Strengthening capacities at local level to increase the resilience of fishing communities to climate change.
- **Component 4:** Monitoring and Evaluation (M&E) and Adaptation learning

1.3.2 *Resilience strategies*

215. The project will promote an integrated package of resilience strategies, which will build upon the coping strategies already applied by local communities, and may as necessary be adapted to reflect local variations in conditions and needs.

216. The formulation of the resilience strategies to be promoted through the project responds to a number of strategic considerations, in addition to the nature of the climate change stresses themselves (see section 1.2.4):

- Under the “business as usual” scenario, fisheries on Lake Malombe are already in a state of collapse, due to overfishing resulting primarily from high levels of use of inappropriate gear (see section 1.2.1). Climate change threatens to accentuate and accelerate the existing processes of decline, while increasing some pre-existing stresses (such as lake level variations) from manageable to critical levels. There is therefore a need for “no regrets” actions to correct the drivers of this decline, at the same time as introducing additional measures to counter the additional stresses imposed by climate change and to improve the resilience of fisheries and livelihoods to climatic shocks.
- The actors with least ability to adapt to climate change through switching livelihood support options are the poorest. Those with greater access to economic resources, who currently own most of the factors of production in the form of fishing boats and gear, are considered to have a relatively high capability to adapt by investing their capital in alternative businesses⁹³. There is therefore a need to ensure that adaptation strategies are formulated in such a way as to maximise their benefits for the poor, both through improvements to their own production systems and through the generation of employment opportunities and other economic multiplier effects as a result of improvements to production systems managed by the less poor.

⁹³ The “Lords of Malombe: An Analysis of Fishery development and Changes in Fishing Effort on Lake Malombe, Malawi. M. Hara and E. Jul-Larsen. In: Management, Co Management or No Management? Major dilemmas in southern African freshwater fisheries. 2. Case studies. FAO FISHERIES TECHNICAL PAPER 426/1. Edited by Eyolf Jul-Larsen, Jeppe Kolding, Ragnhild Overå, Jesper Raakjær, Nielsen Paul A.M. van Zwieten. 2003

- There are already a number of aquaculture ponds in the project area, and aquaculture has some potential to contribute to the income and food needs of local stakeholders. A number of factors, however, including poorly developed value chains, limited technical and organisational capacities, high capital requirements and the risk of price fluctuations due to the availability of fish from the large wild fisheries of Lakes Malombe and Malawi, limit the potential of aquaculture as a reliable alternative livelihood strategy capable of generating significant resilience benefits for the poor. These constraints are beyond the scope of this project alone to address effectively. The project will not therefore aim to increase the scale of aquaculture in the area, but rather will focus on supporting the “climate-proofing” aquaculture and on integrating it into diverse and resilient farming/livelihood systems, accessible to the poor.

217. Taking into account these considerations, the project will aim to create a situation in which:

- 1) **Capture fisheries on Lake Malombe are restored and “climate-proofed”**, allowing them to generate livelihood benefits for local people in the form of income and food security, despite the BAU stresses of overfishing and the added stresses to ecosystems and livelihoods that are expected as a result of climate change;
- 2) **Local people (especially the poor) have access to resilient options for meeting income and food security needs**, in order to buffer their livelihoods against the potential impacts of climate change and BAU pressures on their existing livelihood support strategies.

218. To achieve these situations, the project will prioritise the following (the “additionality reasoning” for these is summarised in 0 and their technical justifications and feasibility are described in more detail in the following section):

- **Improvement and adaptation of the governance of the capture fisheries of Lake Malombe** (*see Outcome 3.1 below*), in the face of the evolving biophysical and socioeconomic pressures that are expected under conditions of climate change (in addition to BAU pressures);
- **Restoration of habitats in Lake Malombe** (*see Outcome 3.2 below*), in order to facilitate the recovery of wild fish populations, with an emphasis on climate-resilient approaches to ecosystem management;
- **Promoting the role of climate-proofed aquaculture to contribute to** diverse and resilient livelihood strategies among the more vulnerable sectors of society (*see Outcome 3.3 below*);
- **Support to diverse, pro-poor livelihood systems** featuring efficient management of water resources (including, as appropriate, aquaculture) in order to improve CC resilience (*see Outcomes 3.4 below*);

219. The effectiveness of the project in promoting CC resilience will depend on the above elements being implemented in an integrated manner: habitat restoration, for example, will only be sustainable if accompanied by effective governance of the fisheries sector; while aquaculture will only be able to fulfil its potential to contribute to CC resilience if it is integrated into the diverse overall livelihood support strategies of the target population.

Table 16 Additionality reasoning linking CC-related threats and CC-resilience strategies to be promoted by the project, relative to the “Business as Usual” (BAU) scenario

Business as Usual scenario (situation if climate change was not happening)			Climate change scenario		
Threats	Implications for condition of resource base and livelihoods	Strategies required to address BAU scenario	Additional stresses resulting from climate change (the justification for LDCF funding)	Additional implications for condition of resource base and livelihoods	Strategies required to address additional stresses imposed by climate change (to be funded by LDCF)
Overextraction of fish due to population growth, and poor governance and decline of agricultural livelihood support options due to poor land management and population growth	<ul style="list-style-type: none"> Decline in fish stocks Reduction in fishery income due to declining catches and changes in species composition towards less valuable species 	<ul style="list-style-type: none"> Strengthening of governance through BVCs/PFM Promotion of alternative livelihood options to substitute fisheries income when this collapses due to overexploitation Promotion of sustainable land management 	Further acceleration of overfishing (maladaptation) due to accelerated decline of agricultural livelihoods due to climate stresses	<ul style="list-style-type: none"> Accelerated declines in fish stocks Accelerated reduction in fishery income due to declining catches and changes in species composition towards less valuable species 	<ul style="list-style-type: none"> Adjustment of governance structures to reflect changes in pressures and socioeconomic conditions resulting from climate change Promotion of climate-proofed alternative livelihood options (including aquaculture) to substitute fisheries income when this collapses due to overexploitation
Use of inappropriate fishing gear , due to poor governance, results in capture of immature fish		<ul style="list-style-type: none"> Strengthening of governance through BVCs/PFM 	Increase in use of inappropriate fishing gear , due to poor governance, results in capture of immature fish		<ul style="list-style-type: none"> Adjustment of governance structures to reflect changes in pressures and socioeconomic conditions resulting from climate change
Dragging of seine nets damages nursery habitat (nearshore, underwater vegetation) and sandy patches used as breeding ground by some <i>chambo</i> species, due to poor governance		<ul style="list-style-type: none"> Strengthening of governance through BVCs/PFM Installation of obstacles to prevent dragging of seine nets Restoration of aquatic vegetation 	Increase in frequency of damage from seine nets due to increased numbers of fishers, resulting from accelerated decline of agricultural livelihoods due to climate stresses		<ul style="list-style-type: none"> Adjustment of governance structures to reflect changes in pressures and socioeconomic conditions resulting from climate change Installation of obstacles to prevent dragging of seine nets Practices for accelerated and CC resilient restoration of habitat?
Poor land management		<ul style="list-style-type: none"> Promotion of sustainable 	Accelerated siltation due		<ul style="list-style-type: none"> Collaboration with other

Business as Usual scenario (situation if climate change was not happening)			Climate change scenario		
Threats	Implications for condition of resource base and livelihoods	Strategies required to address BAU scenario	Additional stresses resulting from climate change (the justification for LDCF funding)	Additional implications for condition of resource base and livelihoods	Strategies required to address additional stresses imposed by climate change (to be funded by LDCF)
in the watershed and plains surrounding the lake results in siltation, affecting shallow water breeding habitat		land management	to increase in erosive rainfall events affecting watershed and plains surrounding the lake		initiatives supporting climate-smart agriculture and sustainable land management
Seasonal variations in rainfall leading to fluctuating water levels, affecting nearshore nursery habitat and breeding grounds.		<ul style="list-style-type: none"> Promotion of alternative livelihood options to substitute fisheries income when this collapses due to decline in breeding success resulting from degradation of habitat and breeding areas 	Increased variability in rainfall and water levels, resulting in increased impacts on nearshore nursery habitat and breeding grounds		<ul style="list-style-type: none"> Promotion of climate-proofed alternative livelihood options (including aquaculture) to substitute fisheries income when this collapses due to overexploitation
			Changes in water circulation patterns and temperature regimes	Periodic fish kills	<ul style="list-style-type: none"> Promotion of climate-proofed alternative livelihood options (including aquaculture) to substitute fisheries income when this collapses due to fish kills
			Changes in water circulation patterns and temperature regimes	Changes in species composition	<ul style="list-style-type: none"> Promotion of climate-proofed alternative livelihood options (including aquaculture) to substitute fisheries income lost due to changes in catch composition

1.3.3 Outcomes, outputs and activities

Component 1: Strengthening access to information and knowledge regarding climate change and its implications.

Outcome 1.1. Enhanced access to information on climate trends, extreme events and resource status, necessary for the formulation and implementation of effective and timely resilience and management measures

220. Actions under this component will address the current problem of limited access among policy-makers and decision-makers, at both national and sub-national levels, to information on climate risks, the vulnerability of local fishing communities, or lessons learned with different options for climate change resilience. Resolving this situation, through the strengthening of their access to appropriate and reliable information, is a key condition for the relevance of the policy and planning instruments to be supported under Component 2 and the management plans proposed under Component 3.

221. The project's investments in enhancing access to information will be coordinated with co-financed activities. These include investment by the FISH project in a knowledge management system that systematically collects and shares available research information on the fisheries sector in Malawi and identifies and supports research on critical and emerging research issues pertaining to climate change and the fisheries sector; and support through the FAO TCP to a baseline assessment which will provide a knowledge base for the establishment of the restoration plan for the lake and its surroundings (Output 3.2.1). Effective sharing of this knowledge will be furthered through integration with FISH-led knowledge management system and platform.

Output 1.1.1. Detailed Vulnerability and Disaster Risk Assessments (VDRA) of 47 fishing communities around Lake Malombe

222. By project end, 47 communities situated within the project area will have conducted participatory assessments, with gender-balanced representation, of climate risks and vulnerabilities, with a particular emphasis on aspects related to fisheries (including aquaculture). The following activities will be carried out to this end:

- ***Activity 1.1.1.1. Development of methodological tools for participatory CC vulnerability and disaster risk assessment (VDRA)***

223. These tools will draw on FAO's extensive experience in incorporating climate change considerations into agricultural investment programmes⁹⁴, including the rapid assessments of impacts of climate variability and climate change and building ecosystem approaches for climate-smart agriculture; as well as tools and approaches developed and applied for other CC vulnerability contexts, such as the community planning tools of the Coastal Resilience network (www.coastalresilience.org). The tool will also be designed in such a way as to explicitly factor in levels of social, economic and cultural dependence on the target ecosystems and natural resources for food, income, employment or recreation; they will also factor in future change, including projected human impacts from climate change and other more local impacts, but also social, demographic and economic change⁹⁵.

⁹⁴ http://typo3.fao.org/fileadmin/templates/tci/pdf/climate_change_considerations.pdf

⁹⁵ Spalding, M. et al "The role of ecosystems in coastal protection: Adapting to climate change and coastal hazards". Ocean & Coastal Management. 2013 (in press); Lacambra Segura, C.L., 2009. Ecosystem-inclusive Coastal Vulnerability Assessment in Tropical Latin America. Department of Geography. University of Cambridge, Cambridge, UK

- *Activity 1.1.1.2. Training on VDRA*

224. Initial training on climate change and climate vulnerability concepts and on the use of the tool will be conducted prior to the assessments. In order to maximize the sustainability of uptake and ownership, the project will seek to strengthen existing entities such as BVCs.

- *Activity 1.1.1.3. Realisation of participatory VDRA*

225. Detailed CC vulnerability risk assessments will be carried out covering the vulnerability of the fisheries, the aquatic ecosystems of the lake, productive and administrative infrastructure, and the overall livelihoods of the members of the target fishing communities, including issues such as resource tenure and incorporating gender issues. These assessments will be planned on a community-by-community basis in PY1 and applied during PY2 and the beginning of PY3.

- *Activity 1.1.1.4. Documentation and validation of VDRA results*

226. The results of the VDRA exercises will be documented by facilitators funded through the project, and then subjected to participatory validation by the community members who participated in the exercises, and their representatives at village level. The documented results will then be made available as inputs into the policy and planning support proposed under Component 2, and also the village level planning and governance support proposed under Component 3.

Output 1.1.2. Information resources on ecological parameters determining management and resilience options in and around Lake Malombe

227. Reliable science-based information on the status and characteristics of the target resources in and around the lake will be an essential foundation for the development of relevant and effective strategies for promoting resilience. At present, limited research is being carried out by DoF and its Monkey Bay Research Unit on Lake Malawi on habitat condition and linkages to fish production, complemented by research by the FISH project and the FAO TCP that helps understand the magnitude of degradation, as well as the identification of possible restoration practices.

228. The project will build upon this base and support the generation of additional, more specific knowledge on key issues of relevance to the target area of Lake Malombe and its surroundings, meeting key information needs that will permit the confirmation of management strategies and the assessment of their technical, environmental and social viability. The agenda for this information generation will be adaptive in response to emerging needs identified throughout the life of the project, but key areas of focus highlighted during the PPG phase include:

- The nature, magnitude and spatial/temporal dynamics of fish stocks and biomass in the lake;
- The biology of chambo and other species, including the migration patterns of chambo between Lake Malawi and Lake Malombe, which are of relevance for restoration options, resilience to extreme drying events and genetic diversity;
- The feasibility and implications of using a single or multi-species approach to rehabilitation;
- The extent, characteristics and management needs of lake habitats, especially chambo nursery areas, and their implications for restoration and management options (in collaboration with National Park authorities);
- The nature, magnitude and dynamics of existing threats/risks (such as illegal gear, siltation, predation, irrigation and clearing of vegetation);

- The nature, causes and implications of social structures and conflicts of relevance to fisheries, natural resource management, livelihood resilience and the distribution of impacts and benefits.

- ***Activity 1.1.2.1: Definition of agenda for knowledge generation***

229. Knowledge generation activities will be highly selective and targeted at key priority issues. The project will facilitate planning workshops involving DoF, other Government agencies working on agricultural, environmental and climate issues, civil society organizations (especially those with strong technical and scientific capabilities) and academic/research institutions to identify these key knowledge bottlenecks.

- ***Activity 1.1.2.2: Definition of responsibilities, work plans, and organizational and financial arrangements***

230. It is foreseen that the knowledge generation activities, which will include small-scale targeted scientific and technical studies and will also be linked where possible to larger existing research programmes of partner institutions, will be carried out through a combination of international or national consultancies arranged directly through the project, and through collaborations with partner institutions. To this end, terms of reference and contractual arrangements will be developed for consultancies, and memoranda of agreements or institutional contracts will be established with partners.

- ***Activity 1.1.2.3: Implementation of knowledge generation activities***

231. The activities will be carried out in accordance with the terms of the contractual arrangements and memoranda of understanding, as proposed above. The project will oversee the activities closely, in order to ensure that they meet the identified information needs, and also to facilitate information flow and interinstitutional discussion of the studies as they progress.

- ***Activity 1.1.2.4: Analysis, systematisation and dissemination of results***

232. While the institutions or consultants that carry out the studies will also be responsible for the analysis of their results, the project will have strong inputs in defining the format for their systematization and how they are disseminated, in order to maximize their utility as inputs into decision making. Systematization and dissemination will be specifically targeted, for example, at supporting the implementation of the policy influencing strategy proposed under Output 2.1.3, the resource management plan for the lake proposed under Output 3.1.2 and the restoration plan proposed under Output 3.2.1.

Output 1.1.3. Climate and environmental monitoring and early warning (EWS) systems

233. DCC is currently coordinating the GEF/UNDP and Green Climate Fund project “Strengthening Climate Information and Early Warning Systems in Malawi to Support Climate Resilient Development and Adaptation to Climate Change” (GEF ID 4994)⁹⁶, with Malawi Meteorological Services, which is strengthening the national climate observatory network. At the same time, the FISH project is monitoring and analysing changes such as the transition of the fish populations on Lake Malombe from a *chambo*-dominated to a *usipa*-dominated system, and reviewing the causal factors influencing such changes, including climate change. Furthermore, through the recently approved FAO TCP, some initial baseline data will be collected and an initial system put in place to support DoF in delivering relevant information to the project.

⁹⁶ https://www.thegef.org/gef/project_detail?projID=4994

234. The monitoring systems and EWS to be supported by this project will build on these baseline investments, but will be more specific to the case of fisheries, aquatic ecosystems and fishing communities on and around Lake Malombe, and will be carried out with the participation of the BVCs. They will provide ongoing flows of information to policy makers and planners, as well as to the community members themselves, on trends in local conditions, including those influenced by climate change, and on the effectiveness and implications of management strategies, including the risks to biodiversity possibly posed by restocking of fish populations, issues of carrying capacity, and the environmental and climate change risks for the newly stocked fish. Other aspects to be monitored may include habitat conditions (in both aquatic and nearshore terrestrial environments), land use practices, and the status of invasive species (such as water hyacinth “moving islands”).

235. This information generated through these systems will be integrated into wider monitoring and knowledge management frameworks, and will be linked to the FISH knowledge management platform. The systems will be designed in such a way as to make them cost-effective and sustainable upon completion of the project.

236. Existing monitoring and research facilities will be closely involved in this process, which will result in a strengthening of their capacities to institutionalize monitoring as an ongoing process beyond the life of the project. These institutions will include DoF and specifically the research station at Monkey Bay, as well as the Meteorological Service, which will be supported in establishing a weather/climate monitoring station in Mangochi.

- *Activity 1.1.3.1: Planning and design of monitoring systems and EWS*

237. Current needs, capacities and systems for monitoring and information management will be reviewed. This process will include the definition and characterisation of the end users of the information, and will consider the types and formats of information needed for decision-making, planning and management responses, in support of sustainable fisheries management and CC resilience. The design of the systems will cover all aspects ranging from data collection through to management, storage and dissemination. Attention will be paid to ensuring the institutional and financial sustainability of the systems: financial sustainability may be linked to the licensing fee system proposed under Output 3.1.4 below, part of the revenue from which may be used to cover monitoring costs. This planning process will also include the confirmation of the types and detail of the information to be generated and managed accordingly, which will be dependent on the provisions of the participatory resource management plan proposed under Output 3.1.2.

- *Activity 1.1.3.2: Establishment and organization of monitoring teams, operational rules and resourcing strategies*

238. It is foreseen that monitoring will be carried out in collaboration between the Government (especially DoF) and local communities, with support from research institutions. In order for the monitoring to be institutionally and socially sustainable in the long term as a central element of the adaptive management of the lake and its surroundings, careful attention will be paid to ensuring that it is organized within the framework of existing institutions and social structures. To this end, wherever possible it should not be seen as a stand-alone activity but rather integrated wherever possible into the other activities and responsibilities of the actors in question – in the case of local communities, monitoring may be integrated into the community-based surveillance activities proposed under Output 3.1.4.

- *Activity 1.1.4.3: Definition of monitoring protocols*

239. Once the monitoring has been planned and organized, specific monitoring protocols will be developed for each location and parameter, specifying the timing, location and methodologies for monitoring.

- *Activity 1.1.4.4: Training of monitoring teams*

240. The project will support technical and hands-on training to the actors at different levels involved in the monitoring (ranging from community organisations to DoF field staff and research stations); this will be carried out within the framework and approaches to capacity development proposed under Outcome 2.2.

- *Activity 1.1.4.5: Roll-out of monitoring systems and EWS*

241. The monitoring systems and EWS will be subject to progressive roll-out from initial pilot locations to the whole of the target area, allowing trouble-shooting and corrections in the process.

Output 1.1.4. Strengthened fisheries monitoring system

242. Planning and decision-making on fisheries management and climate change adaptation will further be facilitated through the strengthening of systems and capacities specifically focused on monitoring the status of fisheries resources. At present, DoF is undertaking very sporadic stock assessment on all the lakes under its jurisdiction, including on Lake Malombe, and through the FAO TCP, some initial baseline data will be collected and an initial system will be put into place to support DoF in delivering relevant information to the project.

243. The project will assist DoF in improving fisheries monitoring on Lake Malombe. This will constitute a vital element of adaptive management, allowing the effectiveness of the management and governance strengthening proposed under Component 3 to be assessed on an ongoing basis, and corrective measures applied where necessary. With additional LDCF funding, monitoring systems will be established for Lake Malombe. These will cover the status of the fisheries resources themselves, including parameters such as Catch per Unit of Effort (CPUE), species composition, average length per species, and size distribution per catch for different gears and methods; as well as ecosystem condition, such as the status of fish nursery habitats and reserve areas; and the effectiveness of restocking activities, through controlled exploratory fishing to monitor growth and migration of the stocked chambo. Tagging will be introduced, which will require a well-organized awareness campaign so that particular data on the re-captured chambo is recorded and shared with FRU and/or the project.

244. It will be of paramount importance that the fishing communities be involved in the monitoring programme. The careful and conscientious monitoring of the fish stocks will provide indications on the health of the fishery and ecosystem. The results, in combination with the broader parameters monitored under Output 1.1.3, will provide information for an EWS so that timely corrective measures can be taken, in close collaboration with the communities.

245. The project will contribute to improving the accuracy of the data collection without the need for additional staff. Close collaboration with other fisheries projects is foreseen. There will be an important role for the Fisheries Research Unit (FRU) to guide the fisheries extension officers and data collectors.

246. The activities required to deliver this output will reflect those set out above under Output 1.1.3, but will be adjusted to reflect the differences in the parameters to be monitored, the methodologies to be applied, and the technical capacities required:

- *Activity 1.1.4.1: Definition of monitoring plan*
- *Activity 1.1.4.2: Establishment and organization of monitoring teams, operational rules and resourcing strategies*
- *Activity 1.1.4.3: Definition of monitoring protocols*
- *Activity 1.1.4.4: Training of monitoring teams*
- *Activity 1.1.4.5: Roll-out of monitoring*

Output 1.1.5: Mechanisms for dissemination and input of knowledge into adaptive management of fisheries and other natural resources

247. The justification for the generation of information as proposed under the above Outputs is its indispensability as a guide for the definition and adjustment of resilience and resource management structures, in accordance with principles of adaptive management. The project will therefore ensure that effective channels exist for the communication of this knowledge to decision-makers and planners at all levels, in a timely manner and in relevant and accessible formats.

248. The investments of the project in dissemination will complement those of the FISH project, placing particular emphasis on issues such as climate change resilience and aquaculture, and on compiling “best practices” (past and present climate change adaptation in fisheries) which can provide information for use by both this project and the FISH project in livelihood adaptation strategies. The project will create further synergies with the FISH project by strengthening capacities for information use, with the aim that both projects would source and share data through a shared knowledge management system.

- *Activity 1.1.5.1: Identification and characterisation of target audiences*

249. The participatory resource management and restoration plans proposed under Component 3 will set out the management strategies that will need to be guided in an adaptive manner by the information flows generated through the above Outputs. With the participation of relevant institutional and local stakeholders, each of the management strategies proposed in the plans will be reviewed and the key stakeholders responsible for each, together with the types of information they will need, will be identified, and they will be characterised in terms of their ability to access and manage information.

- *Activity 1.1.5.2: Definition and establishment/strengthening of information supply materials and mechanisms*

250. On the basis of the above characterisation, specific mechanisms will be defined and established for ensuring that information is channelled in an effective and sustainable manner to the target users. These may include, for example, internet-based information platforms, email circulars, printed mailings, occasional publications or internal information management systems within institutions.

- *Activity 1.1.5.3: Strengthening of capacities for information management and use within target audiences*

251. In addition to making the information available, the project will help to ensure that it is in fact reflected in adaptive management decisions by raising awareness among the target audiences of its potential utility; advising them and developing their capacities for interpreting the information and its implications and taking adaptive decisions accordingly; and carrying out participatory monitoring of its results in terms of the reflection of the information in decisions.

Component 2: Creating a favourable enabling environment of policies, plans, regulatory instruments and capacities for the promotion of climate change resilience among fishing communities

252. The success and sustainability of the resilience measures proposed under Component 3 are dependent on the existence of a favourable framework of policies, plans, regulatory instruments and capacities. Many of the issues highlighted in Lake Malombe are of wide relevance, to Lake Malawi and other smaller lakes in the country, and much of the enabling work proposed under this component will have similarly wide benefits, and will therefore require the involvement of a wide range of actors.

Outcome 2.1. Climate change resilience considerations mainstreamed into key policy instruments of relevance to fisheries and fishing communities

253. Key policy areas on which the project will work, identified through PPG studies and highlighted as barriers at present in Section 1.2.8, include the following:

- Inclusion of specific reference to climate change issues in the fisheries sector in the National Climate Change Policy and Disaster Risk Management Policy (both of which are currently in draft form), and reflected in the mechanisms charged with their oversight.
- Increased emphasis on the fisheries sector in the provisions related to climate change of the Malawi Growth and Development Strategy (MGDS) and the National Adaptation Programme of Action (NAPA), both of which are predominantly agriculture-oriented.
- Improved reflection of climate change issues of relevance to fisheries in the implementation of the Agricultural Sector Wide Approach (ASWAp) of the Ministry of Agriculture, Irrigation, and Water Development (MoAI&WD).

254. The investments of this project in policy influence at this broader level will complement those of the FISH project, which will focus more specifically on working with DOF on the sectoral policy (National Fisheries and Aquaculture Policy), particularly in relation to issues of governance and Participatory Fisheries Management (PFM). At the level of dissemination, the approaches of the two projects will also be complementary: the LDCF project will use its policy influencing strategy to mainstream issues of fisheries climate change resilience, while the FISH project will make use of a series of internal fish policy communications on governance.

Output 2.1.1. Think tank on climate change in the fisheries and aquaculture sector with an integrated vision and incorporating results of CC and fisheries monitoring systems

255. In response to the recommendations of the FAO/GoM/UNIMA Consultative Workshop on Aquaculture Development in Malawi (2009), the project will support the establishment and functioning of an inter-ministerial and inter-sectoral Think Tank (Fisheries Sector Climate Change Adaptation Coordination body) to provide advisory services to projects implementing climate change adaptation issues. Representatives from the Ministry of Agriculture and Food Security, the Ministries responsible for Environment, Trade, Planning, Finance, Health, Departments of Fisheries, Climate Change and Meteorology Services, etc., will form the Fisheries and Aquaculture Support Committee (FASC), strengthened by representatives from relevant projects in the same field (FISH, ASWAp), Universities and Colleges, the private sector and the fisheries sector (including processing, trading, marketing, etc.).

256. This Think Tank will complement the Fisheries Science and Technology Advisory Panel (FSTAP) that has been established with support from the FISH project. While FSTAP will advise on a wide range of fisheries science issues of interest, the Think Tank under GEF project will create a coordination and advisory platform where all fisheries and aquaculture climate change-related projects within the fisheries sector will share experiences, challenges and lessons.

- *Activity 2.1.1.1: Support to establishment and functioning of Think Tank*

257. In collaboration with the FISH project and DoF, the project will review and advise on the remit of the Think Tank, its composition, the capacity strengthening needs of its members, its operational functioning and the efficiency and reliability of the supply of information on which it bases its analyses.

- *Activity 2.1.1.2: Ongoing advisory support*

258. On the basis of the vulnerability assessments and flows of information generated under Component 1, the project will provide ongoing advisory and where necessary facilitation support to the Think Tank, including the proposal of issues to be brought to the attention of the technical committee and onto their meeting agenda, and recommendations for its policy influencing strategy (Output 2.1.3).

Output 2.1.2. Policy review document

259. Early in the implementation phase of the project, a detailed review will be carried out of policy, planning and regulatory frameworks of relevance to the issue of CC-resilience in the fisheries of Lake Malombe and among its fishing communities, in order to confirm the priority issues on which the project should work. This will further elaborate the findings generated through PPG studies, presented in sections 1.1.11 and 1.2.8, and will use similar methodologies to those applied in a recent policy analysis commissioned by FAO that looked at the level of integration of CC and CSA in agriculture and CC sector policies and development planning. This review will be scoped with the participation of key actors in Government and the NGO/CSO and donor community, who will also participate in its review and validation and who will constitute the key target audiences for its results.

- *Activity 2.1.2.1: Policy review*

260. A desk-based review will be carried out of all key policy instruments (not necessarily limited to the fisheries sector) of potential relevance to the resilience of fisheries and associated livelihoods. This review will focus in particular on Lake Malombe but also consider the wider relevance of these issues throughout fisheries in Malawi. A draft document presenting the results of the review will be shared with key national stakeholders as a resource for the policy influencing work proposed below.

Output 2.1.3. Policy influencing strategy for mainstreaming climate resilient fisheries and aquaculture

261. In order to maximize the project's effectiveness in influencing the policy, regulatory and planning framework related to climate change resilience in fisheries and among fishing communities, its work in this area will be structured on the basis of a detailed "policy influencing strategy", which will be developed for national and sub-national levels. This will take into account the results of a recent review by FAO of best practice in policy analysis relating to climate smart agriculture in Malawi.

262. This strategy will identify "entry points" for policy influence in terms of the principal actors and processes involved in policy development, key moments during the project lifetime

at which opportunities will present themselves for influencing the development of policy instruments, and effective strategies for influencing policy makers. These may include, for example, direct bilateral meetings with policy formulators, national level workshops and fora, email shots, television and radio shots and the use of printed materials, focusing on awareness-raising and the communication of best practice or research results.

- *Activity 2.1.3.1: Validation and planning workshop*

263. A national workshop will be held in which key stakeholders will consider the results of the policy review, and generate an action plan identifying priorities for policy support by the project, including an outline of strategies and responsibilities.

- *Activity 2.1.3.2: Generation of policy influencing strategy and plan*

264. The proposals generated in the workshop will be synthesized into a policy influencing strategy document, setting out principles, strategies, resources, responsibilities and time plans for policy influence work. This will take into account the current state of play with relevant policy instruments and policy development processes, as well as expected milestones which will determine the timing of the project's work. It will also differentiate policy influencing approaches according to the specific needs and characteristics of each target actor.

Output 2.1.4. Policy guidance materials

265. The project will generate a range of policy guidance materials, the format and content of which will be based on the results of the policy review and policy influencing strategy proposed above, taking into account the different needs and characteristic of different target groups. These may include printed materials (e.g. booklets, pamphlets and posters), radio slots and electronic media (e.g. mail shots).

- *Activity 2.1.4.1: Design and validation of materials*

266. Communication specialists will support the technical staff of the PMU and DoF in developing materials that are technically sound and at the same time transmit their messages clearly and effectively. The materials will be subject to initial validation by DoF staff and others.

- *Activity 2.1.4.2: Production and dissemination of materials*

267. Subject to the results of the validation, the materials will be produced in the required numbers, and disseminated or presented to the target audiences. DoF will be involved as much as possible in this process, in order to ensure their buy-in into the policy influencing messages.

Output 2.1.5. Guidelines/Code of Conduct for responsible CC-resilient aquaculture developments in riparian areas in Malawi

268. The project will support the development of documents providing guidelines and a code of conduct for climate change resilience in the aquaculture sector in Malawi, as a key reference for public and private sector actors intending to invest in or promote riparian aquaculture. These guidelines will be based on a review of the results of research and experience nationally and worldwide, as well as the systematization and documentation of lessons learned through the project's support to aquaculture at local level in Lake Malombe. This will focus in particular on issues of climate change, floods, droughts and disaster reduction management, and corresponding strategies for dealing with these challenges; it will also address other key bottlenecks that have to date limited the development of aquaculture

in the country, including the operational and financial management of fish ponds and farms, and particularly matters related to water storage, fish feed production and marketing.

- *Activity 2.1.5.1: Review of technical information and lessons learned*

269. An initial review will be carried out of existing technical information and lessons learned to date in the country and region, as the basis of initial draft guidelines. The project will support this process through the provision of technical specialists.

- *Activity 2.1.5.2: Preparation of initial draft guidelines*

270. Initial guidelines will be developed early in the project, based on the above review, in order to support the generation of initial benefits in terms of improved practice for resilience. The “think tank” Output 2.1.1 will participate in the development and validation of these guidelines.

- *Activity 2.1.5.3: Updating of guidelines*

271. The initial guidelines will be subject to progressive subsequent review and adjustment on the basis of lessons learned at site level in Lake Malombe throughout the life of the project (and by others elsewhere in the country, as appropriate), as well as other information that becomes available on social, productive, ecological and climatic conditions. This process will depend on the mechanisms and capacities for the generation and management of information, proposed under Component 1.

- *Activity 2.1.5.4: Dissemination of guidelines*

272. Through a communication network and dissemination workshops, involving for example the Aquaculture Network of Africa (ANAF), the guidelines will be shared with the project’s beneficiaries.

Outcome 2.2. Strengthened capacities and awareness for promoting climate resilience in fisheries sector

273. Activities and outputs in support of this outcome will be carefully tailored and targeted, and will aim at ensuring that a suite of sustainable capacities exists among relevant institutional actors that will enable to play key roles in supporting and sustaining the resilience strategies to be promoted by the project. Key institutional roles in this regard, for which capacities will be developed, will include:

- **Knowledge generation, management, analysis and communication**, including the monitoring of CC trends, vulnerabilities, resource status and socioeconomic conditions and the effective incorporation of the results into management decisions: this is necessary to permit the adjustment of resilience strategies and institutional support actions as necessary in response to changing conditions, and thereby to maximise effectiveness;
- **The provision of technical, organizational, entrepreneurial and marketing support** to members of the target communities, in order to optimise the productive and financial viability of the production systems to be included in their menus of resilience strategies;
- **The formulation and effective enforcement of regulations** on resource management, within a framework of transparent and collaborative governance;
- **The consideration of integrated sustainable livelihoods concepts** in the development and implementation of resilience strategies, in order to maximise their relevance, effectiveness and sustainability;

- **The facilitation of effective and equitable participation** by local stakeholders in the development and application of resilience strategies, in decision-making and planning and in the distribution of the resulting benefits, including the consideration of gender issues;
- **Interinstitutional coordination and collaboration.**

274. As a result of this capacity development, at least 30 professional DoF staff, with a focus on the district level and extension services (District Office Mangochi, 4 sub-stations at Chimwala, Chapola, Kadewere, Upper Shire, 5 other districts along Lake Malawi (Karonga, Nkhata Bay, Likoma, Salima, Nkhotakota), 2 Aquaculture Research Stations (Domasi, Mzuzu), the Fisheries college in Mangochi, Fisheries Research Stations: Monkey Bay, Senga Bay) will have significantly increased capacities to deal with climate risks and vulnerabilities as they pertain to the fisheries sector on the greater Lake Malawi and Lake Malombe area.

Output 2.2.1. Capacity development programme for staff of key institutions in relation to climate change preparedness and resilience building

275. In order to address the capacity deficiencies described in Section 1.2.8, the project will invest in specific capacity building efforts among institutional staff at national, district and sub-district levels, aimed in particular at helping DoF staff to better understand climate change risks, vulnerabilities of local communities and adaptation options. Various DoF units will be strengthened to undertake monitoring and implement activities in conjunction with the project team and relevant international expertise that FAO.

- ***Activity 2.2.1.1. Detailed Capacity Building Needs Assessment (CBNA)***

276. The results of the capacity review carried out during the PPG phase will be updated and further detailed through a CBNA at the beginning of the implementation phase. This will include processes of pre-selection and baseline assessment of candidates for training, which will consider the strategic importance of the professional roles of each candidate, as well as their cultural characteristics, current educational level, previous record of training and experience, aspirations and the precise nature of their capacity gaps relative to the capacities needed for the successful application and sustainability of the resilience strategies to be promoted by the project.

- ***Activity 2.2.1.2. Development of gender-sensitive Capacity Building Plans***

277. At least 2 detailed Capacity Building Plans, one for Mangochi District and later one for DoF headquarters will be developed in a participatory manner, rolled out and continuously updated through the project implementation. The comprehensive plans will be the foundation for the development of demand driven training approaches and content.

- ***Activity 2.2.1.3. Development of capacity development materials***

278. Specific capacity development materials will be developed, tailored to the needs and characteristics of the different sectors of the target audience. These will include training manuals, instruction videos and other means of communication aimed at fisheries and aquaculture officers, based where possible on existing materials from other fisheries and aquaculture situations, where “best practices” have been applied. “Lessons learnt” in other situations will be used to avoid repetition of mistakes by other projects. Gender considerations will be applied in the training content and materials development.

- ***Activity 2.2.1.4. Realisation of capacity development activities***

279. Capacity development will involve a range of different approaches. Training, which will principally be carried out during PY2, will focus on dynamic approaches to learning, including

peer-to-peer dialogue, on-the-job training, the training of trainers, testing tools and real-life application, as well as study tours in which topics are presented in contexts to which the trainees can relate.

- ***Activity 2.2.1.5. Knowledge assessments***

280. Capacity development will be followed up by regular knowledge assessments from PY3 to project end, to ensure knowledge has been assimilated and to identify difficulties or limitations that need to be addressed; this could take the form of awareness surveys and tests at either individual or institutional levels.

Output 2.2.2. Improved physical capacities for DoF to sustain the resilience strategies

281. The project will carry out a limited amount of highly targeted investment in the improvement of the facilities and equipment on which DoF staff members will depend for the provision of effective support to the sustainable management and resilience of fisheries in the target areas. Subject to confirmation and updating at project inception, this support will include the following:

- Upgrading of office space at Mangochi, which will also be used by the project team and short term consultants;
- Upgrading of field staff houses in the target area in order to improve staff access to target communities and reduce fuel and transport costs;
- Provision of transport to ensure that the project team is able to operate effectively and that DoF technical and extension staff are able to carry out their roles at field level, including technical support and monitoring: these will include 5 motorbikes, one 4x4 vehicle, 3 boats for monitoring and enforcement and one light truck to be used for transporting demonstration materials and community members attending training events;
- Rehabilitation of office facilities at Namiasi MSC centre
- Library materials for MCF and FRU
- Underwater camera
- Office and field equipment for Mangochi Office, FRU and MFC, including computers, network data saver, video and digital still cameras, external hard drives, printers, projectors and GPS equipment
- MCS uniforms to support local level enforcement

- ***Activity 2.2.2.1: Confirmation of support needs***

282. The needs initially identified during the PPG phase will be confirmed through detailed site-level inspections and analyses of the potential contribution of the support, in real terms, to the operational effectiveness of the target institutions and the project. Project staff will support DoF in developing detailed specifications and arranging for procurement in accordance with DoF, FAO and GEF procedures.

- ***Activity 2.2.2.2: Investment in facilities and equipment***

Wherever possible the investments will be carried out through sub-contractors, which will be selected and overseen in accordance with DoF, FAO and GEF rules.

Output 2.2.3 National “Chambo” campaign, supporting behaviour change and motivation, rolled out

283. The CRM of 2003 included a public campaign component; however, its impact was limited in terms of public awareness and commitment. A wider, well-designed communication

approach is needed, to support fisheries management efforts with local fishing communities, in the form of a “pro-*chambo*” movement.

284. Through the project, public awareness and project buy-in measures will be supported by a well-designed and executed campaign which will stress the economic, nutritional and resilience benefits of managing *chambo* stocks sustainably, and the importance in this regard of compliance with the participatory management for the lake. The campaign will have three main objectives: (1) to build public awareness, buy-in and behaviour change for project vision amongst communities around Lake Malombe; (2) to support engagement from fishing communities elsewhere in Malawi; (3) to rally support at national level, including from key decision makers, for *chambo* restoration and sustainable fisheries.

285. Central to this intensive awareness campaign will be the development of an innovative communication strategy, supported by professional communication specialists⁹⁷ who will work jointly with a team of Ministry staff members. The campaign will be targeted in particular at the BVCs around Lake Malombe. The following elements of the campaign will be highlighted: convincing the stakeholders of need for conservation and sustainable management of *chambo* stocks; community surveillance for enforcement of resource conservation measures such as the banning of destructive gear, closed areas and seasons; activation of bye-laws; facilitation of policy adjustments, etc. Fisheries extension officers will have a particularly important role to play in the campaign.

- *Activity 2.2.3.1. Planning and design*

286. Initial activities will focus on the formation of the joint team of communication specialists and Ministry staff who will be involved in developing and implementing the campaign. This will be followed by the detailed characterisation of the target groups, and the conduct of necessary baseline studies on their values, motivations and other behavioural change information related to the project issues. This will build where possible on methodological experiences and tools, which will be requested from actors in, for example, the health sector (e.g. UNICEF/UNAIDS) and commercial marketing firms.

- *Activity 2.2.3.2: Production of materials*

287. The project will finance the production of materials, which is expected to be carried on under contract to a private sector publishing/media company.

- *Activity 2.2.3.3: Implementation of campaign*

288. The campaign will receive financial and advisory support through the project, but otherwise will as far as possible be owned and led by DoF and District Authorities.

Component 3: Strengthening capacities at local level to increase the resilience of fishing communities to climate change.

289. The bulk of the project’s investment of effort and resources will be focused at this level, with the aim of delivering concrete resilience benefits for the target communities, and at the same time generating lessons that will support the project’s policy influencing work, proposed under Component 2. As explained in paragraph 217 above, the activities of the project at local level will, on the one hand, seek to improve the sustainability of capture fisheries in the lake in the face of climate change, as a key element of local people’s livelihood support systems; and on the other it will seek to provide them with livelihood support alternatives to insure

⁹⁷ Such as PCI Media Impact, IUCN Commission on Education and Communication (CEC) in advisory functions, and national marketing experts, as well as Ministry of Agriculture and DoF Outreach Unit.

against the failure of capture fisheries (pressures on which are likely to be exacerbated by climate change) to meet these livelihood support needs.

290. The focus of the project on co-management will help to ensure buy-in and social sustainability. It will also in part address the problem mentioned in section 1.2.8 of chronic shortage of human and financial resources in Government institutions, especially DoF: full participation of local communities in fisheries management, governance and oversight will help to reduce conflicts and therefore reduce the level of investment required by DoF in enforcement and conflict management.

Outcome 3.1: Adaptive co-management and resource governance systems in support of climate-resilient capture fisheries

291. Several decades of investment into setting up a functional co-management system (Participatory Fisheries Management or PFM) on and around Lake Malombe, with support from DoF, are providing a good foundation for new engagement. Today, specific community-support interventions are being implemented by DoF with local fishermen, to support the management of resources, harvest processing and access to markets – covering a full production chain of the sector for artisanal fisheries. The FISH project is investing in co-management approaches in fishing communities around the four key lakes in southern Malawi; the south east Arm of Lake Malawi, Malombe, Chiuta and Chilwa; however, this excludes the 27 BVCs around Lake Malombe that are the focus of this LDCF project.

292. Despite these investments, governance and co-management structures (particularly DoF and BVCs) remain weak (see paragraphs 203 and 204). Paragraph 70 describes some of the challenges that have been faced by these PFM initiatives to date. The present project will learn from these experiences and seek to overcome these challenges through a highly participatory and collaborative approach involving Government and local organisations, while recognising the diversity of the stakeholders who constitute the target fishing communities and the complexity of the social structures and power relations between them. Particular attention will be paid to re-examining in a participatory manner the factors that have in the past determined the different levels of acceptance of and commitment to fisheries governance proposals by different actors, focusing in particular on those actors who have in the past been opposed to the governance models due to perceived threats to their interests at individual or community levels, and analysing with them and with other actors how the models may be adjusted to address their concerns.

293. One of the areas of emphasis of LDCF-funded support will be on ensuring that the governance models are adaptive, as well as participatory and collaborative: mechanisms and capacities will be developed that will permit adaptive adjustment of governance provisions in response to trends in the biophysical environment (including climate change) and socioeconomic conditions, and to allow any conflicts that emerge through the application of the model to be managed and resolved in a participatory and adaptive manner.

294. The success of this new project will also be furthered through the application of an integrated approach that will combine capacity strengthening at institutional and local levels, the raising of awareness on fisheries sustainability and resilience, improved coordination and collaboration between sectors, institutions and stakeholder groups, and improved and more democratized access to information on resource status and trends, in order to guide the actions of actors at all levels from communities to central Government. Particularly important will be the promotion of “buy-in” by local communities to the whole package of support

measures, on the basis of recognition that livelihood, productive and environmental sustainability are dependent on the coordinated application of the different elements of the package at household, community and landscape levels.

295. The success of the project in promoting effective and sustainable fisheries governance will be dependent on the coordinated and integrated implementation of its different components, in order to generate a “critical mass” of capacities, awareness and motivation. Particularly important in this regard will be the project’s support, under Component 2, to cross-sectoral and multi-institutional collaboration, linking fisheries issues to those in related sectors (especially agriculture and forestry); the development of awareness of “pro-fisheries conservation” under Output 2.3.1; and the demonstration of the linkages between sustainable fisheries management and overall livelihood sustainability and social cohesion.

- The capacity of Government, inclusive of DoF, needs to be strengthened in order to play an effective partnership role in fisheries resources governance and law enforcement, both of which are underfunded and underdeveloped.
- The Director of Fisheries has the power to appoint ‘honorary fisheries officers’ for local areas, with power to enforce fisheries regulations in their area. To this effect, Beach Village Committees (BVCs) can be appointed in the capacity of honorary fisheries management bodies in their areas of jurisdiction either to effect regulations emanating from the Act or to implement by-laws. These by-laws have been subject of discussion for many years. Local government elections for district councillors were finally held in May 2014, whose role is to activate and validate by-laws.
- There is a lack of community involvement in the fight against illegal fishing gear and methods due to the fact that the by-laws have not been ratified and endorsed. The by-laws need to be reviewed for adoption and implementation. These by-laws may then regulate the delegation of Beach Village Committee (BVC) members to a wider network or association/federation of BVCs to discuss the implementation of co-management through e.g. community surveillance. For that purpose fisheries extension officers need to be trained in a coordinated way, so that they convey the same message to the BVCs involved.

Output 3.1.1: Multi-stakeholder co-management structures

296. The project will build upon the existing baseline of governance structures, focusing on revitalising and strengthening them, and promoting improved integration, collaboration and complementarity between community and institutional (district and central) levels. Attention will be paid to ensuring the inclusiveness of community-level structures, their ability to take into account in an equitable manner the diverse interests of the different stakeholders, and that they respect and complement other social and governance structures operating at community level.

- *Activity 3.1.1.1: Participatory review of conditions, structures and capacities for co-management*

297. The project, with specialist support from expert sociologists, will fund and facilitate participatory reviews of current local and district level governance structures related to fisheries, aquaculture and land management, including BVCs, District councils, Local Fisheries Management authority and TA. The results of these reviews will be fed back to the stakeholders in question, and will form the basis for the participatory definition and implementation of strategies for the strengthening of governance structures.

- Activity 3.1.1.2: Stakeholder participation plan

298. On the basis of the above review, the project team will, with the participation and subject to the approval of local stakeholders, define a stakeholder participation plan that will set out principles and specific strategies for ensuring the effective and equitable participation of all relevant stakeholders in the governance structures that will be strengthened by the project. This would include the setting up of a joint coordination and information sharing platform for cross-sectoral planning and extension, to address issues such as upstream resource governance i.e. on forestry practices and agriculture. This would include the initiation of exchange platforms with project partners, including FISH and other NGOs.

- Activity 3.1.1.3: Strengthening and facilitation of co-management entities

299. Responding to the results of the governance review (Activity 3.1.1.1) and in accordance with the principles of the stakeholder participation plan (Activity 3.1.1.2), the project will support the improvement, as necessary, of the structure, composition and functioning of the identified co-management entities, in order to maximise their effectiveness and relevance for the execution of their duties and responsibilities, and their ability to represent the interests of diverse local stakeholders. It is foreseen that these responsibilities will include the formulation of fishery management plans and oversight of their implementation, the definition of rules for fisheries management, and the establishment and implementation of mechanisms for participatory monitoring and adaptive management.

- Activity 3.1.1.4: Implementation of capacity development programme for co-management entities

300. On the basis of the results of the capacity review (Activity 3.1.1.1), the project will support the implementation of a capacity support programme and training for local community members associated with the co-management governance structure (including BVCs) and relevant government officers (i.e. fishery officers). Capacity development will specifically include the BVC members to support monitoring, evaluation and training in vulnerability assessment for fishery officers and other BVC members.

Output 3.1.2: Participatory resource management plan(s)

301. Resource use, management and governance measures will be implemented in accordance with an integrated management plan for the lake, that will stipulate the spatial configuration of the management of the lake and its surroundings, and the differentiated regimes of use, conservation and/or restoration to be applied in each defined management unit. In each zone, the precise nature of these management regimes will be specified, priority actions required for their implementation will be defined, and the corresponding stakeholders and necessary resources will be identified.

302. An initial indication of how this zoning may provide for the definition of habitat restoration and conservation areas is given in Figure 13. It is foreseen that the zoning provided for in the plan will also go beyond the lake itself, to define specific lakeshore and other terrestrial areas which need to be subject to special management regimes in order to minimize land-based impacts on the ecological integrity of the lake, such as siltation and pollution. Under conditions of climate change, this broader scope of zoning will become increasingly important: increasingly frequent and extreme rainfall events are expected to increase the risk of sediment-laden runoff from terrestrial areas impacting lake ecology and fish breeding, unless particularly fragile terrestrial areas are subject to specific zoning for improvement management; while an expected increase in the frequency of high water levels in the lake risks resulting in increased pollution by land-based chemical and domestic pollutants, unless the

areas that are most susceptible to flooding are defined and managed to avoid the presence of such pollutants.

303. This zoning and management planning will be based on a combination of sound science (in particular, information on the biological characteristics of the lake, the ecological dynamics and requirements of fish populations, and the nature and implications of climate change), an integrated understanding of the interactions between biological, productive and social parameters (applying an integrated sustainable livelihoods approach and taking into account considerations of gender equity, poverty reduction and resilience), and the views and priorities of the diverse local stakeholder groups who are directly or indirectly associated with the resources of the lake. The plan will be developed in a participatory and collaborative manner between local communities and entities of district and central level Government (including, but not limited to, the DoF), and they will be subject to validation and approval by all of these stakeholders.

- *Activity 3.1.2.1: Methodological definition, organization and planning*

304. With support from specialist sociologists, methodologies will be defined for the process of plan preparation, providing for aspects such as the opportune input of relevant and understandable information, “knowledge dialogue” bringing together conventional scientific information and traditional knowledge, and effective, efficient and equitable participation that ensures that the interests of vulnerable groups (especially women and the poor) are represented in the plans while at the same time respecting existing social norms and structures. The nature and composition of the entities to be involved in the process will be defined, and a detailed work plan will be drawn up.

- *Activity 3.1.2.2: Participatory definition of plan provisions*

305. The plan will be drawn up through a series of participatory workshops, backed up and advised by expert consultations and working groups. Depending on the results of the process of methodological definition and planning (Activity 3.1.2.1 above), it is expected that these will include local workshops each covering a cluster of villages, complemented by others at the level of the lake as a whole and others focused on specific issues and specific stakeholder groups. DoF and district governments will play a key role in organizing and convening these workshops; the project will complement this by providing facilitation and advisory support.

- *Activity 3.1.2.3: Drafting of plan*

306. Project resources will be used to record and systematize the results of the workshops, and to synthesize them in the form of a draft management plan.

- *Activity 3.1.2.4: Validation and dissemination*

307. The draft plan will be validated through a series of workshops attended by key stakeholders including representatives of central and district Government, and of community- and sector-based organizations, who will judge how accurately and effectively the instrument reflects the results of the plan development workshops, and how useful its format is to allow it to function as a practical guide to management by actors at diverse levels.

308. Subject to the results of these validation processes, the plan will then be modified as necessary, and then printed in bulk and disseminated to all key stakeholder groups. The plan will be launched at a high profile event aimed at maximizing awareness among stakeholders regarding the plan and its provisions, and motivating their buy-in to its implementation.

- *Activity 3.1.2.5: Implementation*

309. The plan will be implemented in collaboration between local stakeholders (fishers, farmers, BVCs and other local organizations) and entities of district and central Government, in accordance with the provisions defined through Activity 3.1.2.2 (covering aspects such as the definition and enforcement of norms, the application of specific management practices, and the restoration of habitats). The project will play a supportive role focused largely on oversight, facilitation and capacity strengthening, but will also invest directly in support of certain provisions of the plan, including habitat restoration and the provision of equipment for enforcement, the demonstration of technology and monitoring. The aim will however be that by project end the implementation of the plan will be entirely in the hands of local and national stakeholders.

Output 3.1.3: Norms and regulations for resource co-management

310. Legislation is already in place guiding fisheries-related regulations on issues including net types and sizes, seasonal fishing and closed seasons, and allowed catch sizes. The project will support the adjustment, where necessary, of these existing instruments in order to ensure that they respond to the provisions of the management plan, and thereby support the resilience and sustainability of the fisheries: for example, through the modification of the timings of closed seasons in response to climatic variations.

311. As necessary, according to processes of analysis during the life of the project, complementary new regulatory instruments may be formulated, which may address issues such as land-based threats to the ecological integrity and productive sustainability of the lake, the prohibition of the removal of Seine Preventing Objects and the protection of restored habitats. The FISH project is also undertaking a review of the legal framework for sustainable fisheries management and biodiversity conservation, which will identify gaps that may be important to the LDCF project. These regulatory instruments will be defined in a participatory manner, in discussion between local communities and Government entities, and will also be take into account as appropriate the results of reviews of existing instruments and international best practices.

- ***Activity 3.1.3.1: Review of regulatory requirements of management plan***

312. A review will be carried out of the management plan of the lake, in order to identify management provisions whose effective application depends on the existence of corresponding regulatory frameworks and enforcement capacities, such as the definition of no-take zones and periodic moratoria on fishing, or the avoidance of the use of inappropriate fishing gear.

- ***Activity 3.1.3.2: Participatory review of existing norms and regulations***

313. Project resources will be used to compile a compendium of existing norms and regulations, including those formally established through national or local legislation, and those defined and applied by local communities. The project will review the co-management arrangement and the draft by-laws that were formulated in 2007 and are awaiting approval by Mangochi District Council.

- ***Activity 3.1.3.3: Participatory definition of needs for modifications or additions to norms and regulations***

314. On the basis of the above review of the management plan and the existing baseline, the project will facilitate workshops to define needs for modifications or additions to existing norms and regulations in order to allow the provisions of the management plan to be implemented. Full stakeholder participation in this process will be essential in order to ensure

buy-in to the norms and regulations in local communities, and therefore their support to their application, as well as to screen for and minimise the risk of negative impacts on local people's livelihoods.

- *Activity 3.1.3.4: Drafting and dissemination of norms and regulations*

315. The norms and regulations that result from these discussions will be systematized with project support, and published and disseminated through a range of different media adapted to the needs and characteristics of the different stakeholder groups, including printed leaflets, posters, signs and radio slots.

Output 3.1.4: Enforcement mechanisms for resource co-management

316. The by-laws and other norms and regulations defined as Output 3.1.3 will be underpinned by effective enforcement, which will feature shared responsibilities and participation of local communities and Government entities (especially DoF). The project will negotiate sustainable options for enabling community surveillance, in close collaboration with the relevant authorities (including DoF, police, marine police, park authorities and the judiciary). The organization of community surveillance teams to support compliance will be assisted by DoF extension officers. The project will assist in negotiating collaboration between neighbouring BVCs and form clusters, associations or federations of BVCs.

317. It is foreseen that community-based surveillance teams constitute one element of the social capital and commitment that will be strengthened by the project in relation to fisheries co-management, and will normally therefore be linked to strengthened BVCs (see Output 3.1.1). Community-based surveillance is expected normally to be voluntary, but in order for it to be effective and sustained it will be subject to the provision of incentives and material support, the continued provision of which will be subject to communities' continued participation and effectiveness in ensuring compliance with regulations. Local commitment to supporting compliance will further be ensured by the participation of local stakeholders in the process of formulating the regulatory framework, as described above.

318. Innovative incentives for fisheries management compliance and effective monitoring of compliance will be scoped and negotiated during the life of the project. These incentives could include preferential fishing quotas, support in accessing opportunities for loans or micro-finance, reduced licence fees, and increased availability of extension services and leadership training.

319. Additional revenue from licensing and registration fees could potentially be generated and injected as to sustain the provision of incentives and operational inputs for community-based surveillance. At this point, fishermen are obliged to pay a license fee for access to the lake's natural resources and the registration of their canoes. DoF will be supported in licensing all fishermen on Lake Malombe and registering all operational canoes. Smart Licensing using payments of license fees through "mobile money" applications will be tested and scoped. License and registration fees from the professionals in the fishery sector (inclusive of fishers, processors, traders and other professions) can be collected in such a manner once the mobile phone system is in place. Other revenues to be collected may be paid in a similar fashion, e.g. landing fees, fish catch tax, etc.

320. The project will also provide support to community surveillance efforts in the form of equipment and materials, which in the longer term may be sustained through financial mechanisms, such as licence fees. This support will include the co-financing of the purchase

and maintenance of motorised canoes: this will help the local surveillance teams to inspect fishing gears and methods, landed fish sizes and fishing areas (outside closed areas).

- *Activity 3.1.4.1: Definition of needs and capacities for enforcement*

321. On the basis of a review of the adjusted regulatory framework (Output 3.1.3), the numbers of actors requiring surveillance, the magnitude of their activities and the size of the target area, estimates will be made of the levels of surveillance and enforcement activities that will be required and the types of corresponding capacities that will be needed, and these will be contrasted with a review of existing capacities (both human and material) in order to generate estimates of the levels of strengthening that will be required.

- *Activity 3.1.4.2: Formulation of incentive mechanisms and organizational structures*

322. Incentive mechanisms will be defined, costed and planned in discussion between local communities and DoF, together with strategies for ensuring their oversight and their financial and institutional sustainability, with particular emphasis on organizational aspects in order to maximise their social sustainability.

- *Activity 3.1.4.3: Roll-out of mechanisms*

323. Each of the proposed enforcement and support mechanisms will be subject to progressive roll-out, with adjustments as necessary (as indicated by joint monitoring of buy-in and effectiveness), until by the end of the project all priority areas are covered.

- *Activity 3.1.4.4: Systematization and consolidation*

324. Throughout the project, the functioning and effectiveness of the enforcement mechanisms will be monitored and systematized and, based on the results of this, they will be subject to joint review by local stakeholder and authorities and agreements will be reached on how to consolidate and sustain them in the long term, together with procedures for trouble-shooting and conflict management.

Outcome 3.2: Fish stocks and habitats restored through Ecosystem Approach to Fisheries (EAF) approaches

325. The disturbance that has been caused to habitat and breeding areas on Lake Malombe as a result of dragging of seine nets and coastal development (see section 1.2.1) means that, without explicit investment into habitat protection and restoration, the lake will become even less productive and riparian communities will become increasingly vulnerable to any shock, especially those related to climate change and extreme climatic events.

326. DoF has invested, with various cooperation partners, in developing a sound technical approach and national plans for the restoration of chambo and the implementation of an Ecosystem approach to Fisheries and aquaculture. Relevant action plans for follow-up are in place but remain largely unfunded. At this time, they do not address climate risks in particular, but form a useful baseline for this project.

327. The rehabilitation of Lake Malombe will take place through the application of EAFA-based approach to ecosystem restoration, as well as a dedicated fish stock restoration. The project will learn from the lessons drawn from earlier attempts to manage and conserve Chambo, and will link it to the threats of climate change in order to reduce vulnerabilities of the riparian population, reduce and manage risks and increase the resilience of the fishing communities around Lake Malombe. The project will achieve this by applying the ecosystem approach to fisheries adaptation (EAFA), which calls for participation from the involved communities. During PPG consultations, community members confirmed their commitment to participating

in the necessary measures to rescue chambo and other fisheries resources; through further community meetings to be facilitated by the project during the implementation phase, specific details of management approaches will be discussed and confirmed with the communities in question.

328. Subject to the provisions of the restoration plan (Output 3.2.1), it is foreseen that specific restoration activities to be funded under this outcome will include the following:

- *Rehabilitation of aquatic vegetation for fish nurseries*, including not only the reeds at the lakeshore, but also the so-called “oxygen weeds”. This will take place over a total of around 40ha, targeting areas that are of particular importance as nursery habitats, and avoiding areas that are susceptible to siltation as a result of inputs of land-based sediment into the lake. The project will undertake applied trials of practices for the propagation of the weeds for recovery of original vegetation, which is crucial for fish nursery functions. “Nurseries” will be established for the propagation of locally-occurring water plant species to be planted in identified key areas. These nurseries will be established in areas with sufficient water, protected against flooding.
- *Seine-net Preventing Objects (SPOs)*: in full consultation with local communities, the project will support the placement of SPOs in the relevant habitats; together with the complementary installation of ‘brush parks’ by the FISH project, this will increase fish shelter and production as well as reducing illegal fishing operations, particularly the use of seines which damage aquatic vegetation and nursery habitat.
- *Restocking with Chambo fingerlings*: the project will release an estimated 25 million fingerlings (5 million per year) in the key habitats of Lake Malombe, concentrating on the two commercially available species of the three that occur naturally in the lake. The aim is thereby to rebuild the stock to pre-1990s levels. Subject to the results of environmental and economic analyses to be carried out through the TCP project, fry will be taken from Domasi National Aquaculture Centre (NAC) hatchery, which will be supported by the project; from there, fry will be transported to a DoF nursery, located at a strategic point on Lake Malombe to grow them into fingerling size before restocking. The nursing activity may subsequently be adopted by small-medium enterprises (SMEs) and is likely to be perpetuated as a source of fingerlings for aquaculture extension.

329. The FISH project will consider carrying out complementary research to look at the viability of promoting pen culture for chambo, subject to zoning provisions in order to avoid impacts on breeding and spawning areas.

330. The sustainability of these investments, and their contributions to CC resilience, will be dependent on them occurring as an integrated package of strategies, foremost among which will be the restoration and protection of habitat and breeding areas which will contribute to the long-term viability of the restocked populations and facilitate their recovery following likely impacts from possible future stresses such as lake drying events; also of crucial importance will be the maintenance of adequate conditions of governance on the lake in order to protect the restocked populations against continued overfishing.

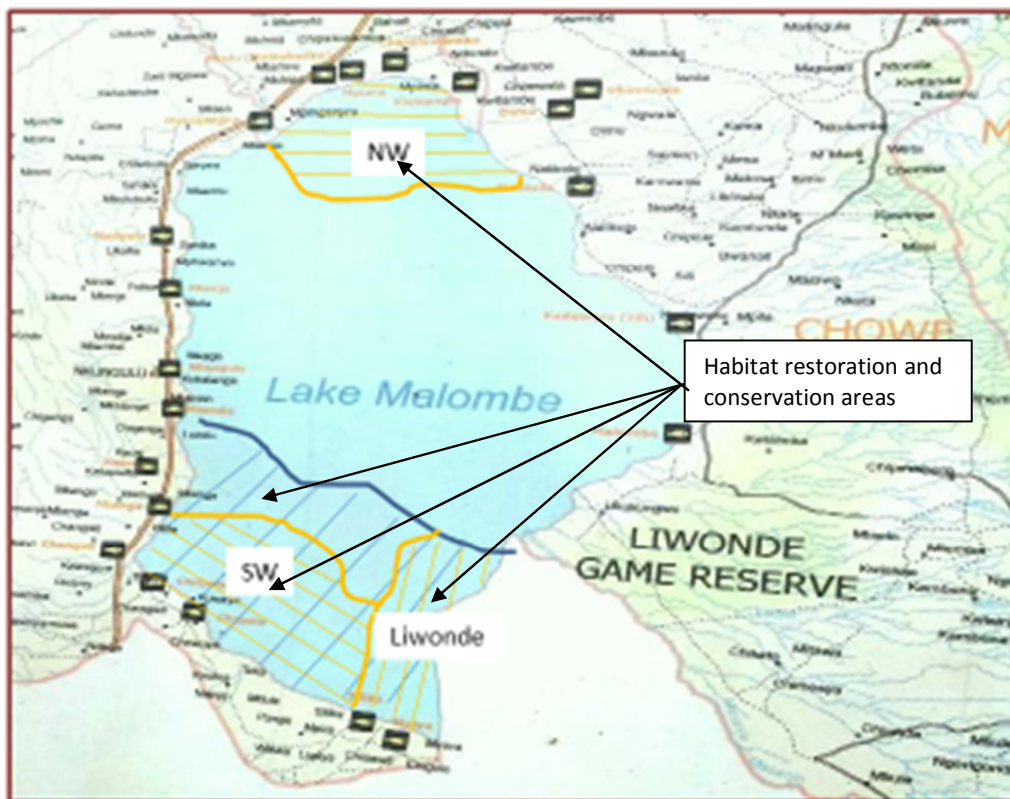
331. In addition to the rehabilitation actions themselves, the effective and sustainable restoration of the lake will be dependent on the existence of a sound knowledge base on the ecological conditions of the lake and the trends and implications of climate change (Outcome 1.1), strengthened capacities and awareness of fisheries management and resilience issues at

institutional and local levels (Outcomes 2.1, 2.2 and 2.3) and the existence of effective co-management and governance frameworks for the lake and its resources (Outcome 3.1).

332. Aspects of governance, that will be essential for the success and sustainability of the restoration, and which will be strengthened under Outcome 3.1, will include the removal of illegal and destructive gear and methods, and the definition and enforcement of closed areas and seasons for fishing.

333. The indicative locations of restocking and restoration activities, subject to the provisions of the proposed management and adaptation plans, are shown in Figure 13.

Figure 13 Map of intended release and habitat conservation sites



Output 3.2.1: A verified and updated restoration plan for Lake Malombe, including risk assessment

334. Restoration activities will be implemented in accordance with a restoration plan, which will be led by DoF with local government and partners and fully consulted with and endorsed by local communities. This will be based on existing CRS and EAFA management plans, and subject to the overall provisions of the participatory resource management plan for the lake that will be developed as Output 3.1.2. This plan will also incorporate the information on resource status, ecological conditions and socioeconomic factors to be generated under Outcome 1, and will also reflect the needs, priorities and traditional knowledge of the local communities, with a particular emphasis on favouring the interests of women and the poor.

- *Activity 3.2.1.1: Participatory formulation of the restoration plan*

335. Following the same process as proposed above in relation to the overall participatory resource management plan for the lake, the restoration plan will be developed with the full

participation of local stakeholders, authorities from district level and relevant Government entities (especially DoF), taking into account technical information on resource status, fisheries biology and lessons learnt generated through Component 1, and resulting in the definition of management and restoration practices, their spatial zoning (refining the broad brush proposals set out in Figure 13) and responsibilities for their implementation.

- Activity 3.2.1.2.: Risk assessment

336. An important element of the restoration plan will be a risk assessment, which will focus in particular on the risks potentially associated with the proposed restocking of *chambo* populations on the lake. This risk assessment will be co-financed through an FAO TCP project, which will include an assessment of the fingerling supply chain.

Output 3.2.2: Restoration programme

337. Subject to the provisions of the restoration plan (Output 3.2.1), the project will finance and facilitate specific restoration activities.

Activity 3.2.2.1: Local validation of restoration proposals

338. The broad brush proposals of restoration strategies, to be defined in the process of formulating the restoration plan (Output 3.2.1) will be validated on a site-specific basis with local communities and in consultation with local authorities, as will their specific locations. This process will involve participatory discussions and trials using a farmer action research and citizen science approach, and will bring together conventional and traditional knowledge and experiences.

Activity 3.2.2.2: Planning and organization of restoration activities

339. It is foreseen that the proposed restoration activities will be carried out in practice by the members of local communities, whose wage and material costs will be covered through project funds, complemented wherever possible by in-kind contributions from local communities in order to maximize ownership and support. This hands-on involvement, and the corresponding receipt of financial benefits, will serve to contribute to the awareness among community members of the importance of the ecosystem and its restoration. Wherever possible, these activities will be implemented through existing local organisations under the overall oversight of the project, in order to improve operational efficiency; this arrangement will require initial joint planning and the formalization of memoranda of agreement or contracts.

Activity 3.2.2.3.: Implementation of restoration strategies

340. The project will provide technical and financial support for the implementation of the identified restoration strategies. Wherever possible the project will focus on having an advisory and oversight role, delegating actual implementation of the activities to local organisations (see above). The principal tasks that will be funded in this way will include the establishment and management of nurseries for the production of locally occurring water plant species, the planting of these species in prioritised areas, in accordance with the provisions of the restoration plan, and the installation of seine prevention objects (SPOs) – these may require the establishment of bamboo stands in areas near to the lake, to produce the materials for their construction.

Output 3.2.3: Restocking programme for healthy native chambo

341. A dedicated chambo restocking exercise will be implemented, taking the outcomes and recommendations of the restoration plan risk assessment (see output 3.2.1) into consideration, as well as the findings of the environmental and economic analyses proposed

under the FAO TCP. This restocking will not occur in the open lake but rather in protected/sanctuary areas. The project will invest into rehabilitating selected *chambo* species occurring in the lake (*O. shiranus* and *O. karongae*), and the restocking will use the same stock as the native species in order to avoid negative impacts on existing populations.

342. The project will release an estimated 25 million fingerlings (5 million per year): assuming a natural mortality of 20 to 40%, this would result in the addition of 15 to 20 million live individuals to the existing populations. Once these fish reach a weight of 350g, this will equate to a total weight of between 5,250 and 7,000 tons: adjusting for the fact that Chambo takes more than a year to reach this weight, it is estimated total biomass increase over the life of the project could reach a total of between 4,200 and 5,600 tons (60-80%). It is expected that this restocking will build stocks to pre-1990s levels, when the average total annual *chambo* production in the lake was of the order of 7,000 metric tonnes, equivalent to approximately 21 million adult fish of about 330g each. By restoring the fish populations on Lake Malombe, significant improvement to local food production will be achieved, from around 5,000 tons of fish of various species at project start to 10,000 tons at project end.

- *Activity 3.2.3.1: Establishment of chambo nursery centre and training of staff*

343. The nursery centre will be established at a strategic location (to be determined through technical studies) on the shores of Lake Malombe, and the staff will be trained in technical aspects.

- *Activity 3.2.3.2: Purchase and transport of fry*

344. Fry will be purchased from the Domasi National Aquaculture Centre (NAC) hatchery and transported to the DoF nursery to grow them into fingerling size before restocking.

- *Activity 3.2.3.3: Selection of brood stock.*

345. It is intended that the project will collect sufficient numbers of brood fish for the hatchery. In order to maintain genetic integrity of the offspring, attention will be paid to the maintenance of as large a genetic pool as possible and in proper fish species identification.

- *Activity 3.2.3.4: Monitoring*

346. To determine the success of the restocking, a monitoring programme will be implemented. Although technically challenging, tagging of *chambo* fingerlings will be applied to monitor fish movements, and possible solutions will be piloted by the project. This requires a lake wide sensitization programme to inform fishermen about the need to return the captured tagged fish. By means of participatory exploratory fishing, abundance and growth can also be monitored.

Outcome 3.3: Aquaculture is climate-proofed and able to contribute to diverse and resilient livelihood strategies of the most vulnerable sectors of the population

347. The project will provide advisory support to fish farmers and to the entities that service them (including DoF and NGOs) in order to maximize the resilience of existing aquaculture ponds, and thereby the livelihoods of those involved to the impacts of climate change. This support will primarily target existing fish farmers, rather than seeking to increase the numbers of people carrying out fish farming. While the existing fish farmers targeted through this approach will not normally be the poorest members of the target communities, this support will indirectly contribute to the livelihoods of the poorest by helping to safeguard their access to employment and economic multiplier effects generated by the fish farms. As explained in Section 1.3.2 above, the project will focus on climate-proofing aquaculture and integrating it

into local people's diverse livelihood support and resilience strategies; given the currently poor levels of development of technical capacities and value chains, and the exposure of prices to the effects of periodic gluts due to oversupply from the nearby capture fisheries, it will not actively foment the growth of the sector, or encourage reliance on it as a stand-alone resilience strategy.

348. The project's strategies for climate-proofing aquaculture (and associated value chains) and enhancing its contribution to livelihood resilience will include the following:

- **Promotion of the deepening of aquaculture ponds and/or other required measures taken** in order to protect them against drying risk during drought periods, and **increasing the wall height of ponds** to prevent fish escape, in cases where they are vulnerable to flooding (the project will provide advisory support and, as needed and appropriate, short term investment support to this activity).
- Supporting commercial **small to medium-scale climate-resilient hatcheries**, in order to climate-proof farmers' access to fingerling stock (this potentially provides specific opportunities for women to participate and gain economic benefits). The emphasis will be on supporting already existing hatcheries, since this is an activity which is not best managed by the poorest who typically have no experience in hatchery management and lack access to capital, but by actors who are already technically competent and experienced and therefore have more ability to create employment opportunities, for women in particular. This approach has wide potential for roll-out further afield beyond Lake Malombe.
- **Improvement of practices for drying of fish**, in order to reduce fuelwood consumption. This will increase the efficiency and profitability of fish production, and thereby the potential contribution of this activity to the sustainability and resilience of livelihoods; and it will reduce pressures of fuelwood extraction on the vegetation around the lake, thereby helping to buffer local communities against the effects of climate change, while at the same time reducing rates of erosion and consequent siltation of aquatic habitats, thereby contributing to the sustainability and resilience of capture fisheries.
- **Strengthening of technical, organizational and marketing skills** of fish farmers, and establishment of aquaculture user-groups or associations. In addition to improving farmers' productivity, product quality and access to markets, this support is aimed to improve their capacities for monitoring, analysis, the sharing of resources and knowledge, and the formulation and application of adaptive solutions to emerging threats and challenges associated with climate change.

Output 3.3.1: Aquaculture resilience plan developed, implemented and underpinned through on-going research and impact tracking programme

349. LDCF funds will be used to support the development of a plan that will provide the framework for the implementation of the climate-proofing measures set out above. This will complement the national aquaculture development plan; while it will be specific to Lake Malombe and its surroundings, it will provide a model with potential for nationwide replication. The plan will be prepared with the participation of all relevant stakeholders, and will incorporate lessons learned from experiences to date in the project area and elsewhere, as well as the results of research worldwide, published in academic and grey literature.

- *Activity 3.3.1.1: Participatory situation analyses and plan development*

350. The project will help to organize and facilitate a structured series of workshops, in which stakeholders (including fish farmers, representatives of community organizations, private sector actors, NGOs, district authorities and DoF) will review the current status of aquaculture in the area in terms of its potential, challenges and vulnerability to climate change. On the basis of these analyses, the participants will generate proposals for the climate-proofing of the sub-sector. Issues to be considered are likely to include the supply of fingerlings and fish feed, arrangements for collaboration, the formation clusters to strengthen bargaining power, market position and knowledge exchange, and needs for and sources of technical and financial support.

- *Activity 3.3.1.2: Systemization, validation and publication*

351. In addition to organizing and facilitating the process of plan development, project resources will be used to systematize the results of the workshops, and feed them back for validation before drafting and publishing the plan.

Output 3.3.2: Action learning and knowledge generation programme

352. The relevance of the aquaculture resilience plan and the effectiveness of its provisions will not only depend upon it taking into account stakeholders' needs and priorities: it must also be based on sound science, and adaptive rather than static, allowing stakeholders to adjust its provisions as circumstances evolve and/or new knowledge emerges.

- *Activity 3.3.2.1: Facilitate and develop capacities for action learning by local stakeholders.*

353. In order to maximise social relevance, ownership and social acceptance of the practices promoted, the project will facilitate participatory experimentation, learning and interchange of information between producers.

- *Activity 3.3.2.2: Collaborative knowledge generation*

354. This will be complemented by highly targeted and practically applicable generation of knowledge on technical aspects of aquaculture resilience, in collaboration with universities, training and research institutions, where students may be challenged to experiment on topical issues during project implementation. These may cover not only issues related directly to productivity, but also socio-economic aspects in fish farming households or clusters, and climatological conditions in relation to climate change.

Output 3.3.3. Capacity development programme for resilient aquaculture

355. As a necessary complement to the action learning and knowledge generation proposed above, the project will provide capacity development support to stakeholders. The issues to be covered will include those mentioned in paragraph 348 above, especially the incorporation of resilience considerations, but also BAU aspects that are crucial for the viability and profitability of aquaculture (and therefore its potential to act as a livelihood support option), including bookkeeping, stock management, integration with livestock and poultry husbandry, value chain access and the establishment and management of (small) businesses/enterprises, with emphasis on participatory and collaborative approaches.

- *Activity 3.3.3.1: Capacity Development Needs Assessment (CBNA)*

356. In collaboration with DoF and other relevant entities and stakeholders at central, regional and local levels, a CBNA will be carried out. This will start with the identification of the key stakeholders and capacities required for the implementation and sustainability of the model of aquaculture resilience to be promoted by the project; the identified stakeholders will then

be assessed in terms of their levels of capacities, together with their baseline cultural and educational characteristics that may determine the forms of capacity development that will be most effective for them.

- *Activity 3.3.3.2: Development of strategies, materials and channels for capacity development*

357. On the basis of the results of the CBNA, appropriate capacity development approaches will be defined for each identified target stakeholder group, materials (printed or audiovisual) will be produced, and channels for the delivery of the capacity development will be defined, with an emphasis on working through existing institutions (including DoF, other Government bodies, NGOs and private sector) with the aim that these institutions will continue capacity development and follow-up support post project. Emphasis will be placed in particular on strengthening the capacities of DoF extension workers, but Department of Agriculture extension workers will also be included in order to promote the integration of aquaculture into diverse overall farming/livelihood systems (see below).

- *Activity 3.3.3.3: Delivery of capacity development programme*

358. The capacity development will be delivered in collaboration with existing institutions and central, regional and local levels, as explained above. Depending on the results of the CBNA, it is envisaged that this will use a range of tools suited to the needs and characteristics of each target group, including participatory workshops, in work training, action learning and more conventional “classroom” type approaches.

- *Activity 3.3.3.4: Monitoring and follow-up*

359. The effectiveness of capacity development will be monitored among all of those targeted, using a combined “Knowledge, Attitudes and Practice” (KAP) approach which will not only look at what participants have learned but also how they are applying it in practice. Taking into account the results of this ongoing monitoring, the initial capacity development activities will be followed up by further activities aimed at consolidating learning and at helping the participants to apply their knowledge in practice.

Output 3.3.4: Impact tracking programme

360. The effectiveness of the aquaculture resilience plan will be monitored through an impact tracking programme, which will cover a range of variables including levels of uptake of resilience strategies, levels of productivity, implications for overall livelihood sustainability and resilience, and distributional implications (particularly between different economic levels in society and across the gender divide). This monitoring will allow the plan to be implemented in an adaptive manner, and adjusted as necessary in response to emerging lessons and changing conditions.

- *Activity 3.3.4.1: Participatory definition of indicators, and mechanisms and responsibilities for monitoring*

361. The sustainability and local ownership of the tracking programme will depend on its indicators being relevant to the needs and interests of the stakeholders who will ultimately be responsible for sustaining it in the long term. The indicators, together with the mechanisms and responsibilities for their measurement and for the input of the results in support of the adaptive implementation of the plan, will therefore be developed in a participatory manner with facilitation and advisory support provided by the project.

- *Activity 3.3.4.2: Support to the implementation of the tracking programme*

362. LDCF funds will be used to provide advisory and oversight support to local stakeholders and DoF in the implementation of the tracking programme, aiming that by the end of the project it will be entirely managed by them in a sustainable manner.

Outcome 3.4: Local people have access to diverse, pro-poor farming systems as a central element of resilient rural livelihoods

363. Few if any of the members of the target communities depend exclusively on fishing: rather, their livelihood support strategies have multiple elements, the most important of which in most cases is agriculture, which plays a vital role in contributing to food security as well as generating surplus for sale. The project will support local people in integrating fish-based (including aquaculture) elements and efficient water management into their farming systems, complemented by other strategies such as off-farm employment and commerce, in order to contribute to the overall diversification and CC-resilience of their livelihoods. This will have the dual objective of i) increasing on-farm incomes and food supply (thereby buffering livelihoods against the risk of CC-related failure of off-farm sources of food and income, such as capture fisheries) and ii) increasing the diversity of on-farm strategies (in order to reduce the exposure of farmers' livelihoods to the CC-related failure of individual elements). Box 3 summarises findings of studies regarding the potential benefits resulting from the integration of agriculture and aquaculture by small farmers.

Box 3: Potential benefits from integrating agriculture and aquaculture in smallholder livelihood support systems

Brummett et al (Food Policy 33 (2008) 371-385) found that "In Malawi, a serious drought from 1991 through 1995 had a major negative impact on smallholding agriculture. Yet in all cases studied, even though staple crops failed and farmers lost money, the integrated fishpond sustained the farm. By retaining water on the land, ponds enabled farmers to continue food production and balance economic losses on seasonal cropland. For example, in the 1993/94 season, when only 60% of normal rain fell, average net cash income to integrated farms was 18% higher than to non-integrated farms (Brummett and Chikafumbwa, 1995). In areas with high population pressure, integrated aquaculture systems can help keep people alive and on the land producing food for themselves and their communities."

364. Additional specific elements of these farming systems, that will contribute to the livelihood resilience of the farm families in question, may (subject to farm-specific participatory situation analysis and planning) include the following:

- Rainwater capture and storage systems, to increase the availability of water for domestic and agricultural purposes;
- "Grey" (domestic waste) water filtering and storage systems, to increase the availability of water for food production (especially household vegetable gardens, in which there is particular potential for women's participation);
- Multi-storey agroforestry systems and cover crops, contributing to the cycling and conservation of soil humidity;
- Climate-resistant crop species and varieties
- Small scale water storage ponds, with the dual purpose of providing an emergency source of water and permitting small scale aquaculture

365. The promotion of these diversified farming systems will be achieved through a combination of participatory learning and conventional extension approaches.

Output 3.4.1: Participatory learning and extension programmes and demonstrations

366. In the same way as described above with the climate-proofing of aquaculture, the project will prioritise a participatory action learning approach to the development and dissemination of diversified farming systems. Successful farms will subsequently have the potential to be used as resources for the demonstration of the systems to other stakeholders.

- *Activity 3.4.1.1: Conduct participatory situation analyses with farmers*

367. Buy-in to and adoption of modifications to existing farming systems will only be achieved and sustained in farmers are individually convinced of the need for them. The promotion process will therefore start with the facilitation by the project of participatory situation analyses which will cover diverse overall livelihood aspects including current income, food security, living conditions and access to services such as health and education; scenario analyses in which participants will consider their livelihood sustainability and vulnerability to external factors including economic and climatic variations; and analyses of resources and capacities, which will form the basis for the consideration of the feasibility of different management options.

- *Activity 3.4.1.2: Organization and planning of participatory learning, extension and demonstration programmes*

368. In consultation with the local stakeholders, learning, extension and demonstration activities will be carried out at strategic locations around the lake, identified in such a way as to be easily accessible to manageable groups of farmers and also to have the potential to serve as demonstration sites in the longer term. Initial planning meetings will be held to define the forms of organisation, collaboration and responsibilities of the participants, and to draw up work plans.

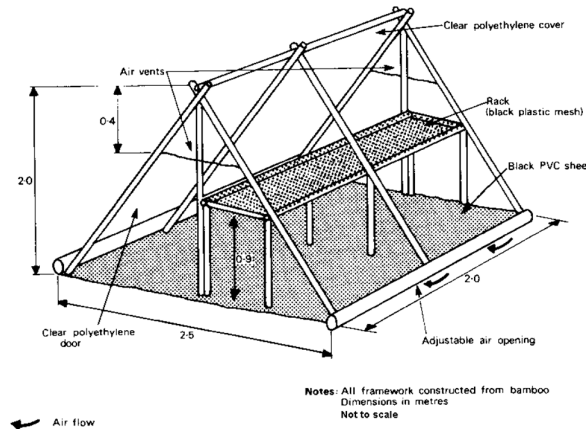
- *Activity 3.4.1.3: Implementation of learning, extension and demonstration programmes*

369. Project field staff (who will typically have a technical background and practical experience in fish farming and smallholder livelihood support) will partner with DoF and DoA extension agents in facilitating the learning, extension and demonstration activities, with an emphasis on developing capacities among the extension agents to continue facilitation support beyond the life of the project. The initial learning, extension and demonstration activities on selected farms will be complemented by advisory and follow-up visits to the individual farms of the participants in order to monitor their application of the knowledge gained. Materials and inputs (such as seed and fingerlings) will be provided as needed to give an initial kick-start to these processes, but attention will be paid to ensuring the sustainability of farmers' access to these in the long term, which will in turn be a crucial determinant of the sustainability of the practices themselves.

Output 3.4.2: Solar driers

370. The project will directly finance the provision of solar fish driers to selected fishing communities in order to demonstrate their benefits in terms of reductions in pressures on vegetation resources from fuelwood extraction, and to improve the quality and marketability of the fish. The provision of these driers will be carefully targeted in order to maximise their demonstration potential among fish producers in a range of socioeconomic categories and locations: it is expected that these initial demonstrations will result in rapid and significant upscaling due to the low cost, accessible technology and economic benefits of the driers.

Figure 14 Example design for low-tech solar fish driers⁹⁸



- **Activity 3.4.2.1: Community-wide awareness raising on solar driers**

371. Village-level meetings will be held throughout the target area, in which the concepts and benefits of solar driers will be explained and discussed, and target locations and families for their demonstration will be defined in a participatory manner.

- **Activity 3.4.2.2: Installation of driers**

372. Project funds will be used to finance the purchase of the materials for the installation of the driers, which will principally consist of plastic sheeting; it is expected that materials for the frame will be obtained locally. It is also expected that labour for the construction of the driers will be provided by the participating families/communities.

- **Activity 3.4.2.3: Demonstration and training activities**

373. The project will finance and facilitate training activities aimed at the participating families, aimed at ensuring the correct use of the driers and also promoting other aspects of product care; and demonstration activities in which members of the target and neighbouring communities will visit the driers with the aim that they will replicate them, at their own cost.

- **Activity 3.4.2.4: Follow-up support**

374. The project will provide follow-up technical support throughout its duration in order to trouble-shoot any problems with the driers and ensure their optimum management and adjustment as necessary.

Component 4: Monitoring and Evaluation (M&E) and Adaptation learning

Outcome 4.1 Project implementation is based on results-based management and application of lessons learned and good practices in current and future interventions.

Output 4.1.1: Monitoring, evaluation and reporting system established, supporting adaptive project management

375. The effective implementation of the project will require the development and execution of a project monitoring and evaluation system, including internal measurement of project indicators on a regular basis as prescribed in the results framework, as well as external evaluations at project mid-term and end. The Project Monitoring and Evaluation System will provide members of the Project Management Unit, DoF and other partners with systematic

⁹⁸ www.nzdl.org

and timely information on implementation progress in delivering on outputs and outcomes. The Mid-term Evaluation report will provide an independent assessment of project activities and recommendations for improving project performance. The Final Evaluation report will assess the extent to which the project delivered on expected outcomes and provide recommendations for future activities.

- *Activity 4.1.1.1: Development and implementation of project M&E system*

376. The M&E system will be developed in accordance with the provisions of Section 4 below, with full participation of DoF staff in order to ensure buy-in and maximize the probability of continued measurement of selected indicators beyond the life of the project.

Output 4.1.2: Mechanisms for effective management and dissemination of knowledge

377. Effective management and communication of knowledge, information and lessons learned will be essential for maximizing the acceptance of the project among key stakeholders, and the realization of the potential for scaling up its impacts.

- *Activity 4.1.2.1: Establishment of communication plan*

378. A dedicated communication plan will be established, based on best practice in relation to strategic and behaviour change communications (see Section 4.6).

- *Activity 4.1.2.2: Training of project staff in communication*

379. All project staff will receive training to ensure that they are able to communicate project objectives, principles, strategies and lessons learned effectively to all key stakeholders, tailored as appropriate to the diverse needs of different target groups.

- *Activity 4.1.2.3: Documentation and sharing of lessons learnt from the project*

380. Systematization and dissemination of lessons learned will not be left until the end of the project, but rather will be a continuous process throughout its implementation period. The progressive supply of such inputs to key stakeholders, timed and tailored appropriately in order to maximise acceptability and utility, will help to ensure stakeholder buy-in to the project: stakeholders will in turn be invited to share and compare their own experiences and to collaborate in the generation of lessons by the project.

1.3.4 Adaptation benefits

381. As a result of the project, the livelihoods of the members of 29 fishing villages (corresponding to Beach Village Communities) will have increased resilience to the impacts of climate change. This will be measured by:

- Reductions in men and women's perceptions of their vulnerability and risk exposure, from "extreme" to "medium", in accordance with AMAT indicator 1.2.14, the precise definitions of which will be confirmed at project start in accordance considerations of relevance to local socioeconomic, cultural and biophysical contexts.
- 10% increase in average household income (including the poorest, more vulnerable and female-headed households) due to the application of viable and profitable adaptation measures
- The maintenance of the quantity and quality of family food consumption (including the poorest, more vulnerable and female-headed households) at least baseline levels, reflecting the fact that livelihood and economic resilience measures (which may require increased dedication of time, land and financial resources) will not be carried out at the expense of food security.

382. The approaches to climate change adaptation to be applied by the project will have a number of aspects:

- Measures will be taken to reverse the decline of capture fisheries on Lake Malombe, which has been accelerated by climate change, with corresponding livelihood impacts: this will help to restore the position of capture fisheries as one of the mainstays of local livelihoods, thereby contributing to their resilience.
- The management of capture fisheries on Lake Malombe will feature an Ecosystem Approach to Fisheries (EAF), combining improvements in governance with restocking and ecosystem/habitat rehabilitation, and an emphasis on the strengthening of capacities in DoF and local communities for adaptive management that responds flexibly to future trends in climatic and other conditions.
- Aquaculture, using appropriate technology levels and incorporating climate change measures, will be promoted as one of the suite of livelihood support measures available to community members, with potential to compensate in part for the declining contribution (accelerated by climate change) of capture fisheries to local livelihoods.
- Aquaculture will be promoted where possible within the framework of an integrated farming/livelihood systems approach, enabling farmers to balance and integrate it with the other components of their farms: this will avoid the risk of families depending excessively on aquaculture at the expense of other farm elements, and thereby exposing themselves to increased risks in the event of the failure of the aquaculture.
- The integrated farming/livelihood approach will also focus on optimizing the use of water resources, which are likely to become increasingly scarce under conditions of climate change, at farm and community level, by for example siting aquaculture in such a way as to allow it to take advantage of irrigation infrastructure, and advising farmers on how to use agricultural by-products as fish feed, and fishpond water and sediment for crop irrigation and fertilization.
- The project will support resilience from a community perspective, through the promotion of different resilience options tailored to the needs, capacities and conditions of the different socioeconomic strata within the community: mid-scale commercial fish farms, for example, will be targeted at those members of the community with access to the financial capital required for their establishment, resulting in direct economic benefits to them and also trickle-down benefits to others in the community in the form of employment and commerce; while poorer members of the communities will be targeted by the integration of low-input, low-output aquaculture into diverse smallholder farming systems.

1.3.5 Project Assumptions

1) Complementary livelihood support elements continue to be viable

383. In order to avoid diluting its focus and resources excessively, the project will only be able to address certain aspects of the livelihood support systems of the target populations. The attainment of the overall targets of the project, in terms of reduced livelihood vulnerability, increased incomes and stable access to food, assume that the other support strategies on which the target population's livelihoods depend continue to function. These include, for example, cash-cropping and off-farm employment. There will be a limit to the degree to which

the resilience alternatives offered by the project will be able to buffer against failures in these other livelihood elements.

2) *Climatic trends and natural disasters remain within the coping range on the basis of which the resilience strategies are designed*

384. Increasing resilience to climatic trends and natural disasters is the core focus of the project. The achievement of the project's targets in this regard are, however, dependent on the magnitude of these phenomena remaining approximately within the limits described in Section 1.2.2. If this "coping range" is exceeded, the livelihoods of the target population will be affected more than is foreseen: the project will still have a net benefit, however, meaning that the target population will not be as seriously affected by these phenomena as they would have been without the project.

3) *Political and social conditions remain stable*

385. Achievement of the project's targets depends on the continuation of Government support, allowing the development of the policy and institutional conditions proposed under Component 1, that will constitute the 'enabling environment' essential for the success and sustainability of the ground level actions. This Government support in turn assumes the existence of overall political stability in the country. There is no reason at this stage to doubt that this assumption will hold, following the smooth transition of power following the democratic elections in 2014.

386. The attainment of the targets in relation to fisheries governance also assumes that social conditions remain stable and manageable at local levels. There is no recent history of social disorder or violence in the project area, and there has been a significant amount of investment in strengthening social structures in recent years, which make it reasonable to assume that this condition will be met.

4) *Continued receptivity on the part of stakeholders, including policy makers, to receiving and responding to information inputs*

387. The eventual effectiveness of the project in improving fisheries management and resilience, through strengthening stakeholders' access to information on resource status and management recommendations, assumes that they will be receptive to the information and respond accordingly. In order to ensure that this assumption is met, the project will pay careful attention to the application of effective strategies for dissemination and awareness raising: specifically, activities under Output 1.1.5 will concentrate on developing mechanisms for dissemination and input of knowledge into adaptive management.

5) *Continued commitment to collaboration between stakeholders (particularly GoM and research institutions) in information generation and management*

388. Attainment of outcomes 1.1 and 2.1, in relation to the generation and management of information, and its input into policies and management instruments, assumes the maintenance and furtherance of collaboration between stakeholders: on the one hand, the research institutions (particularly national universities) responsible for generating the information (through research and synthesis of existing information) and on the other the Government entities responsible for defining policy frameworks and management strategies. This collaboration will be assured through ongoing personal contacts facilitated by the project team, and also through the existence of a multi-institutional Technical Advisory Committee supporting the Project Management Unit (PMU), on which these entities will be represented.

6) Continued receptivity on the part of stakeholders, including policy makers, to receiving and responding to information inputs

389. In addition to willingness to collaborate, the achievement of the changes sought by the project in terms of policies and management approaches assumes receptivity among those involved to the information and recommendations generated by the project, and a willingness to take the messages and board and make real adjustments accordingly to their way of operating. The project will promote this in particular through its actions under Output 1.1.5 in relation to dissemination and input of knowledge into adaptive management; under Outcome 2.1 in relation to policy influence; and under Outcome 2.3 in relation to strengthened awareness of climate change issues and responses. The “think tank” to be supported under Output 2.1.1 will be of particular utility in the promotion of stakeholder receptivity at policy and institutional level. The project’s emphasis on “action learning” under Outcomes 3.3 and 3.4 will promote receptivity among community-level stakeholders.

7) Existence of sufficient budgetary flexibility to allow provisions to be made for climate resilience

390. The sustainability of the institutional capacities to be developed at national level in support of the proposed models of fisheries management and resilience will depend in part on the adequate allocation of reliable budgetary resources. This will be promoted through the policy influencing actions of the project under Outcome 2.1: these will aim to increase awareness among Government actors responsible for defining budget allocations, of the returns potentially achievable through funding DoF adequately, in terms of the generation of social and economic benefits among local communities and the reduced need for remedial funding to correct the impacts of climate change. The project’s strategies will also provide for the possibility that this assumption will not be met, due to overall scarcity of budgetary resources, by emphasising the development of capacities for fisheries co-management among local communities: these capacities will complement those of DoF, especially in relation to governance and enforcement, thereby limiting the resourcing needs of DoF.

8) Availability of staff for capacity development activities

391. The development of staff capacities assumes that the institutions in question (particularly DoF) will make the staff in question available at the required times. The likelihood of this assumption being met will be furthered by the fact that the project’s implementation arrangements make strong provision for ownership of the project by DoF, and through the project’s provisions for the promotion of awareness raising and receptivity at institutional level, as described above.

9) Adequate baseline educational levels to allow effective participation in capacity development

392. The capacity development activities to be supported by the project will in all cases be preceded by assessments of the educational background of the targeted stakeholders, in order to ensure that the strategies applied are appropriate.

10) Existence of institutional culture, systems and baseline capacities within DoF allowing capacities to be applied effectively and budgetary execution to be improved.

393. An adaptive approach will be applied to the development of capacities in DoF in order to ensure that the project does not overload the institution and attempt to generate changes that are not sustainable. This will be achieved through the focus of the project’s implementation arrangements on strong ownership by DoF, and the central roles of the National Project Coordinator and National Project Director, both of whom will be DoF staff

members. Capacity development will also be guided by ongoing institutional capacity analyses under the orientation of project staff and consultants.

1.3.6 Stakeholder consultation and engagement

394. Stakeholder engagement in the project has been promoted through the consultation activities carried out during the PPG phase.

395. The fieldwork applied a Rapid Appraisal (RA) methodology to interview individuals and communities in selected areas along Lake Malawi including the most vulnerable areas to climate change, especially in Salima, Nkhota Kota and Karonga districts⁹⁹. Apart from being an additional most vulnerable site to climate change, Mangochi was identified based on the decline of chambo in the southern Lake Malawi and Lake Malombe, and existence of both small-scale and commercial fishery operations. In addition, there is presence of various sectors and organisations both governmental and non-governmental organisations (NGOs) that are engaged in climate-related environmental issues with an aim of assessing whether they had mainstreamed climate change issues in the context of gender in their programmes and project activities. The main focus was to examine whether their activities had any relevance to the fisheries and aquaculture sub-sectors.

396. Four researchers were engaged to administer individual interviews by administering both semi-structured and open-ended question schedules and facilitate focus group discussions (FGDs) as tools for data collection. The study conducted 18 focus group discussions (FGDs) in Mangochi (4), Salima (4), Nkhotakota (5) and Karonga (5) with participants ranging from 15 to 40. Distribution of the respondents by district is as shown in Table 1. For individual interviews data entered so far include Mangochi, Salima and Karonga in which 121 people were interviewed of which 90 were men, 28 women and 3 companies (private sector).

397. The choice of the beaches or villages was influenced by how active the beaches were in terms of fishing and to a certain extent, their experience in weather induced calamities or disasters as reported in various reports¹⁰⁰. Specifically, the following key gender based stakeholder groups were targeted for consultations: fishers, fish traders, fish farmers, crop and livestock farmers, traditional leaders, government departments/ministries responsible for environmental management e.g. Environmental Affairs, Parks and Wildlife, Fisheries and Agriculture; non-governmental organisations (NGOs) or civil society organisations (CSOs) and the private sector.

398. Purposely selected key informants including district authorities, government staff, traditional leaders and more experienced fishers like those that have depended on fishing for their livelihood were also be interviewed to update status of fisheries and find out how much knowledge they had on climate change. Visits were made to the fisheries research centres (Monkey Bay and Senga Bay) to gather data on fisheries and climate change capacity. Finally, a questionnaire was also sent by email to selected fisheries officers, academic institutions (universities) to assess their capacity in terms of their knowledge base, infrastructure and manpower development on climate change.

399. During the project preparation a specific effort was placed in consulting with primary and secondary stakeholders on climate change issues and vulnerabilities relating to the fisheries sector in southern Lake Malawi, the Upper Shire River and Lake Malombe to undertake a

⁹⁹ Munthali et al., 2004; Munthali, 2007; GoM, 2011

¹⁰⁰ Munthali et al., 2004; Munthali, 2007; GoM, 2011

preliminary vulnerability assessment. Between 22 February and 06 March 2015, a project team of DoF and LUANAR¹⁰¹ conducted consultations with:

- Approximately 350 community members in 12 villages (Makanhjira, Ntiya, Katuli, Chapola, Mwalija, Malembo, Simon, Makawa, Limbundugwa and Chikuluma, Nawanga and Magamba), with a special effort to include women in the conversations
- District Executive Committees (DEC) and District Environmental Sub-Committees (DECS) in Mangochi and Machinga Districts, respectively
- Mangochi District consultations with local DoF entities, District Government, Private sector and selected communities (March 6 to 9, 2015)
- Technical experts from various institutions incl. DoF, LUANAR, Zomba University, FAO a.o. and dedicated workshops in Lilongwe and Mangochi (between March and August 2015)
- National level consultations with other projects in various ministries, donors esp. The FISH project and USAID, possible co-financiers and key players in the climate change field (DCC, DEM, UNDP, World Fish)

1.4 LESSONS LEARNED

400. There has been a history of previous investments in fisheries management in Lake Malombe, stretching over several decades. A number of important lessons have been learnt in the process, which will be taken into account in this project:

- Importance of local ownership and transparent governance: prior investments have focused on participatory fisheries management, but in reality the resulting mechanisms and structures have often come to be perceived by many of the local actors as Government-led, and perpetuating prior power imbalances that disproportionately favour local elites.
- Limited access by poorer stakeholders to higher-input, higher-output options such as commercial aquaculture. The project will make available diverse options for resilience and livelihood support, tailored to diverse needs and capacities, ranging from commercial aquaculture to small-scale systems integrated into traditional farm-based livelihoods.
- Limited capacities in Government institutions, most crucially DoF: these have in the past limited the effectiveness of the enforcement of fisheries regulations and management plans. Despite the project's proposed investments in capacity development, it must be recognised that there are always likely to be deficiencies: strong collaboration between Government, district authorities and local communities will therefore be vital to ensure that the limited resources and capacities at each of these levels are used in an effective and complementary manner.

1.5 ALIGNMENT AND STRATEGIC FIT

1.5.1 Alignment with national priorities and obligations

401. Malawi ratified the UNFCCC in 1994 and submitted its NAPA in 2006. Specifically the project addresses NAPA priority 5 *“Improving climate monitoring to enhance Malawi’s early*

¹⁰¹ LUANAR, April 2015. Building climate change resilience in the Mangochi and Machinga Districts – field report from initial vulnerability assessments. PPG report, Lilongwe University of Agriculture and Natural Resources, under the leadership of Professor Emmanuel Kaunda

warning capability and decision making and sustainable utilization of Lake Malawi and lakeshore areas resources”, but also NAPA priority 1 “Improving community resilience to climate change through the development of sustainable rural livelihoods” with a focus on fisheries resources.

402. Malawi has developed a National Medium-Term Priority Framework (NMTPF) 2010-2015 that guides FAO project priorities and development in the country. The GEF project addresses Priority outcome 3: Sustainable land and water management. The sustainable management of natural resources will enhance the productivity of both food and cash commodities and increase sustainability of output per unit of resource, mainly land and water, while protecting the environment. FAO will therefore contribute towards sustainable land and water management, as well as towards the mitigation of weather variability and climatic change. Priority outputs for the NMTPF¹⁰² will be *inter alia* programmes to meet the challenge of climate change in natural resources, the environment and the agricultural sector implemented through the promotion of farming, forestry, aquaculture and fishing system adaptation.

403. The United Nations Development Assistance Framework (UNDAF) in Malawi sets out climate change as a key delivery area, and specific activities are mainstreamed through the framework. **UNDAF Key Priority 1: National policies, local and national institutions effectively support equitable and sustainable economic growth and food security by 2016**, which includes a specific target 1.3 *Targeted population in selected districts benefit from effective management of environment, natural resources, climate change and disaster risk by 2016*. FAO is an identified key partner, under lead of UNDP. Whilst most of the food security actions have been conceived for the agricultural sector, it is clear that in Malawi the fisheries sector is of critical importance and must be included.

404. At the request of the Government, FAO has been supporting development of aquaculture in Malawi including supporting a consultative workshop which was held 12th - 14th August 2009 to assess the status of aquaculture development and promote coordination among various stakeholders engaged in the sub-sector in Malawi. Additional requests on aquaculture development have been addressed through a TCP where FAO recently supported the transfer of breeding technology of catfish. FAO is also pursuing a TCP in response to a request by the DoF to support work on curbing post-harvest losses of the fishes from Lake Malawi. FAO has supported DoF in developing the EFA strategy and plan for the South-East Arm of Lake Malawi and Lake Malombe, including the holding of an expert meeting in August 2014. FAO further advises the Government of Malawi and the MAFS on food security priorities.

1.5.2 Alignment with GEF focal area and/or LDCF/SCCF strategies

405. The project will contribute to the LDCF objective of supporting Climate Change Adaptation by addressing national priorities to address climate risks as laid out in the NAPA of Malawi (2006). Specifically the project addresses NAPA priority project 5 *“Improving climate monitoring to enhance Malawi’s early warning capability and decision making and sustainable utilization of Lake Malawi and lakeshore areas resources”, but also NAPA priority project 1 “Improving community resilience to climate change through the development of sustainable rural livelihoods” with a focus on fisheries resources.*

406. The concept follows the “Revised Programming Strategy on Adaptation to Climate Change for the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF)”, of July 2010. The strategy recognises that ecosystem-based approaches to fisheries

¹⁰² The title of the NMTPF has been changed to Country Programming Framework

can help reduce vulnerability to multiple climate change related stresses and disasters, as well as the importance of fisheries to food security and livelihoods of small-scale fishermen.

407. The project design follows the results-based management framework set out in that document and the results expected from the project intervention will make tangible contributions to the focal area objectives 1 to 2, especially related to *Objective 1: **CCA1** - Reduce vulnerability to the adverse impacts of climate change, including variability, at local, national, regional and global level* and to *Objective 2: **CCA2** - Increase adaptive capacity to respond to the impacts of climate change, including variability, at local, national, regional and global level* and *Objective 3: **CCA3** - Adaptation Technology Transfer: Promote transfer and adoption of adaptation technology*. The contribution will be primarily through the promotion of climate change resilient fisheries practices and adaptation alternatives, informed by an improved early warning system of climate related threats to fisheries in the Lake Malawi area.

SECTION 2 – INNOVATIVENESS, POTENTIAL FOR SCALING UP AND SUSTAINABILITY

2.1 INNOVATIVENESS

408. The following aspects of the project will be innovative relative to past investments in the fisheries sector in the area, ensuring that it will generate significant and sustainable benefits in terms of CC resilience:

- It will apply an ecosystem approach to fisheries management (EAF) in the lake, recognizing that fisheries sustainability depends not only reducing offtake levels and the use of inappropriate gear, but also on the creation of favourable ecological conditions in the lake for fish breeding and habitat, and addressing (through landscape-wide planning) land-based threats to the aquatic ecosystem.
- It will promote an adaptive approach to management: rather than responding solely to a “snapshot” of present-day conditions, it will develop capacities among stakeholders in Government, district authorities and local communities to access and respond appropriately to information on evolving conditions in the lake. This will be important given the high level of exposure of this shallow lake to environmental fluctuations and trends, which limit the relevance of conventional concepts of fisheries management based on sustainable yield.
- It will adopt a multi-pronged approach to resilience. At the level of individual community members, this approach recognises that resilience depends in large part on spreading risks by diversifying livelihoods, rather than generating dependence on limited alternatives (such as aquaculture) with the risk of potentially maintaining or increasing livelihood vulnerability if these alternatives themselves fail to meet expectations. At community level, it recognises the diverse nature of community members, making available a range of alternatives tailored to their different needs and capacities – including aquaculture for those with sufficient investment capacity (with trickle-down employment benefits for other community members) and low-input, low-output systems featuring the integration of agriculture and aquaculture, for those with more limited financial and technical capacities.

2.2 POTENTIAL FOR SCALING UP

409. Overall, project activities will be scaled up through integration with the entire DoF system and staff, as well as with national development programmes run by NGOs, government and partner agencies. By focusing on food security we can ensure that the integration of climate resilient fisheries investments in the future will broaden food security opportunities in Malawi. A natural resource, traditionally a significant contributor to Malawian diets, will be promoted to a more prominent position in national food security policies in the future. Focusing on technical capacity support at this stage is a critical foundation for future up-scaling of the work.

410. Up-scaling of lessons learned to a regional level can be envisaged, informing climate resilience building in the fisheries sector throughout the African Great Lakes region, and especially amongst the three countries that border Lake Malawi, namely Malawi, Mozambique and Tanzania.

2.3 SUSTAINABILITY

2.3.1 Environmental Sustainability

411. Environmental sustainability is a central focus of the project, and will be ensured through the application of the Ecosystem Approach to Fisheries (EAF). This approach considers not only the sustainability of the fish populations themselves (through the strengthening of evidence-based planning and governance of offtake levels and gear) but also the ecological integrity of the ecosystem as a whole, including the restoration of key nurseries and habitat areas, the designation of no-take areas to allow population recovery, and the addressing of land-based threats such as pollution and sedimentation. Another key element of sustainability will be the focus of the project on developing capacities for adaptive management, through the effective flow of reliable and up to date information regarding the status of the ecosystem and its components into decision-making: this focus is particularly important in the case of this shallow lake, which is subject to wide seasonal and inter-annual fluctuations of water levels and quality.

412. The promotion of solar fish driers will reduce the risk of increases in fish offtake due to population recovery resulting in increases in deforestation to supply needs for fuelwood for the currently-used driers and smokers.

413. The sustainability of the management of water resources will be furthered through the integration, where possible, of fish farming into agricultural systems and infrastructure projects. This will allow stakeholders to take advantage of existing water management systems, such as irrigation reservoirs, for fish farming; while water from fish ponds will be available for irrigation use on farm, alongside other water management measures such as grey water filters and agroforestry systems.

2.3.2 Gender Equality

414. Project design has incorporated gender considerations through gender-specific vulnerability assessment and capacity development planning.

Table 17 Priority issues and strategies in relation to gender equity

EXISTING GAPS/ ISSUES	PRIORITY ISSUES/GAPS	HOW TO ADDRESS THE ISSUES
<p>Sociological and cultural:</p> <ul style="list-style-type: none"> - Traditions and customs e.g. patriarchal systems - Land tenure systems that favour men as land rights are governed by institutions that are culturally and socially determined hence affecting fish farming <p>Legal and legislative:</p> <ul style="list-style-type: none"> - Absence or non application of laws - Dichotomy between laws and customs - Laws that discriminate against women <p>Political:</p>	<ul style="list-style-type: none"> - Social protection for women - Improving trade policies to take care of women's needs - Female-Headed households to be given special attention when developing safety nets - Improve access to information on fish and markets - Improve access to credit facilities 	<ul style="list-style-type: none"> - Analysis of gender specific impacts and protection measures related to floods, droughts, diseases, and other environmental changes and disasters - Develop strategies to enhance women's access to and control over natural resources, in order to reduce poverty, protect environmental resources, and ensure that women and poor communities can better cope with climate change - Identify women's particular skills and capacities that lend themselves to mitigation and adaptation in climate change - Include women in decision – making of climate change adaptation at all levels - Conduct gender analysis to determine the roles and responsibilities of various players in fisheries

<ul style="list-style-type: none"> - Low status of women in society - Decision making reserved for men <p>Economic</p> <ul style="list-style-type: none"> - Difficulties in accessing means of production for women - Limited income for women - Limited access to education and training - Inadequate information on women's rights - Shortage of reliable and sex disaggregated data both qualitative and quantitative <p>Health</p> <ul style="list-style-type: none"> - HIV and AIDS have significant impacts on land tenure systems including inheritance rights, shifts in ownership of tenure and distress sales. - Increase in the tradition custom of property grabbing for both men and women - Increased vulnerability and increased food insecurity among women headed households and girls 	<ul style="list-style-type: none"> - Civic education on women empowerment - Effective communication strategies which are context specific - Promotion of Behavior Change Communication (BCC) strategies at all levels 	<ul style="list-style-type: none"> - To determine how individuals, households and others make a living and access to essential resources and services - Increase awareness on property rights among men and women not only promoting access to land and inputs - Adaptation of the gender concept in the local context - Enhanced investment in research - Revise/adopt laws aiming to improve women's status - Repackaging and dissemination of adopted laws - Setting up community watch-dogs - Increasing development of female leadership - Increased involvement of women in decision making bodies and structures - Enhance participation of women in training courses and organisational structures - Increased attention to girls education - Improve documentation - Undertake cross sectoral research at different levels (local, district and national) for networking and resource mobilization - More research to provide data that allows to better understand the situation on the ground - Enhance advocacy campaigns - Protect women and girls from Gender Based Violence (GBV) - Promote equal access to women and girls to information on HIV and AIDS
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2.3.3 Social and Economic Sustainability

415. Social sustainability will be ensured as follows:

- The strengthening of multi-stakeholder co-management structures as the cornerstone for sustainable fisheries and ecosystem management, allowing the needs and concerns of all relevant stakeholder groups to be aired and considered, including possible obstacles to social sustainability.
- The application of a highly participatory approach to the planning of ecosystem and fisheries management, and restoration activities, as proposed under Outputs 3.1.2 and 3.2.2, in order to ensure that they make provisions for issues with potential implications for social sustainability, and are "owned" by all major stakeholder groups.
- Participatory development and collaborative application of norms and regulations on resource management, in order to ensure that they receive social backing.
- Participatory approaches to the development of technologies and management strategies, featuring leadership by the farmers/fishers themselves, or at least their full involvement in the processes. This will maximize the probability of compatibility with other elements of stakeholders' complex livelihood support strategies, as well as with cultural norms, and will ensure their ownership of the practices. A focus on

experimental “action learning” will furthermore allow stakeholders to adapt the practices in the future, thereby ensuring their continued relevance and sustainability in the face of changing circumstances.

- Economic sustainability will be ensured by developing technical and business-management capacities among aquaculture producers, under Output 3.3.3: this will include aspects of post-harvest care, marketing, producer clustering (in order to improve access to affordable inputs and services, and markets) and technical support aimed at optimising the efficiency of input use (for example by reducing mortality rates and therefore cost of fry, and improving feed inputs).

2.4 HUMAN RIGHTS BASED APPROACHES (HRBA), INCLUDING RIGHT TO FOOD, DECENT WORK, ACCOUNTABILITY TO AFFECTED POPULATIONS

416. The project will specifically contribute to the following aspects of human rights:

- Food security, through support to the recovery of capture fisheries, the promotion of aquaculture (tailored to the capacities of different stakeholder sectors) and the integration of aquaculture and efficient water management into traditional farming systems;
- Employment, through support to capture fisheries and aquaculture, and an emphasis on tailoring production models to the needs of different stakeholder groups in order to ensure that employment opportunities are decent and accessible;
- Representation and accountability, through the strengthening of multi-stakeholder co-management structures accompanied by checks and balances to avoid their domination by traditional elites or the exclusion of women; and the application of participatory, gender-sensitive approaches to planning and governance.
- Security, through the participatory development of norms and governance structures, and their collaborative application.

2.5 CAPACITY DEVELOPMENT

417. Initial capacity assessments were undertaken as inputs into the PPG phase¹⁰³. During the project implementation phase, more detailed assessments will be undertaken. As proposed under Outputs 2.2 and 2.3, the following overall sequential approach will be applied to institutional capacity development, reflecting current FAO best practice:

- 1) *Detailed Capacity Building Needs Assessment (CBNA)*: The results of the capacity reviews carried out during the PPG phase will be updated and further detailed through a CBNA at the beginning of the implementation phase. This will include processes of pre-selection and baseline assessment of candidates for training, which will consider the strategic importance of the professional roles of each candidate, as well as their cultural characteristics, current educational level, previous record of training and experience, aspirations and the precise nature of their capacity gaps relative to the

¹⁰³ DoF, 2015. Climate Change Adaptation in The Fisheries Sector In Malawi: Policy And Institutional Analysis And Capacity Assessment. Contact Friday Njaya

capacities needed for the successful application and sustainability of the resilience strategies to be promoted by the project.

- 2) *Development of gender-sensitive Capacity Building Plans.* Capacity Building Plans will be developed in a participatory manner, rolled out and continuously updated through the project implementation. The comprehensive plans will be the foundation for the development of demand driven training approaches and content.
- 3) *Development of capacity development materials:* Specific capacity development materials will be developed, tailored to the needs and characteristics of the different sectors of the target audience. Gender considerations will be applied in the training content and materials development.
- 4) *Realisation of capacity development activities.* Capacity development will involve a range of different approaches. Training will focus on dynamic approaches to learning, including peer-to-peer dialogue, on-the-job training, the training of trainers, testing tools and real-life application, as well as study tours in which topics are presented in contexts to which the trainees can relate.
- 5) *Knowledge assessments.* Capacity development will be followed up by regular knowledge assessments from PY3 to project end, to ensure knowledge has been assimilated and to identify difficulties or limitations that need to be addressed; this could take the form of awareness surveys and tests at either individual or institutional levels.

418. Detailed capacity plans especially for BVCs and communities - the key beneficiaries of this project – will be developed during the project implementation, when the 45 target villages around Lake Malombe will undertake their specific vulnerability assessments and when the project is being introduced.

419. In principle, for **primary stakeholders** the following capacity development strategies, aimed at ensuring sustainability, in addition to impact, will be pursued:

- BVCs, local and district governance structures and institutions: development and implementation of capacity building plans based on needs assessment; trainings on relevant technical topics, overall institutional capacity building support;
- Community action learning: engagement of primary stakeholders in citizen-science type of approach, engaging local communities in monitoring their own resources in the three key conservation areas; they will also be engaged and take responsibility for law enforcement
- Capacity building support in institutionalisation of co-management arrangements
- Specific learning about climate change risks, impacts and vulnerabilities – and adaptation actions that can be taken to strengthen resilience (of people and ecosystems)
- Capacity support for pursuing alternative livelihoods and food security strategies by introducing and carefully supporting climate resilient aquaculture developments

420. For **secondary stakeholders** the following will be implemented:

- DoF: Capacity support for local and district level staff, as well as research and extension services beyond Mangochi, mostly on project learning and project specific training modules such as on climate change risks, impact and options for the fisheries sector. A detailed capacity needs assessment will be undertaken during the project

- implementation phase, building on a scoping assessment undertaken during the PPG phase. The Project Management arrangements are orchestrated in a manner that the PMU and project facilitate technical know-how and work closely within DoF and with DoF staff in Magochi to allow for skills transfers and learning-by doing. The delivery of the project is fully in the hands of DoF.
- Think Tank: A technical think tank is convened and co-supported by the FISH project as a co-financing contribution with the aim to strengthen capacity of national professionals and experts in terms of fisheries and aquaculture agenda setting in a climate change context. Exchanges and interactions with international counterparts can be facilitated via FAO according to need.

SECTION 3 – INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

3.1 INSTITUTIONAL ARRANGEMENTS

3.1.1 Roles and responsibilities of main institutions

421. A detailed stakeholder plan including roles and responsibilities of main stakeholders is included in Annex 4.

Ministries – national level and relevant coordination mechanisms

422. The execution of this project will be supported by the Department of Fisheries (DoF) in the Ministry of Agriculture, Irrigation and Water Development (MoAIWD). The DoF is involved at numerous levels and with different units and offices, specified below.

423. On the national level, DoF convenes and liaises with the Ministry of Natural Resources, Energy and Mining's Environmental Affairs Department, which houses the National Climate Change Programme and Department of Climate Change and Meteorology Services (DCCMS).

424. The Environmental Affairs Department is the overall coordinating entity for the National Adaptation Plan (2013-2016), and leads the National CC Steering Committee and National GEF Steering Committee, respectively.

425. Other relevant technical Ministries will be involved mostly through the existing national CC coordination platforms such as the NCCSC. The project will interface with these bodies through the think tank to be established by the project (Output 2.1.1), and the Fisheries Science and Technology Advisory Panel (FSTAP) that has been established with support from the FISH project.

Department of Fisheries (DoF)

426. The DoF will support the project execution on national, district and sub-district levels (see details in Annex 4) and will also be the focus of capacity support rendered through the project (Annex 9). The Mangochi District Fisheries Office will be the host of the Project Management Unit, and the hub for project activities and field operations, including the coordination of DoF sub-stations in Chimwala, Chapola, Kadewere, Upper Shire.

427. The research units of the Department, especially at Monkey Bay will be key project implementation partners, responsible for establishing a fisheries EWS and key monitoring elements critical for project management. The Fisheries College in Mangochi will be specifically engaged through its Communications and Outreach unit. It will be part of specific activities relating to component 2 of the project, such as running a "Chambo campaign". The DoF-run National Aquaculture Centre in Domasi will serve as provider of fry for the restocking activities of the project (see Output 3.2.3)

District and sub-district governance level

428. The District (Mangochi) Commissioner is the Government's appointed leader responsible for any district level governance issue. He/she convenes the District Development Committee (DDC), which is tasked with development, planning and budgeting responsibilities. Several technical sub-committees are established. The DDC is a specific project target group, with identified project roles and a capacity development target.

429. In terms of sub-district governance, the project will work with three Traditional Authorities (Chimwala, Chowe, Mponda), all of which participated actively during the project preparation. The TAs play a significant role in convening local level stakeholder engagement

and coordination and all three TAs have expressed gratitude for the possibility to be part of the project.

430. At the village level, there are 45 villages around Lake Malombe. Village Development Committees (VDCs) are responsible for the development of village development plans and budgets. As VDCs are the lowest formal level of governance organisation, they form an important entry point for fisheries management as well as climate change resilience building amongst local communities. They also form the direct link to the fisheries law specific Beach Village Committees (BVCs), which are a primary stakeholder of this project.

Beach Village Committees (BVCs)

431. Set out by the Fisheries Act, BVCs were established in the 1990s with specific fishery related governance responsibilities. In an attempt to create effective and participatory co-management arrangements BVCs were set up as local fisher committees which act as intermediaries between fishing communities and the Fisheries Department. They were conceived to provide a two-way channel of communication, in particular concerning the discussion and adoption of fisheries regulations and extension work. In principle, the groups are elected at a community level. The 10–14 members are mainly fishermen although efforts are made to include traders and fish processors (including women) in the work. Traditional authorities such as local chiefs and village headmen are *ex officio* members in the area of their jurisdiction. After initial set up and development of a constitution, BVCs are involved in management components such as discussion and adoption of fisheries regulations, licensing and record keeping of fishing gear and boats, control of their beach and fishing area, namely gear and license inspection, organisation of extension sessions and participation in fisheries enforcement. At this time, most BVCs are not functional, but will be re-established (or reformed) as part of this project.

3.1.2 Coordination with other initiatives

432. The DoF will seek to engage with relevant projects and partners on the national and district level, supported by the existing NCCSC and GEFSC structures coordinated by the Department of Environment. Relevant representation on the Project Steering Committee (see below) will enable flow of information and governance interaction.

433. Coordination with relevant projects with presence in Mangochi District will convene regular project update meetings amongst the community of practice in Mangochi. These meetings will be led by DoF and supported by the PMU. A meeting schedule will be agreed upon and will be set up according to demand, following the inception workshop.

434. Close coordination is foreseen with the USAID-funded FISH (Fisheries Integration of Society and Habitats) Programme. Areas of synergy and complementarity between the two projects are summarized in Box 3, Section 1.2.7. Whereas the FISH project has a national and a district level office presence, the LDCF project will mainly be based at the Mangochi Fisheries office. Regular interactions with the national team as well as with the various FISH implementation partners such as Emmanuel International (responsible for project delivery in the Lake Malombe and South-East arms of Lake Malawi areas) will have to be set up during the project inception. Joint planning and activity execution through formally set up work coordination platforms both in Mangochi as well as at national level are foreseen. Furthermore, a formal representation on the Project Steering Committee is foreseen, even if *ex officio* as FISH is a formal co-financing partner.

435. On technical matters, the FISH led co-financing support to a national Task Force on fisheries, aquaculture and climate change will convene government and non-government experts, including from the leading academic institutions, individual experts and even the private sector. Such a think tank would also provide a certain level of coordination and thought leadership, which will be an important aspect of this project, i.e. in terms of policy guidance and capacity building.

436. There are a multitude of relevant recent and ongoing projects, which are of interest to this LDCF, GEF and non-GEF funded. Key initiatives that the project will coordinate with, in addition to those projects considered as baseline and/ or co-financing contribution, include:

437. Lake Chilwa Basin Climate Change Program (LCBCCP) (2010-2015). The LCBCCP, implemented by WorldFish in partnership with Leadership for Environment and Development (LEAD), The Forestry Research Institute of Malawi and the University of Malawi and funded by the Norwegian Ministry of Foreign Affairs, is developing a range of Basin-wide climate change adaptation solutions that are being implemented in support of the country's CCP and NAPA so as to enhance the capacity of communities to adopt sustainable livelihoods and natural resource management practices. The project has adopted an integrated management approach. This includes the conduct of various stakeholder fora, and collaboration with other NGOs, and projects such as World Vision International (WVI), Wildlife and Environmental Society of Malawi (WESM), Malawi Environmental Endowment Trust (MEET), Mulanje Mountain Conservation Trust (MMCT) and Wellness for Agriculture and Livelihoods Advancement (WALA), all of who are implementing related activities in the Basin.

438. Malawi Environment and Natural Resource Management ("ENRM") Project (MCA) (September 2013 - August 2018). The Environment and Natural Resource Management ("ENRM") Project is intended to help the Government and other relevant stakeholders address the growing problems of aquatic weed infestation and excessive sedimentation in the Shire River which cause costly disruptions to downstream power plant operations. The ENRM Project is also expected to improve land use and watershed management practices in the Shire River basin by addressing underlying environmental and social issues.

439. Climate Smart Agriculture: Capturing the Synergies between mitigation, adaptation and food security (01 Jan 2012 – foreseen 31 Dec 2014 – still on-going). The project with the European Commission and FAO aims to build the capacity of three participating countries, including Malawi, to undertake and finance climate smart agriculture through: (i) building an evidence base for developing and implementing policies and investment for climate smart agriculture; (ii) formulation of country-owned strategic frameworks and investment proposals for climate smart agriculture; and (iii) building capacity for evidence-based planning, implementing and financing climate smart agriculture including training of agricultural and climate change policy-makers on issues of climate smart agriculture. The focus of this initiative is on the overall agriculture sector at policy and planning level. The proposed LDCF project will complement it by focusing specifically on fisheries and aquaculture, and the implementation of adaptation measures at local level. The results from the LDCF project will contribute to the evidence-based planning and implementation of climate smart agriculture.

440. FAO Improving Food Security and Nutrition Policies and Programmes Outreach. A collaboration between the Ministry of Agriculture and Food Security (MoAFS) and the FAO; currently the second phase of this programme is underway. Farmers are involved in small scale irrigation, soil and water conservation, nutrition and health education and water and

sanitation. The project is funded by Flanders International Cooperation Agency (FICA) and is being implemented mainly in Kasungu and Mzimba Districts, with national policy implications.

441. AfDB-GEF LDCF project “Climate Adaptation for Rural Livelihoods and Agriculture (CARLA)”. The goal of the CARLA project is to improve resilience to current climate variability and future climate change by developing and implementing adaptation strategies and measures that will improve agricultural production and rural livelihoods. Lessons learned in this on-going project which focuses on community level climate change adaptation have been considered in this project’s design, especially with a view too food security.

442. WB-GEF multi-focal area “Shire Natural Ecosystems Management Project”. Cutting across the biodiversity, sustainable land management and climate change focal areas, this project aimed to develop a strategic planning and development framework for the Shire River Basin and support targeted investments to improve land and water resources management, and associated ecological services and livelihoods in the Basin. Lessons learned are being considered for upper catchment climate actions needed, which will be part of the climate change awareness raising and learning with various institutions at district and sub-district level.

443. UNDP-GEF LDCF project “Climate Proofing local development gains in rural and urban areas of Machinga and Mangochi Districts Malawi” (July 2014 to June 2019). This project will utilize community-based approaches to adaptation in order to mainstream climate change considerations into the baseline programmes (decentralization and agricultural subsidy programme). Thus increasing the resilience of local economic development in the Shire River basin. The goal of the project is to secure the development and food security gains from the baseline programs by empowering communities to integrate climate risk considerations in the development policies, plans, projects and actions. The project will provide knowledge, tools, capacities and methodologies for the adoption of an ecosystems and community based approach to adaptation, which is more effective in enabling climate vulnerable people to plan for and adapt to the impacts of climate change; benefiting over 458,371 in 91,674 households. Catalytic linkages are foreseen between these two projects, especially concerning climate change related awareness raising, training and outreach. The primary stakeholder groups of the two projects complement each other in Mangochi and selected parts of Machinga districts.

444. UNDP-GEF LDCF project “Strengthening climate information and early warning systems in Eastern and Southern Africa for climate resilient development and adaptation to climate change – Malawi”. The project aims to strengthen the capacity of the Department of Climate Change and Meteorological Services to monitor extreme weather and climate change, and for integrating sector-specific climate information into development plans and early warning systems. Linkages relevant to the fisheries sector will be established.

445. National Programme for Managing Climate Change in Malawi (CCP) and Africa Adaptation Programme- Building Capacity for Integrated and Comprehensive Approaches to Climate Change Adaptation in Malawi (AAP-Malawi). The Government of Malawi with support from its cooperating partners (Norway, DFID, UNDP and Japan) is implementing a comprehensive climate change formulation and integration phase programme called the National Climate Change Programme which aims at mainstreaming and addressing climate change issues in the national development agenda. A joint climate change coordination mechanism for donors also exists. This project will be steered by the National Climate Change

Committee under the DCC – and thus will be directly coordinated under the indicated climate change programmes.

3.2 IMPLEMENTATION ARRANGEMENTS

3.2.1 Organizational structures, roles and responsibilities

446. The principal elements of the organizational structure of the project are shown in Figure 15.

447. The Food and Agriculture Organization of the United Nations (FAO) will be the GEF agency supporting the execution of this project. The main responsibilities will comprise of:

- Administer funds from LDCF in accordance with the rules and procedures of FAO, and in accordance with the agreement between FAO and the GEF Trustee.;
- Oversee project implementation in accordance with the project document, work plans, budgets, agreements with co-financiers and the rules and procedures of FAO;
- Provide technical guidance to ensure that appropriate technical quality is applied to all project activities and outputs;
- Carry out at least one supervision mission per year; and
- Report to the GEF Secretariat and Evaluation Office, through the annual Project Implementation Review, on project progress and provide financial reports to the GEF Trustee.

448. The **Executing Partner/Lead Coordinating Agency (LCA)** of the project will be the Ministry of Agriculture, Irrigation and Water Development (MoAIWD). The LCA shall be responsible for overall project coordination, cooperation with other government line agencies and other actors, and ensuring that the project is implemented so as to deliver the outputs indicated in the approved Project Document in a timely and cost-effective manner.

449. A Project Steering Committee (PSC) will be established and chaired by the Permanent Secretary of the MoAIWD. The work of the PSC will be supported by a **Technical Think Tank**, specifically set up under project Component 1 through co-financing by FISH, but supporting all other technical components. It will be comprised of representatives from FAO, DoF Project Director, Mangochi District Administrator, NCCSC Chair or representative, FISH, LUANAR, Mzuzu College, LEAD, NCST, Fishermen Association, NGO representation, GEF FP (MNREM).

450. The National Project Coordinator (see below) will be the Secretary to the PSC. The PSC will meet at least two times per year to ensure:

- Oversight and assurance of technical quality of outputs;
- Close linkages between the project and other on-going projects and programmes relevant to the project;
- Timely availability and effectiveness of co-financing support;
- Sustainability of key project outcomes, including up-scaling and replication;
- Effective coordination of government partner work under this project; and
- Approval of the six-monthly Project Progress and Financial Reports, the Annual Work Plan and Budget.

451. The members of the PSC will each assure the role of a Focal Point for the project in their respective agencies. Hence the project will have a Focal Point in each concerned institution. As Focal Points in their agency, the concerned PSC members will (i) technically oversee

activities in their sector, (ii) ensure a fluid two-way exchange of information and knowledge between their agency and the project, (iii) facilitate coordination and links between the project activities and the work plan of their agency, and (iv) facilitate the provision of co-financing to the project.

452. In addition to the National Project Steering Committee the inception workshop will establish the need for district level project governance/local steering committee, funded with LDCF resources.

453. A Project Management Unit (PMU) will be established at the DoF District Office in Mangochi. The PMU will, among its key functions:

- Technically identify, plan, design and support all activities;
- Liaise with government agencies and regularly advocate on behalf of the project;
- Prepare the Annual Work Plan and Budget (AWP/B) and monitoring plan;
- Be responsible for day-to-day implementation of the project in line with the AWP;
- Ensure a results-based approach to project implementation, including maintaining a focus on project results and impacts as defined by the results framework indicators;
- Coordinate project interventions with other on-going activities;
- Monitor project progress;
- Be responsible for the elaboration of FAO Project Progress Reports (PPR) and the annual Project Implementation Review (PIR); and
- Facilitate and support the mid-term evaluation/review and final evaluation of the project.

454. The PMU will be led by a **National Project Coordinator (NPC)**, responsible for overall operational coordination of all aspects of the project. In order to maximize national ownership of the project, the NPC will be an existing member of DoF, 100% funded by DoF and 100% dedicated to the project. The PMU will work closely with other staff of DoF and the district and local governance structures in their operations.

455. The NPC, and the PMU in general, will be supported by a **Chief Technical Advisor (CTA)**. The CTA will provide essential services to the project in terms of oversight of quality (of reporting and administration), cost effectiveness, compliance with ProDoc provisions and FAO/GEF rules and principles, as well as conceptual and technical guidance/mentoring; while at the same time respecting and promoting ownership and coordination of the project by DoF, as represented by the NPC.

456. The next level down in the PMU from the NPC and CTA would be composed of specialist staff. Most of these team members will be drawn from existing DoF staff, under the same arrangements as the NPC (100% time, 100% DoF funded). These would include a socioeconomic/governance specialist, a communications and outreach specialist and an aquaculture/value chain specialist.

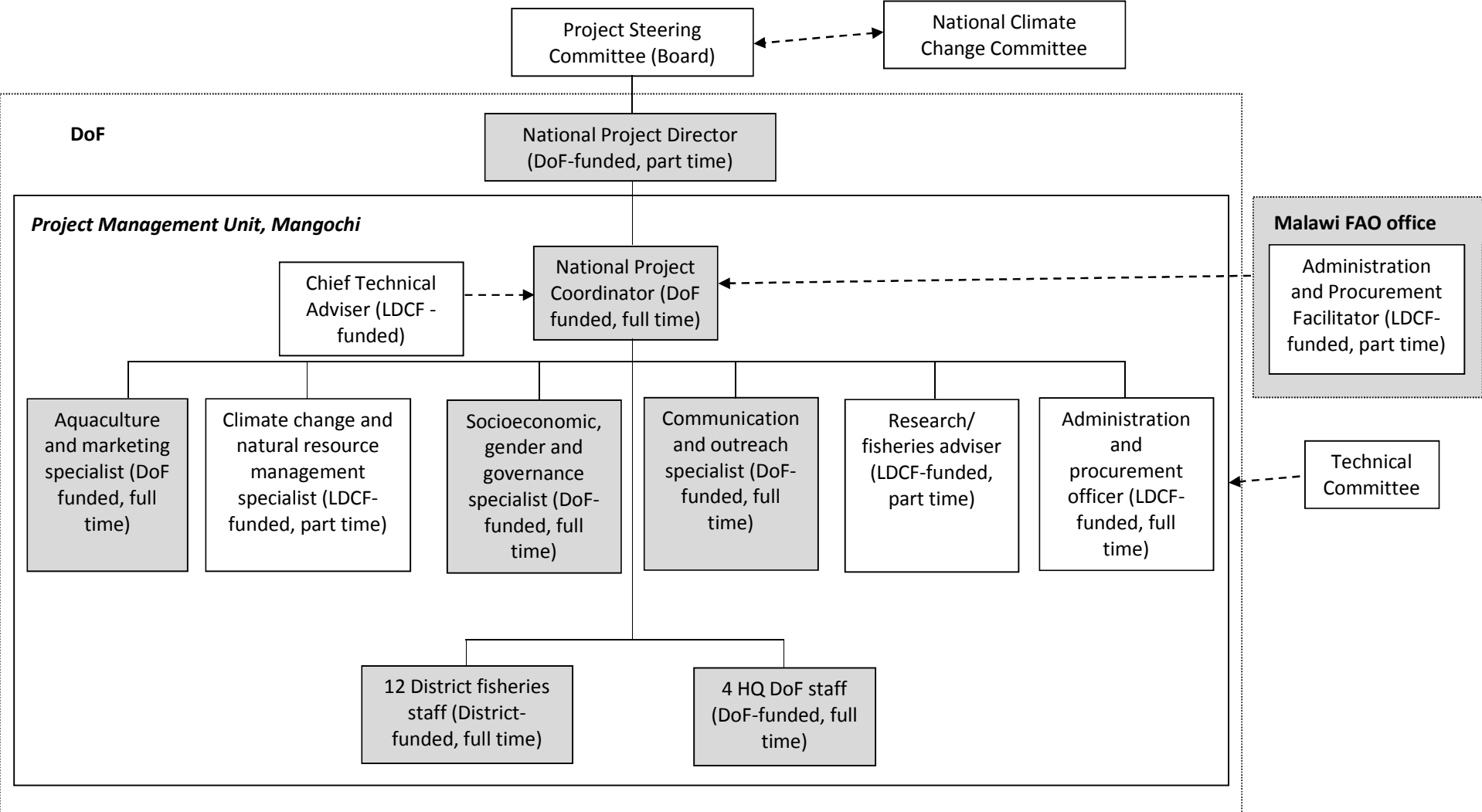
457. In addition, there would be the following national specialists in the PMU who would be LDCF-funded and part time: a monitoring/information management/fisheries advisor, in the Fisheries Research Unit; a CC/natural resources management specialist; and a gender specialist.

458. At field level, there will be 12 field staff made up of existing (government funded) DoF/district government staff.

459. There will in addition be a part-time LDCF-funded procurement and administration specialist based in FAO office in Lilongwe responsible for ensuring transparency of budgetary management and reporting. This post will be funded through the "Project Management Cost" component of the budget. Administration and budgetary management at field level will be supported by a local administrator based in the Mangochi project office.

460. PMU staff will be supported by national and international consultants who will be recruited during project implementation as needed.

Figure 15 Organizational structure



3.2.2 Budgetary management

461. Based on a request from the Government of the Republic of Malawi, FAO will also be the financial and operational executor of the LDCF resources including financial management, procurement of goods and contracting of services following FAO rules and procedures. As the financial executor, FAO will provide six-monthly financial reports including a statement of project expenditures to MoAIWD/PMU and the PSC. In accordance with the present project document, progress in the financial execution of the project, and the Annual Work Plan and Budget approved by the PSC, FAO will prepare budget revisions to maintain the budget current in the financial management system of FAO. The budget revisions will be provided to MoAIWD/PMU and the PSC to facilitate project planning and execution. FAO will, in collaboration with MoAIWD/PMU participate in the planning and execution of contracting and procurement processes.

462. The FAO Representative in Malawi will be **the Budget Holder (BH)** and responsible for the management of the LDCF resources. As a first step in project start-up, the FAO Representative in Malawi will establish an interdisciplinary Project Task Force within FAO to guide the implementation of the project. In consultation with the LTO (see below) the FAO Representative will be responsible for timely operational, administrative and financial management of the LDCF project resources, including in particular: (1) contracting and procurement processes based on the request from MAFS/PMU and in accordance with the approved Annual Work Plan and Budget; (2) process the payments corresponding to delivery of goods, services and technical products based on the prior clearance of the same by MAFS/PMU as applicable in each case; (3) provide six-monthly financial reports including a statement of project expenditures to MAFS/PMU and the PSC; and (4) at least once a year or more frequently if required, prepare Budget Revisions for submission to TCI/GEF Coordination Unit for approval. The FAO Representative, in accordance with the PTF, will give its non-objection to the AWP/Bs submitted by the PMU as well as the Project Progress Reports (PPRs). PPRs may be commented by the PTF and should be approved by the LTO before being uploaded by the GEF Coordination Unit into FPMIS He/she will also support the LTO in the preparation of the annual Project Implementation Review (PIR). The FAO Representation in Malawi will work in close consultation with MAFS/PMU, the LTO, and the FAO GEF Coordination Unit for the management of LDCF resources.

463. The **FAO HQ Officer** is a member of the PTF, as a mandatory requirement of the FAO Guide to the Project Cycle. The HQ Officer has most relevant technical expertise - within FAO technical departments - related to the thematic of the project. The HQ Technical Officer will provide effective functional advice to the LTO to ensure adherence to FAO corporate technical standards during project implementation, in particular:

- Supports the LTO in monitoring and reporting on implementation of environmental and social commitment plans for moderate projects. In this project, the HQ officer will support the LTO in monitoring and reporting the identified risks and mitigation measures in close coordination with the project partners.
- Provides technical backstopping for the project work plan.
- Clears technical reports, contributes to and oversees the quality of Project Progress Report(s).
- May be requested to support the LTO and PTF for implementation and monitoring.

- Supports the LTO and BH in providing inputs to the TOR of the Final Evaluation as requested by OED.

464. **The FAO SFS Lead Technical Officer(LTO)** will provide technical guidance to the project team to ensure delivery of quality technical outputs. The LTO will coordinate the provision of appropriate technical backstopping from all the concerned FAO units represented in the Project Task Force responding to requests from the MAFS/PMU. The Project Task Force is thus composed of technical officers from the participating FAO units and of operational officers and is chaired by the BH. The LTO will be responsible for:

- Reviewing and giving no-objection to TORs for consultancies and contracts to be performed under the project and to CVs and technical proposals short-listed by the PMU for key project positions, goods, minor works, and services to be financed by MAFS resources;
- Supported by the FAO Representation in Malawi, reviewing and clearing final technical products delivered by consultants and contract holders financed by LDCF resources before the final payment can be processed;
- Assisting with review and provision of technical comments to draft technical products/reports on request from the PMU during project execution;
- Review and provision of technical clearance of project progress reports submitted by the PMU to the FAO Representation in Malawi;
- Supporting the FAO Representative in reviewing, revising and giving no-objection to AWP/B submitted by the PMU and to be approved by the Project Steering Committee;
- Preparing the annual Project Implementation Review report, supported by the FAO Representation in Malawi and inputs from the PMU, to be submitted for clearance and completion by the FAO GEF Coordination Unit (TCI). TCI will subsequently submit the PIR to the GEF Secretariat and Evaluation Office as part of the Annual Monitoring Review report of the FAO-GEF portfolio. The LTO must ensure that PMU has provided information on co-financing provided during the course of the year for inclusion in the PIR;
- Annual (or as needed) project field supervision missions;
- Review and revision of TORs for the mid-term review/evaluation, participation in review mission including the mid-term workshop with all key project stakeholders, development of an eventual agreed adjustment plan in project execution approach, and supervise its implementation supported by the FAO.
- Review and revision of TORs for the final evaluation, participation in the final project closure workshop with all key project stakeholders and the development of and follow up on recommendations on how to ensure sustainability of project outputs and results after the end of the project.

465. **The FAO GEF Coordination Unit (TCI)** will act as **Funding Liaison Officer (FLO)**. It will review project progress reports, financial reports and budget revisions. The FAO GEF Coordination Unit will review and provide a rating in the annual PIR and undertake supervision missions if considered necessary. The PIRs will be included in the FAO GEF Annual Monitoring Review submitted to GEF by the FAO GEF Coordination Unit. The FAO GEF Coordination Unit will review the TOR and reports of the midterm review/evaluation and final evaluation. If necessary, the GEF Unit will participate in the mid-term review and final evaluation and support the FAO Representative in the development of corrective actions in project implementation. The FAO GEF Coordination Unit will in collaboration with the FAO Finance

Division request transfer of project funds from the GEF Trustee based on six-monthly projections of funds needed.

466. The **FAO Finance Division** will provide annual Financial Reports to the GEF Trustee and, in collaboration with the FAO GEF Coordination Unit, call for project funds on a six-monthly basis from the GEF Trustee.

3.3 RISK MANAGEMENT

467. Project risks have been identified and analyzed during the preparation phase and mitigation measures have been incorporated into the design of the project (see the Risk Matrix in Appendix 4). With FAO support and supervision, the Project Steering Committee will be responsible for the management of such risks as well as the effective implementation of mitigation measures. A Monitoring and Evaluation (M&E) System will serve to monitor performance indicators and outputs, project risks and mitigation measures. The Project Steering Committee will also be responsible for monitoring the effectiveness of mitigation measures and adjusting mitigation strategies as needed, and to identify and manage any new risks that were not identified during the project's preparation, in collaboration with project partners.

468. The semiannual Project Progress Reports (PPR) (see sub-section 3.5.3) are the main instrument for monitoring and risk management. PPRs include a section covering the systematic monitoring of risks and mitigation actions that were identified in previous PPRs. PPRs also include a section to identify new risks or risks that have yet to be addressed, their classification and mitigation actions, as well as those responsible for the monitoring of such risks and their estimated deadlines. FAO will monitor the project's risk management closely and will follow up as needed, lending support for the adjustment and implementation of mitigation strategies. Reports on the monitoring of risks and their classification will also be part of the Annual Project Implementation Review (PIR) prepared by FAO and submitted to the GEF secretariat (see sub-section 3.4.3).

3.4 ENVIRONMENTAL AND SOCIAL RISKS

3.4.1 Environmental risks

469. The project adopts ecosystem approaches to fisheries management (EAFM) and integrates improvement of habitats as a key driver of fishery rehabilitation and sustainability. The formulation of the updated restoration plan for Lake Malombe will include a risk assessment. This approach considers not only the sustainability of the fish populations themselves (through the strengthening of evidence-based planning and governance of offtake levels and gear) but also the ecological integrity of the ecosystem as a whole, including the restoration of key nurseries and habitat areas, the designation of no-take areas to allow population recovery, and the addressing of land-based threats such as pollution and sedimentation.

470. The sustainability of the management of water resources will be furthered through the integration, where possible, of fish farming into agricultural systems and infrastructure projects. This will allow stakeholders to take advantage of existing water management systems, such as irrigation reservoirs, for fish farming; while water from fish ponds will be available for irrigation use on farm, alongside other water management measures such as grey

water filters and agroforestry systems. These approaches also reduce the underlying vulnerability of fishing and fish-farming communities and will be applied to enhance the resilience of aquatic ecosystems to climate change impacts and fishing and fish farming activities. The introduction of these improved climate resilient approaches to both the management of the lake fishery and land-based farming activities and aquaculture ventures is also either environmentally positive or benign.

471. A principal objective of the project is to improve Lake Malombe from an unmanaged, overfished and environmentally degraded system to a more “sustainably managed” system, whereby habitat is restored, human impacts are reduced, but into which fish will be stocked at levels not previously recorded from the lake. The latter action is to complement the re-establishment of stocks through improved natural recruitment. This restocking sub-component of this project bears some environmental risk, which are largely managed through a rigorous design concept and will be informed by an Environmental Impact Assessment to be conducted in the initial stage of the project execution. Based on the outcomes of this EIA a decision will be made concerning how the restocking activity will be conducted, if at all, and the appropriate mitigation measures will be developed. The principle guiding this would be that the project action will adhere to the FAO Code of Conduct for Responsible Fisheries (CCRF) aligned, with FAO technical advisory documentation, such as the FAO Technical Guidelines on the application of the “Precautionary Approach in Capture Fisheries and Species Introductions”.

472. A dedicated environmental monitoring programme under component 1 will be implemented to provide tracking information on all interventions. It was reported that some of the potential fingerling supplies maybe affected by “genetic pollution” through inter-breeding or hybridization with other non-local tilapia species. A dedicated environmental monitoring programme under component 1 will be implemented to provide tracking information on all interventions. It was reported that some of the potential fingerling supplies maybe affected by “genetic pollution”. All project interventions will undergo continuous environmental screening as stipulated under the national EIA laws, and any identified risks will be addressed with the Technical Task team’s inputs and where needed with international expertise through FAO.

473. The aquaculture component is not considered to have potential environmental impacts beyond mild related risks of poor or irresponsible effluent water management. In the systems that typify aquaculture production around the lake such effluents are of insignificant environmental impact relative to other land-based run off.

3.4.2 Social risks

474. The risk of negative socioeconomic impacts is recognized in the potential for powerful vested interests that control access to fishing gears and assets to interfere with project activities or to create disruption. The introduction of fishery management measures into a fishery can be a contentious activity if introduced in a top down manner, without adequate consultation, coupled to immediate introduction of sanctions for non-compliance. The current baseline against which the project will be developed has already seen the introduction of fishery management measures and a somewhat arbitrary or inequitable sanction process. A number of influential individuals already control much of the fishing activity in terms of access to gears and boats and thus the project will already be working within a system that needs improvement.

475. These risks have been carefully considered in project design and will be minimized and mitigated by: (i) the project is designed to give local stakeholders a greater voice in the lake fishery management; project stakeholder awareness building, consultation and participation are measures built into the project; (ii) involving local communities in the development of fishery management measures during the execution of the project.

476. The application of a highly participatory approach to the planning of ecosystem and fisheries management, and restoration activities, and close coordination and consultation with local communities throughout the project will form a stronger basis for consensual management of the lake resources, informed by available knowledge and stakeholder dialogue. Other mitigating actions that lie beyond fishery management that relate to social inclusion and mitigation of potential sources of conflict in the project include exploration of improved climate resilient agriculture (most fishers are also part time farmers) and exploration of income-generating activities for local communities.

3.4.3 Conclusion

477. Sustainable management of the lake fishery, the natural resources and habitats that underpin the fishery and positive environmental benefits from land-based activities are a key element of the project. Analysis of the project shows that there are no negative environmental impacts. According to FAO's EIA methodology it can be categorized as overall LOW RISK, with the exception of a MEDIUM RISK associated with the Restocking sub-component.

478. The project is therefore not expected to produce substantial negative environmental impacts and an EIA is only required in relation to the sub-component related to restocking.

3.5 FINANCIAL MANAGEMENT

3.5.1 Financial planning

479. The total cost of the project will be USD 17,580,000 to be financed through a USD 5,460,000 LDCF grant and USD 12,120,000 in co-financing. The table below shows the cost by component and outputs and by sources of financing and displays the sources and type of confirmed co-financing. The FAO will, as the GEF Agency, only be responsible for the execution of the LDCF resources and the FAO co-financing.

Table 18 Budget breakdown by component in USD

Component	DoF	DCCMS	PACT/ FISH	LUANAR	FAO	MoAIWD	UNDP	CF total	GEF/ LDCF	Total
1: Strengthening access to information and knowledge regarding climate change and its implications.	380,952	-	1,904,762	380,952	142,857	190,476	476,190	3,476,189	788,567	4,264,756
2: Creating a favourable enabling environment of policies, plans, regulatory instruments and capacities for the promotion of climate change resilience among fishing communities	285,714	104,762	1,904,762	333,333	123,810	952,381	666,667	4,371,429	1,638,557	6,009,986
3: Strengthening capacities at local level to increase the resilience of fishing communities to climate change.	285,714	95,238	952,381	-	200,000	209,524	571,429	2,314,286	2,384,943	4,699,229
4: M&E and Adaptation learning	476,190	85,714	476,190	-	76,190	76,190	190,476	1,380,950	387,933	1,768,883
Project Management	71,430	14,286	261,905	35,715	27,143	71,429	95,238	577,146	260,000	837,146
Total Project	1,500,000	300,000	5,500,000	750,000	570,000	1,500,000	2,000,000	12,120,000	5,460,000	17,580,000

Table 19 Sources of confirmed co-financing

DoF	1,500,000
DCCMS	300,000
FISH	5,500,000
FAO (TCP)	470,000
FAO (In Kind Contribution)	100,000
LUANAR	750,000
MoAIWD	1,500,000
UNDP	2,000,000
Total	12,120,000

3.5.2 Inputs by source

LDCF

480. LDCF inputs are broken down by component, outcome and item in Annex 3. As shown in section 1.8, LDCF inputs will focus on:

- Generation of critical knowledge on climate risk and vulnerability in the fisheries sector and incorporation thereof into local and national planning processes
- Strengthening of capacities of fisheries professionals and other relevant stakeholders to address climate risk in fisheries sector
- Application of eco-system based adaptation (EbA) and management (EBM) approaches to fish stock restoration
- Establishment of effective co-management and resource governance systems to support sustainable fisheries
- Establishment of climate resilient aquaculture as alternative livelihood option
- Strengthening of capacity to respond to extreme weather events at community level strengthened through EWS on fisheries health and climate risks.

481. In concrete terms, in order to achieve this LDCF resources will principally be used for the following:

- Salaries, travel and other operational costs of technical advisers, including vehicle, office and equipment costs;
- Travel costs of Government staff attached to the project (the National Project Coordinator and the members of the District Implementation Teams) for activities specifically related to the delivery of the outputs of the project. LDCF funds will not be used to cover the salaries of Government staff members, travel or other costs not related to the delivery of project outputs, or (in order to avoid undermining sustainability) travel costs required for carrying out their institutional functions that would need to be continued after project end;
- Fees, travel and other operational costs of national and/or international consultants required to provide specific expertise in support of the delivery of project outputs or for filling key information gaps;
- Costs for the establishment of the PMU office at the Government premises in Mangochi and the renovations of these according to standards acceptable to the PMU
- Costs of the development and implementation of the project's M&E plan
- Costs of capacity development (equipment, trainer fees, venue hire and the travel and lodging costs of participants in training activities)
- Direct investments in adaptation as proposed under Outcome 3 in particular

Government

482. The Government will provide the following inputs:

- Salaries of Government staff attached to the project
- Offices for Government staff and LDCF-funded technical advisers, aside the required alterations to the plan to meet PMU needs
- Support in coordination and communication between institutional participants
- Information on social, economic and biophysical conditions in the project areas and beyond, as required by the PMU to guide the implementation of the project
- Information on Government and other investments and policy directions, in order to maximize the relevance and effectiveness of the project.

FAO

483. FAO will provide technical assistance, support, training and supervision of the execution of activities financed by GEF resources. The GEF project will be complemented and co-financed by several projects and activities implemented by the FAO Representation in Malawi, including funding by the FAO Technical Cooperation Programme project on VMS and aquaculture feasibility (USD 470,000 allocated for Malawi)

3.5.3 Financial management and reporting

484. **Financial Records.** FAO shall maintain a separate account in United States dollars for the project's GEF resources showing all income and expenditures. Expenditures incurred in a currency other than United States dollars shall be converted into United States dollars at the United Nations operational rate of exchange on the date of the transaction. FAO shall administer the project in accordance with its regulations, rules and directives.

485. **Financial Reports.** The BH shall prepare six-monthly project expenditure accounts and final accounts for the project, showing amount budgeted for the year, amount expended since the beginning of the year, and separately, the un-liquidated obligations as follows:

1. Details of project expenditures on a component-by-component and output-by-output basis, reported in line with project budget codes as set out in the project document, as at 30 June and 31 December each year.
2. Final accounts on completion of the project on a component-by-component and output-by-output basis, reported in line with project budget codes as set out in the project document.
3. A final statement of account in line with FAO Oracle project budget codes, reflecting actual final expenditures under the project, when all obligations have been liquidated.

486. The BH will submit the above financial reports for review and monitoring by the LTO and the FAO GEF Coordination Unit. Financial reports for submission to the donor (GEF) will be prepared in accordance with the provisions in the GEF Financial Procedures Agreement and submitted by the FAO Finance Division.

487. **Budget Revisions.** Semi-annual budget revisions will be prepared by the BH in accordance with FAO standard guidelines and procedures.

488. **Responsibility for Cost Overruns.** The BH is authorized to enter into commitments or incur expenditures up to a maximum of 20% over and above the annual amount foreseen in the project budget under any budget sub-line provided the total cost of the annual budget is not exceeded.

489. Any cost overrun (expenditure in excess of the budgeted amount) on a specific budget sub-line over and above the 20% flexibility should be discussed with the GEF Coordination Unit with a view to ascertaining whether it will involve a major change in project scope or design. If it is deemed to be a minor change, the BH shall prepare a budget revision in accordance with FAO standard procedures. If it involves a major change in the project's objectives or scope, a budget revision and justification should be prepared by the BH for discussion with the GEF Secretariat.

490. Savings in one budget sub-line may not be applied to overruns of more than 20% in other sub-lines even if the total cost remains unchanged, unless this is specifically authorized by the GEF Coordination Unit upon presentation of the request. In this event, a revision to the project document to amend the budget will be prepared by the BH.

491. Under no circumstances can expenditures exceed the approved total project budget or be approved beyond the NTE date of the project. **Any over-expenditure is the responsibility of the BH.**

492. **Audit.** The project shall be subject to the internal and external auditing procedures provided for in FAO financial regulations, rules and directives and in keeping with the Financial Procedures Agreement between the GEF Trustee and FAO.

493. The audit regime at FAO consists of an external audit provided by the Auditor-General (or persons exercising an equivalent function) of a member nation appointed by the Governing Bodies of the Organization and reporting directly to them, and an internal audit function headed by the FAO Inspector-General who reports directly to the Director-General. This function operates as an integral part of the Organization under policies established by senior management, and furthermore has a reporting line to the governing bodies. Both functions are required under the Basic Texts of FAO that establish a framework for the terms of reference of each. Internal audits of imprest accounts, records, bank reconciliation and asset verification take place at FAO field and liaison offices on a cyclical basis.

494. **Procurement.** Careful procurement planning is necessary for securing goods, services and works in a timely manner, on a “Best Value for Money” basis. It requires analysis of needs and constraints, including forecast of the reasonable timeframe required to execute the procurement process. Procurement and delivery of inputs in technical cooperation projects will follow FAO’s rules and regulations for the procurement of supplies, equipment and services (i.e. Manual Sections 502 and 507). *Manual Section 502: “Procurement of Goods, Works and Services”* establishes the principles and procedures that apply to procurement of all goods, works and services on behalf of the Organization, in all offices and in all locations, with the exception of the procurement actions described in Procurement Not Governed by Manual Section 502. *Manual Section 507* establishes the principles and rules that govern the use of Letters of Agreement (LoA) by FAO for the timely acquisition of services from eligible entities in a transparent and impartial manner, taking into consideration economy and efficiency to achieve an optimum combination of expected whole life costs and benefits.

495. As per the guidance in FAO’s Project Cycle Guide, the BH will draw up an annual procurement plan for major items, which will be the basis of requests for procurement actions during implementation. The first procurement plan will be prepared at the time of project start-up, if not sooner, in close consultation with the CTA/NPC and LTU. The plan will include a description of the goods, works, or services to be procured, estimated budget and source of funding, schedule of procurement activities and proposed method of procurement. In situations where exact information is not yet available, the procurement plan should at least contain reasonable projections that will be corrected as information becomes available.

496. The procurement plan shall be updated every 12 months and submitted to FAO BH and LTO for clearance, together with the AWP/B and annual financial statement of expenditures report for the next instalment of funds.

497. The BH, in close collaboration with the CTA/NPC, the LTO and the Budget and Operations Officer will procure the equipment and services provided for in the detailed budget in Appendix 3, in line with the AWO and Budget and in accordance with FAO’s rules and regulations.

SECTION 4 – MONITORING, REPORTING AND EVALUATION

4.1 OVERSIGHT

498. The Project Steering Committee (PSC), the FAO GEF Coordination Unit and relevant Technical Units in HQ will carry out project oversight. Oversight will ensure that: (i) project outputs are produced in accordance with the project results framework and leading to the achievement of project outcomes; (ii) project outcomes are leading to the achievement of the project objective; (iii) risks are continuously identified and monitored and appropriate mitigation strategies are applied; and (iv) agreed project global environmental benefits/adaptation benefits are being delivered.

499. The FAO GEF Unit and HQ Technical Units will provide oversight of GEF financed activities, outputs and outcomes largely through the annual Project Implementation Reports (PIRs), periodic backstopping and supervision missions.

4.2 MONITORING

500. Project monitoring will be carried out by the Project Management Unit (PMU) and the FAO budget holder. Project performance will be monitored using the project results matrix, including indicators (baseline and targets) and annual work plans and budgets. At inception the results matrix will be reviewed to finalize identification of: i) outputs ii) indicators; and iii) missing baseline information and targets. A detailed M&E plan, building on the results matrix and defining specific requirements for each indicator (data collection methods, frequency, responsibilities for data collection and analysis, etc), will also be developed during project inception by the M&E specialist.

4.3 REPORTING

501. Specific reports that will be prepared under the M&E program are: (i) Project inception report; (ii) Annual Work Plan and Budget (AWP/B); (iii) Project Progress Reports (PPRs); (iv) annual Project Implementation Review (PIR); (v) Technical Reports; (vi) co-financing reports; and (vii) Terminal Report. In addition, assessment of the LDCF AMAT against the baseline (completed during project preparation) will be required at midterm and final project evaluation.

502. **Project Inception Report.** After the inception workshop, the NPC will prepare a draft project inception report in consultation with the LTO, BH and other project partners. Elements of this report should be discussed during the Project Inception Workshop and the report subsequently finalized. The report will include a narrative on the institutional roles and responsibilities and coordinating action of project partners, progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. It will also include a detailed first year AWP/B, a detailed project-monitoring plan. The draft inception report will be circulated to the PSC for review and comments before its finalization, no later than one month after project start-up. The report should be cleared by the FAO BH, LTO and the FAO GEF Coordination Unit and uploaded in FPMIS by the BH.

503. **Results-based Annual Work Plan and Budget (AWP/B).** The draft of the first AWP/B will be prepared by the PMU in consultation with the FAO Project Task Force and reviewed at the project Inception Workshop. The Inception Workshop (IW) inputs will be incorporated and the PMU will submit a final draft AWP/B within two weeks of the IW to the BH. For subsequent AWP/B, the PMU will organize a project progress review and planning meeting for its review. Once comments have been incorporated, the BH will circulate the AWP/B to the LTO and the GEF Coordination Unit for comments/clearance prior to uploading in FPMIS by the BH. The AWP/B must be linked to the project's Results Framework indicators so that the project's work is contributing to the

achievement of the indicators. The AWP/B should include detailed activities to be implemented to achieve the project outputs and output targets and divided into monthly timeframes and targets and milestone dates for output indicators to be achieved during the year. A detailed project budget for the activities to be implemented during the year should also be included together with all monitoring and supervision activities required during the year. The AWP/B should be approved by the Project Steering Committee and uploaded on the FPMIS by the BH.

504. **Project Progress Reports (PPR)**: PPRs will be prepared by the PMU based on the systematic monitoring of output and outcome indicators identified in the project's Results Framework (Annex 1). The purpose of the PPR is to identify constraints, problems or bottlenecks that impede timely implementation and to take appropriate remedial action in a timely manner. They will also report on project risks and implementation of the risk mitigation plan. The PPR will be submitted to the BH and LTO for comments and clearance. The GEF Coordination Unit will ensure that the PPR is uploaded into FPMIS in a timely manner.

505. **Annual Project Implementation Review (PIR)**: The LTO (in collaboration with the PMU) will prepare an annual PIR covering the period July (the previous year) through June (current year) to be submitted to the BH and the TCI GEF Funding Liaison Officer (FLO) for review and approval **no later than (check each year with GEF Unit but roughly end June/early July each year)**. The FAO GEF Coordination Unit will submit the PIR to the GEF Secretariat and GEF Evaluation Office as part of the Annual Monitoring Review report of the FAO-GEF portfolio. PIRs will be uploaded on the FPMIS by the TCI GEF Coordination Unit.

506. Key milestones for the PIR process:

- **Early July**: the LTOs submit the draft PIRs (after consultations with BHs, project teams) to the GEF Coordination Unit (faogef@fao.org , copying respective GEF Unit officer) for initial review;
- **Mid July**: GEF Unit responsible officers review main elements of PIR and discuss with LTO as required;
- **Early/mid-August**: GEF Coordination Unit prepares and finalizes the FAO Summary Tables and sends to the GEF Secretariat by (date is communicated each year by the GEF Secretariat through the FAO GEF Unit);
- **September/October**: PIRs are finalized. PIRs carefully and thoroughly reviewed by the GEF Coordination Unit and discussed with the LTOs for final review and clearance;
- **Mid November 17**: (date to be confirmed by the GEF): the GEF Coordination Unit submits the final PIR reports -cleared by the LTU and approved by the GEF Unit- to the GEF Secretariat and the GEF Independent Evaluation Office.

507. **Technical Reports**: Technical reports will be prepared by national and international consultants (partner organizations under LOAs), as part of project outputs and to document and share project outcomes and lessons learned. The drafts of any technical reports must be submitted by the PMU to the BH who will share it with the LTO. The LTO will be responsible for ensuring appropriate technical review and clearance of said report. The BH will upload the final cleared reports onto the FPMIS. Copies of the technical reports will be distributed to project partners and the Project Steering Committee as appropriate.

508. **Co-financing Reports**: The BH, with support from the PMU, will be responsible for collecting the required information and reporting on co-financing as indicated in the Project Document/CEO Request. The PMU will compile the information received from the executing partners and transmit it in a timely manner to the LTO and BH. The report, which covers the

period 1 July through 30 June, is to be submitted on or before 31 July and will be incorporated into the annual PIR. The format and tables to report on co-financing can be found in the PIR.

509. **GEF Tracking Tools:** Following the GEF policies and procedures, the relevant tracking tools for full sized projects will be submitted at three moments: (i) with the project document at CEO endorsement; (ii) at the project's mid-term review/evaluation; and (iii) with the project's terminal evaluation or final completion report. The TT will be uploaded in FPMIS by the GEF Unit. The TT are developed by the Project Design Specialist, in close collaboration with the FAO Project Task Force. They are filled in by the PMU and made available for the mid-term review and again for the final evaluation.

510. **Terminal Report:** Within two months before the end date of the project, and one month before the Final Evaluation, the PMU will submit to the BH and LTO a draft Terminal Report. The main purpose of the Terminal Report is to give guidance at ministerial or senior government level on the policy decisions required for the follow-up of the project, and to provide the donor with information on how the funds were utilized. The Terminal Report is accordingly a concise account of the main products, results, conclusions and recommendations of the project, without unnecessary background, narrative or technical details. The target readership consists of persons who are not necessarily technical specialists but who need to understand the policy implications of technical findings and needs for insuring sustainability of project results.

4.4 EVALUATION

511. For full-sized projects, an independent Mid-Term Review/Evaluation will be undertaken at project mid-term to review progress and effectiveness of implementation in terms of achieving the project objectives, outcomes and outputs. Mid-term Reviews are encouraged for medium sized projects. Findings and recommendations of this review/evaluation will be instrumental for bringing improvement in the overall project design and execution strategy for the remaining period of the project's term. FAO will arrange for the mid-term review/evaluation in consultation with the project partners. The evaluation will, inter alia:

- (i) review the effectiveness, efficiency and timeliness of project implementation;
- (ii) analyze effectiveness of partnership arrangements;
- (iii) identify issues requiring decisions and remedial actions;
- (iv) propose any mid-course corrections and/or adjustments to the implementation strategy as necessary; and
- (v) highlight technical achievements and lessons learned derived from project design, implementation and management.

512. It is recommended that an independent Final Evaluation (FE) be carried out three months prior to the terminal review meeting of the project partners. The FE will aim to identify the project impacts and sustainability of project results and the degree of achievement of long-term results. This evaluation will also have the purpose of indicating future actions needed to sustain project results and disseminate products and best-practices within the country and to neighbouring countries.

4.5 M&E PLAN

Table 19: Summary of the main M&E reports, responsible parties and time frame

Type of M&E Activity	Responsible Parties	Time-frame	Indicative budget	
Inception Workshop	PMU, supported by the FAO LTU, BH, and the FAO GEF Coordination Unit	Within two months of project start up	National workshop \$5,000, local workshops \$5,000	
Project Inception Report	PMU, cleared by FAO LTU, BH, and the FAO GEF Coordination Unit	Immediately after workshop	\$102,857 of CTA salary assigned to Component 4	
Project day to day monitoring	PMU, participating executing partners and other relevant institutions.	Continually		
Supervision visits and rating of progress in PPRs and PIRs	PMU, FAOSV, FAO LTU and FAO GEF Coordination Unit	Annual or as required		\$ 60,000 to NPC salary assigned to Component 4
Project Progress Reports	PMU and Project Coordinator (supported by the Project Bilingual Assistant) with inputs from other partners	Six-monthly		\$180,000 of M&E specialist salary assigned to Component 4
Project Implementation Review report	Inputs provided by the Project Coordinator, assisted by the Project Bilingual Assistant. FAOSV and LTUs supported by the PMU. PIRs cleared and submitted by the FAO GEF Coordination Unit to the GEF Secretariat	Annual		FAO costs covered by agency fee
Co-financing Reports	PMU	Annual		
Technical reports	PMU, /LTU	As appropriate		
Mid-term Evaluation/Review	External Consultant, in consultation with the project team including the FAO GEF Coordination Unit, the LTU, and other partners	At mid-point of project implementation	\$45,000	
Final evaluation	External Consultant, FAO independent Evaluation Office in consultation with the project team including the FAO GEF Coordination Unit, the LTU, and other partners	At the end of project implementation	\$55,000	
Terminal Report	PMU, LTO, TCSR Report Unit	At least two months before the end date of the Execution Agreement	\$8,000	
Total			\$108,000 (excl. salaries indicated above)	

4.6 COMMUNICATION

513. The project will require participation and buy-in from multiple stakeholders at national and local levels, and its success will therefore depend on effective communication and a high level of visibility.

514. A significant base has been established in this regard during the PPG phase, in the form of numerous consultation meetings with Government agencies and other key stakeholders at

central and district levels. This approach will be continued into the implementation phase. A national inception workshop will be held in Year 1, in order to maintain and broaden the profile raised during the PPG phase and ensure concrete participation and buy-in by partners in the definition of detailed operational aspects of the project’s implementation. This will be followed by a district level inception workshop, with the same aim but focused on district, sub- district and community-level actors from Lake Malombe area.

515. The National Project Coordinator and the Chief Technical Advisor will play key roles in maintaining fluid and regular communication about the project with national stakeholders at all levels, but most importantly among high level actors in agencies of central Government, aimed at maintaining their interest in and commitment to the project throughout its entire lifetime. This will be achieved through personal bilateral communication with these actors (the selection criteria for the individual to fill the CTA post will include the ability to communicate effectively in this way), taking advantage of the strategic position of the NPC to channel messages regarding the project to other Government stakeholders. Given their broad stakeholder base, the Project Steering Committee and Stakeholder Committees (see Section 3) will also serve as vehicles for communication and raising visibility regarding the project and its aims and approaches.

516. Communication and knowledge sharing are a key component of this project; they cut across all four project components and are linked to overall capacity development as well as on-going project learning. It is important to ensure internal and external project communication with differing strategies. There is a wide range of primary and secondary stakeholders, and the communication and knowledge sharing strategy focuses on the various target groups in segmented manners. Every key target group has other communication and knowledge needs and therefore need to be analysed and serviced differently. For the overall project success, from the onset, the different backgrounds and needs must be studied and specific motivations and ways of communicating identified. This is particularly important in a context of cultural and religious diversity, and a special consideration for gender.

517. For example, the **primary stakeholders** and **secondary stakeholders** identified in Section 2 represent a very diverse set of targets. It is clear that the project needs to develop different communication strategies for most of these target groups. A detailed plan needs to be developed early on in the project, to set out specific needs and strategies. As Component 2 of the project design entails a dedicated “Chambo campaign”, and experienced communication specialists will be engaged in the design. While the campaign only serves specific purposes, which do not entail all project communications needs, it is possible to engage the experts in the project’s communication and knowledge sharing plan development and review, for example.

518. Some initial thinking on stakeholder segmentation and communication and knowledge sharing is presented in Table 20 as an example. This work needs to be furthered during the inception phase of the project.

Table 20: Example of the target groups segmentation planning for the communication and knowledge sharing C & KS) plan

Target group	Current behaviour	Desired behaviour	Proposals for C & KS strategy approaches and principles
Fishermen	<ul style="list-style-type: none"> Go fishing as they depend on money and fish for food (for themselves, households) Understand little about climate change risks and fisheries – and their and 	<ul style="list-style-type: none"> Become open minded supportive of the project and sustainable fisheries management Become active custodians of the Lake and collaborate with enforcement a.o. institutions 	<ul style="list-style-type: none"> Identify how to appeal to their emotions and social value systems Build ownership – put people into the driving seat to identify their solutions

Target group	Current behaviour	Desired behaviour	Proposals for C & KS strategy approaches and principles
	their families' increasing vulnerabilities <ul style="list-style-type: none"> • Do not adhere to fishing moratoria, or fishing limits and rules and regulations • Limited willingness to transcend into new livelihoods 	<ul style="list-style-type: none"> • Engage in sustainable fishing practices and other livelihood strategies (incl. land uses) • Care for the entire community, not only themselves • Become proactive in identifying and addressing climate related and other livelihood risks and are able to act to protect themselves 	<ul style="list-style-type: none"> • Develop support plan – based on what target groups identify as opportunities • Develop inclusive, not exclusive structures for communication and knowledge sharing • Make it enjoyable and attractive to be part of the project team and vision.

519. It is important that communication and knowledge sharing are the responsibility of the entire project team. Therefore not only one communication expert is being recruited, but relevant competencies are part of the recruitment profile and relevant responsibilities will be integrated into the TORs of each PMU team member. A specific training programme for the staff is planned, and online resources such as the “Frogleaps¹⁰⁴” Training course for Strategic Communications for Conservation practitioners shall be taken. Other communities of practice for “Communications and Development “exist and shall be tapped¹⁰⁵.

520. An upstream communication plan for sharing of project outputs and results with a wider community of practice is incorporated under Component 4. Project learning will be documented and shared, and used in an up-scaling approach with other fisheries personnel from other districts and offices, for example. All communications will follow FAO standard requirements and guidelines.

¹⁰⁴ See <http://www.frogleaps.org/>

¹⁰⁵ See for example: www.cectalksnature.org or www.iucn.org/cec; <http://www.iied.org/new-ways-communicate-climate-change-adaptation-it-time-for-something-loopy>

ANNEXES

ANNEX 1 : RESULTS MATRIX

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
Project Objective: To improve the resilience of fishing communities around Lake Malombe to the effects of climate change	Indicator O.1: Vulnerability and risk perception index score , disaggregated by gender (1. Extreme, 2. High, 3. Medium, 4. Low or 5. No Vulnerability) (AMAT indicator 1.2.14) <i>Objectively verifiable definitions and survey methodology to be developed and applied at project start</i>	Initial survey from two villages during PPG phase suggests rating of “1. Extreme Vulnerability” for both men and women. <i>Full baseline survey to be carried out at project start</i>	“2. High” vulnerability and risk perceptions for both men and women in all sites	“3. Medium” vulnerability and risk perceptions for both men and women in all sites	Gender-sensitive village level surveys by the project (definitions and methodologies to be developed at project start)	Complementary livelihood support elements (e.g. cash cropping and off-farm employment), not directly addressed by the project, continue to be viable Climatic trends and natural disasters remain within the coping range on the basis of which the resilience strategies are designed Political and social conditions remain stable
	Indicator O.2: % increase in income generation in targeted area due to adaptation measures (AMAT indicator 1.2.10)	0%	10% increase in average household income, including poorest, more vulnerable and female-headed households due to adaptation measures	10% increase in average household income, including poorest, more vulnerable and female-headed households due to adaptation measures	Gender-sensitive village level surveys by the project (definitions and methodologies to be developed at project start)	
	Indicator O.3: Food consumption of target households (including poorest, more vulnerable and female-headed households), in terms of total quantities, protein content and intra-family distribution	<i>Baseline survey to be carried out at project start</i>	Food consumption in all households in target communities (including poorest, more vulnerable and female-headed households) maintained at baseline levels	Food consumption in all households in target communities (including poorest, more vulnerable and female-headed households) maintained at baseline levels	Gender-sensitive village level surveys by the project (definitions and methodologies to be developed at project start)	
Component 1: Strengthening access to information and knowledge regarding climate change and its implications.						
Outcome 1.1: Enhanced access to and use of information on climate trends, extreme events and resource status, necessary for the formulation and	Outcome Indicator 1.1.1: Numbers of key actors with access to relevant and understandable information required for the formulation and implementation of resilience and management measures, on:	PPG survey results suggest that local communities have basic understanding of climate change concepts gained through radio, print	Actors with access to information: Nationwide: - 40% of DoF staff in 28 Districts	Actors with access to information: Nationwide: - 80% of DoF staff in 28 Districts	Interviews with actors	Continued receptivity on the part of stakeholders, including policy makers, to receiving and responding to information inputs

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
implementation of effective and timely resilience and management measures	<ul style="list-style-type: none"> - Climate trends and vulnerability levels - Social conditions and social implications of vulnerability - Trends in fisheries and related natural resources - Resilience options and their effectiveness 	<p>media and community meetings.</p> <p>Baseline survey to be carried out at project start</p>	<p>In project area:</p> <ul style="list-style-type: none"> - 40% of staff in Mangochi district authority - Leaders of 2 Traditional Authorities (TA) - Leaders of 15 BVCs 	<p>In project area:</p> <ul style="list-style-type: none"> - 80% of staff in Mangochi district authority - Leaders of 3 Traditional Authorities (TA) - Leaders of 29 BVCs 		Continued commitment to collaboration between stakeholders (particularly GoM and research institutions) in information generation and management
	<p>Outcome Indicator 1.1.2:</p> <p>Numbers and types of key decision-making, planning and regulatory instruments in the project area, related to CC resilience in fishing communities that are based on reliable information on the above parameters</p>	<p>No significant incorporation of reliable information</p>	<p>50% of:</p> <ul style="list-style-type: none"> - Limits on fishing practices and gear - District and community level development plans and strategies in the project area - Resilience and restoration plans and strategies (both aquatic and terrestrial) 	<ul style="list-style-type: none"> - All limits on fishing practices and gear - All district and community level development plans and strategies in the project area - All resilience and restoration plans and strategies (both aquatic and terrestrial) 	<p>Interviews with entities responsible</p> <p>Review of instruments</p>	
<p>Outputs:</p> <p>1.1.1: Detailed Vulnerability and Disaster Risk Assessments (VDRA) of 47 fishing communities around Lake Malombe</p> <p>1.1.2: Information resources on ecological parameters determining management and resilience options in and around Lake Malombe</p> <p>1.1.3: Climate and environmental monitoring and early warning (EWS) systems</p> <p>1.1.4: Strengthened fisheries monitoring system</p> <p>1.1.5: Mechanisms for dissemination and use of knowledge in adaptive management</p>						
<p>Component 2: Creating an enabling environment for the promotion of climate change resilience among fishing communities</p>						
<p>Outcome 2.1:</p> <p>Climate change resilience mainstreamed into key policy and planning instruments of relevance to fisheries and fishing communities</p>	<p>Outcome Indicator 2.1.1:</p> <p>Degree of reference to climate change considerations as related to fisheries in key policy and planning instruments</p>	<ul style="list-style-type: none"> - National Climate Change Policy and Disaster Risk Management Policy are currently in draft form - MGDS and NAPA are predominantly agriculture-oriented - ASWAp does not make specific reference of CC 	<ul style="list-style-type: none"> - Inclusion of specific reference to CC issues in the fisheries sector in the National Climate Change Policy and Disaster Risk Management Policy, and reflected in the mechanisms charged with their oversight. - Increased emphasis on the fisheries sector in the 	<ul style="list-style-type: none"> - Inclusion of specific reference to CC issues in the fisheries sector in the National Climate Change Policy and Disaster Risk Management Policy, and reflected in the mechanisms charged with their oversight. - Increased emphasis on the fisheries sector in the 	<p>Review of policy and planning instruments</p>	<p>Continued receptivity on the part of stakeholders, including policy makers, to receiving and responding to information inputs</p> <p>Continued commitment to collaboration</p>

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
		issues of relevance to fisheries	provisions related to CC in the MGDS and NAPA. Improved reflection of CC issues of relevance to fisheries in ASWAp implementation.	provisions related to CC in the MGDS and NAPA. Improved reflection of CC issues of relevance to fisheries in ASWAp implementation.		between stakeholders (particularly GoM and research institutions) in information generation and management
	<p><u>Outcome Indicator 2.1.2:</u> Degree of consideration of climate resilience in local commune plans and district level plans and budgets</p> <p><i>Relates to AMAT indicator 1.1.1.1: Development frameworks (local/district level) that include specific budgets for adaptation actions</i></p>	No integration of fisheries-related) adaptation action in Mangochi district plan or local level development plans, or Area Development Plans of traditional authorities (TAs) or village clusters (VDCs)	A detailed strategy of how to integrate with ongoing local level development and Area Development Plans in place and commitments from relevant political leadership pledged	Climate resilience provided for explicitly, with corresponding budget allocation, in: - 1 District Development Plan - Area Development Plans of 3 TAs (Chimwala, Chowe, Mponda) - Village Development Plans of 45 VDCs	Review of plans and budget allocations	Existence of sufficient budgetary flexibility to allow provisions to be made for climate resilience
	<p>Outputs:</p> <p>2.1.1. Think tank on climate change in the fisheries and aquaculture sector with an integrated vision and incorporating results of CC and fisheries monitoring systems</p> <p>2.1.2. Policy review document</p> <p>2.1.3. A policy influencing strategy for mainstreaming climate resilient fisheries and aquaculture, developed and implemented.</p> <p>2.1.4 Policy guidance materials</p> <p>2.1.5. Guidelines/Code of Conduct for responsible CC-resilient aquaculture developments in riparian areas in Malawi</p>					
<p>Outcome 2.2 Strengthened capacities of fisheries professionals and other relevant stakeholders to address climate resilience building in fisheries sector</p>	<p><u>Outcome Indicator 2.2.1:</u> Number of members of targeted institutions applying increased knowledge and awareness in support of resilience measures (AMAT indicator 2.2.1.)</p> <p>Target institutions: - DoF HQ - District Fisheries Office in Mangochi - 4 DoF sub-stations</p>	No institution is fully aware of climate risks to the fisheries sector and none have the capacity to deal with these risks. <i>Baseline to be developed through Knowledge, Attitudes and Practice (KAP) survey at project start</i>	25% of members of all target institutions have increased KAP score <i>Target to be confirmed once KAP methodology and baseline are developed at project start.</i>	50% of members of all target institutions have increased KAP score <i>Target to be confirmed once KAP methodology and baseline are developed at project start.</i>	KAP surveys	Availability of staff for capacity development activities Adequate baseline educational levels to allow effective participation in capacity development

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
	<ul style="list-style-type: none"> - 5 other districts along Lake Malawi - 2 Aquaculture Research Stations - Fisheries college, Mangochi - 2 Fisheries Research Stations: Monkey Bay, Senga Bay) - 27 BVCs, 47 Villages, 3 Tas and Mangochi District 					<p>Existence of sufficient budgetary flexibility to allow for increases in assignments to DoF</p> <p>Existence of institutional culture, systems and baseline capacities within DoF allowing capacities to be applied effectively and budgetary execution to be improved.</p>
	<p>Outcome Indicator 2.2.2: Levels of recurrent budget assigned to and executed by district fisheries offices (cost centres 052 Mangochi, 053 Div South, 054 Fisheries North and 055 Regional Centre) in accordance with provisions of resource management and restoration plans</p>	<p>In 2013/14 FY:</p> <ul style="list-style-type: none"> - K56,502,845 (USD81,423) approved - K27,570,103 (USD39,730) disbursed - K25,097,695 (USD36,167) spent 	<ul style="list-style-type: none"> - 15% increase in approved amount (to USD93,636) - 20% increase in disbursed amount (to USD47,675) - 25% increase in spent amount (to USD45,208) 	<ul style="list-style-type: none"> - 30% increase in approved amount (to USD105,849) - 40% increase in disbursed amount (to USD55,621) - 50% increase in spent amount (to USD54,250) 	Budgetary records of DoF	
	<p>Outputs:</p> <p>2.2.1 Capacity development programme for staff of key institutions in relation to climate change preparedness and resilience building</p> <p>2.2.2 Improved physical capacities for DoF to sustain the resilience strategies</p>					
<p>Outcome 2.3 Strengthened awareness of climate change issues and responses of relevance to the fisheries sector and fishing communities</p>	<p>Outcome Indicator 2.3.1: Numbers of people in key fisheries value chain target groups aware of fisheries resilience issues</p>	<p>To be determined through baseline surveys</p>	<ul style="list-style-type: none"> - 25% of supermarket consumers purchasing fish from Lake Malombe - 30% of traders in fish from Lake Malombe - 40% of fishers on Lake Malombe 	<ul style="list-style-type: none"> - 50% of supermarket consumers purchasing fish from Lake Malombe - 60% of traders in fish from Lake Malombe - 75% of fishers on Lake Malombe 	<p>Awareness surveys among supermarket consumers, traders and fishers in Lake Malombe</p>	<p>Receptivity of actors to messages regarding fisheries resilience</p>
	<p>Outputs:</p> <p>2.3.1 National "Chambo" campaign, supporting behaviour change and motivation, rolled out</p>					
<p>Component 3: Strengthening capacities at local level to increase the resilience of fishing communities to climate change</p>						
<p>Outcome 3.1: Adaptive co-management and resource governance systems in support of</p>	<p>Outcome Indicator 3.1.1: Numbers and types of stakeholders considering that they are satisfactorily represented in co-management structures</p>	<p>To be determined through baseline surveys</p>	<p>50% of people (men and women) in all major stakeholder groups</p>	<p>80% of people (men and women) in all major stakeholder groups</p>	<p>Reviews of attendance sheets and minutes in meetings, stakeholder surveys, focus groups</p>	<p>Social and political conditions remain stable and peaceful</p>

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
climate-resilient capture fisheries	<u>Outcome Indicator 3.1.2:</u> Percentage implementation of provisions and targets of participatory resource management plan(s)	N/A	30% implementation of resource management plans	70% implementation of resource management plans	Physical inspections of implementation, focus groups with stakeholders	Openness among stakeholders to collaboration in governance systems
	<u>Outcome Indicator 3.1.3:</u> Percentage of fishers complying with norms and regulations for resource co-management	N/A	40% of all categories of fishers	80% of all categories of fishers	Inspections/monitoring of gear and fishing practices	
	<u>Outcome Indicator 3.1.4:</u> Degree of satisfaction among different stakeholder groups with co-management and governance frameworks	To be determined through baseline surveys	40% in all stakeholder groups are satisfied	75% in all stakeholder groups are satisfied	Stakeholder surveys	
	<u>Output Indicator 3.1.5:</u> Area excluded from fishing	80ha in existing National Park (100m from land)	3,000ha additional no-take area	6,000ha additional no-take area	Reports of local governance structures	
	Outputs: 3.1.1: Multi-stakeholder co-management structures 3.1.2: Participatory resource management plan(s) 3.1.3: Norms and regulations for resource co-management 3.1.4: Enforcement mechanisms for resource co-management					
Outcome 3.2: Fish stocks and habitats restored through EAFA approaches	<u>Outcome Indicator 3.2.1:</u> Area of EAFA -based Chambo nursery habitat rehabilitated	0 ha	5ha	10ha covered by seine prevention objects (SPOs) Planting of 40ha of aquatic vegetation	Project (GIS) mapping and monitoring exercises under outcome 3 Responsible: DoF – Research Unit Monkey Bay	Continued low levels of social conflict
	<u>Outcome Indicator 3.2.2:</u> Representation of higher value species (chambo) in populations	Approximately 2% is chambo	5%	9% of catch is chambo	DoF population monitoring programme under Activity 3.2.3.4	
	<u>Outcome Indicator 3.2.3:</u> Proportion of kasawala (immature chambo i.e. less than 15 cm) in monitoring catches (as an indicator of rebuilding the chambo stocks)	Approximately 2%	20%	50%	DoF population monitoring programme under Activity 3.2.3.4	

Results Chain	Indicators	Baseline	Mid-term targets	End of Project Target	Means of Verification and Responsible Entity	Assumptions
	Outputs: 3.2.1: A verified and updated restoration plan for Lake Malombe, including risk assessment 3.2.2: Restoration programme 3.2.3: Restocking programme for healthy native chambo					
Outcome 3.3: Aquaculture is climate-proofed and able to contribute to diverse and resilient livelihood strategies of the most vulnerable sectors of the population	<u>Outcome Indicator 3.3.1:</u> Numbers of aquaculture ponds with climate resilience measures in place (e.g. deepening, reduced seepage measures, location relative to water availability)	None	200 ponds with climate resilience measure	500 ponds with climate resilience measure	Pond inspections	Receptiveness of producers
	Outputs: 3.3.1: Aquaculture resilience plan developed, implemented and underpinned through on-going research and impact tracking programme 3.3.2: Action learning and knowledge generation programme 3.3.3: Capacity development programme for resilient aquaculture 3.3.4: Impact tracking programme					
Outcome 3.4: Local people have access to diverse, pro-poor farming systems as a central element of resilient rural livelihoods	<u>Outcome Indicator 3.4.1:</u> Numbers of farms households integrating productive aquaculture and good farm management practices and/or efficient water management into diverse portfolio of CC resilience measures	2%	40%	1,500 households	Farm inspections	Receptiveness of producers Availability of quality fingerlings and other required input resources
	Outputs: 3.4.1: Participatory extension programmes 3.4.2 Solar driers					

ANNEX 2 : WORKPLAN

Outputs	Activities	Responsible entity	Year 1				Year 2				Year 3				Year 4				Year 5			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
PROJECT START UP	Recruit PMU members of PMU team	PMU	X	X																		
	Orient PMU members		X	X																		
	National Inception workshop			X																		

Outputs	Activities	Responsible entity	Year 1				Year 2				Year 3				Year 4				Year 5			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Local level inception workshops			X																		
Capacity development	Update capacity needs assessments (linked to vulnerability assessment process) and develop capacity development plans (consultancy)	PMU		X	X																	
	Follow-up on capacity development plans implementation			X	X	X																
Gender mainstreaming	Detailed analysis of gender mainstreaming needs			X	X	X																
	Development of gender mainstreaming strategy				X																	
	Monitoring and follow-up of gender mainstreaming effectiveness					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Monitoring and evaluation	Review of logical framework and indicators			X																		
	Generation of missing baseline data for indicators			X	X																	
	Measurement of indicators				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	Internal review and organisation of indicator data				X																	
	Mid-term review											X										
	Final evaluation																					X
PROJECT CLOSURE	Negotiation of details of exit/sustainability strategy																					X
	Review/feedback workshop																					X
	Administrative closure																					X
1.1.1: Detailed Vulnerability and Disaster Risk Assessments (VDRA) of 47 fishing communities around Lake Malombe	1.1.1.1 Methodology development				X	X																
	1.1.1.2 Training on VDRA						X	X	X													
	1.1.1.3 Realisation of VDRA							X	X	X	X											
	1.1.1.4 Documentation and validation										X	X	X									
1.1.2: Information resources on ecological parameters determining management and resilience options in and around Lake Malombe	1.1.2.1 Definition of agenda for knowledge generation				X	X																
	1.1.2.2 Planning						X	X														
	1.1.2.3 Implementation (studies)							X	X	X	X	X	X	X	X	X	X	X	X	X		
	1.1.2.4 Analysis, systematization, dissemination								X	X	X	X	X	X	X	X	X	X	X	X		

Outputs	Activities	Responsible entity	Year 1				Year 2				Year 3				Year 4				Year 5			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1.1.3: Climate and environmental monitoring and early warning (EWS) systems	1.1.3.1 Planning and design of monitoring system				X	X	X															
	1.1.3.2 Establishment and organization of monitoring teams, operational rules and resourcing strategies					X	X	X														
	1.1.3.3 Definition of monitoring protocols						X	X														
	1.1.3.4 Training of monitoring teams						X	X	X													
	1.1.3.5 Roll-out of monitoring systems and EWS								X	X	X	X	X	X	X	X	X	X	X	X		
1.1.4: Strengthened fisheries monitoring system	1.1.4.1 Planning and design of monitoring system			X	X	X																
	1.1.4.2 Establishment and organization of monitoring teams, operational rules and resourcing strategies					X	X	X														
	1.1.4.3 Definition of monitoring protocols						X	X														
	1.1.4.4 Training of monitoring teams						X	X	X													
	1.1.4.5 Roll-out of monitoring systems and EWS								X	X	X	X	X	X	X	X	X	X	X	X		
1.1.5: Mechanisms for dissemination and use of knowledge in adaptive management	1.1.5.1 Identification and characterization of target audiences			X	X	X																
	1.1.5.2 Definition and establishment/strengthening of information supply materials and mechanisms					X	X	X	X													
	1.1.5.3 Strengthening of capacities for information management and use within target audiences							X	X	X	X	X	X	X	X	X	X	X	X	X		
2.1.1.1. Think tank on climate change in the fisheries and aquaculture sector with an integrated vision and incorporating results of CC and fisheries monitoring systems	2.1.1.1: Support to establishment and functioning of Think Tank			X	X	X																
	2.1.1.2: Ongoing advisory support					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
2.1.2. Policy review document	2.1.2.1 Policy review			X	X	X	X															

Outputs	Activities	Responsible entity	Year 1				Year 2				Year 3				Year 4				Year 5			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2.1.3. A policy influencing strategy for mainstreaming climate resilient fisheries and aquaculture, developed and implemented.	2.1.3.1 Validation and planning workshop						X	X														
	2.1.3.2 Generation of policy influencing strategy and plan							X	X													
2.1.4 Policy guidance materials	2.1.4.1 Design and validation of materials							X	X	X	X											
	2.1.4.2 Production and dissemination of materials									X	X	X	X	X	X	X	X	X	X	X	X	
2.1.5. Guidelines/Code of Conduct for responsible CC-resilient aquaculture developments in riparian areas in Malawi	2.1.5.1: Review of technical information and lessons learned			X	X	X	X															
	2.1.5.2: Preparation of initial draft guidelines					X	X	X														
	2.1.5.3: Validation and updating of guidelines							X	X													
	2.1.5.4: Dissemination of guidelines								X	X	X	X										
2.2.1 Capacity development programme for staff of key institutions in relation to climate change preparedness and resilience building	2.2.1.1. Detailed Capacity Building Needs Assessment (CBNA)			X	X																	
	2.2.1.2. Development of Capacity Building Plans				X	X																
	2.2.1.3. Development of capacity development materials				X	X																
	2.2.1.4. Realisation of capacity development activities					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	2.2.1.5. Knowledge assessments									X	X	X	X	X	X	X	X	X	X	X	X	
2.2.2 Improved physical capacities for DoF to sustain the resilience strategies	2.2.2.1: Confirmation of support needs			X	X	X																
	2.2.2.2: Investment in facilities and equipment					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2.3.1 National "Chambo" campaign, supporting behaviour change and motivation, rolled out	2.3.3.1. Planning and design			X	X	X																
	2.3.3.2: Production of materials					X	X	X														
	2.3.3.3: Implementation of campaign							X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3.1.1: Multi-stakeholder co-management structures	3.1.1.1: Participatory review of conditions, structures and capacities for co-management			X	X	X	X															
	3.1.1.2: Development of stakeholder participation plan				X	X	X															

Outputs	Activities	Responsible entity	Year 1				Year 2				Year 3				Year 4				Year 5				
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
	3.1.1.3: Strengthening and facilitation of co-management entities						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	3.1.1.4: Implementation of capacity development programme for co-management entities						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
3.1.2: Participatory resource management plan(s)	3.1.2.1: Methodological definition, organization and planning				X	X	X																
	3.1.2.2: Participatory definition of plan provisions					X	X	X															
	3.1.2.3: Drafting of plan(s)					X	X	X	X														
	3.1.2.4: Validation and dissemination								X	X	X												
	3.1.2.5: Oversight and support to implementation of plan(s)										X	X	X	X	X	X	X	X	X	X	X		
3.1.3: Norms and regulations for resource co-management	3.1.3.1: Review of regulatory requirements of management plan					X	X	X															
	3.1.3.2: Participatory review of existing norms and regulations					X	X	X															
	3.1.3.3: Participatory definition of needs for modifications or additions to norms and regulations						X	X	X														
	3.1.3.4: Drafting and dissemination of norms and regulations								X	X	X	X	X	X	X	X	X						
3.1.4: Enforcement mechanisms for resource co-management	3.1.4.1: Definition of needs and capacities for enforcement				X	X	X																
	3.1.4.2: Formulation of incentive mechanisms and organizational structures						X	X	X														
	3.1.4.3: Roll-out of mechanisms								X	X	X	X	X	X	X	X	X	X	X	X	X		
	3.1.4.4: Systematization and consolidation									X	X	X	X	X	X	X	X	X	X	X	X		
3.2.1: A verified and updated restoration plan for Lake Malombe, including risk assessment	3.2.1.1: Participatory formulation of the restoration plan				X	X																	
	3.2.1.2: Risk assessment				X	X																	
3.2.2: Restoration programme	3.2.2.1: Formulation and local validation of restoration proposals				X	X	X	X															
	3.2.2.2: Planning and organization of restoration activities					X	X																

Outputs	Activities	Responsible entity	Year 1				Year 2				Year 3				Year 4				Year 5			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	3.2.2.3.: Implementation of restoration strategies (planting, artificial reefs, brush parks)						X	X	X	X	X	X	X	X	X	X	X	X	X	X		
3.2.3: Restocking programme for healthy native chambo	3.2.3.1: Establishment of chambo nursery centre and training of staff					X	X															
	3.2.3.2: Purchase and transport of fry						X	X														
	3.2.3.3: Selection of brood stock.							X	X													
	3.2.3.4: Monitoring								X	X	X	X	X	X	X	X	X	X	X	X		
3.3.1: Aquaculture resilience plan developed, implemented and underpinned through on-going research and impact tracking programme	3.3.1.1: Participatory situation analyses and plan development				X	X	X															
	3.3.1.2: Systemization, validation and publication						X	X	X													
3.3.2: Action learning and knowledge generation programme	3.3.2.1: Facilitate and develop capacities for action learning by local stakeholders.				X	X	X															
	3.3.2.2: Collaborative knowledge generation						X	X	X	X	X	X	X	X	X	X	X	X	X	X		
3.3.3: Capacity development programme for resilient aquaculture	3.3.3.1: Capacity Development Needs Assessment (CBNA)			X	X	X																
	3.3.3.2: Development of strategies, materials and channels for capacity development					X	X	X														
	3.3.3.3: Delivery of capacity development programme						X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	3.3.3.4: Monitoring and follow-up								X	X	X	X	X	X	X	X	X	X	X	X		
3.3.4: Impact tracking programme for aquaculture resilience plan	3.3.4.1: Participatory definition of indicators, and mechanisms and responsibilities for monitoring				X	X																
	3.3.4.2: Support to the implementation of the tracking programme					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
3.4.1: Participatory learning and extension programmes and demonstrations	3.4.1.1: Conduct participatory situation analyses with farmers			X	X	X	X															
	3.4.1.2: Organization and planning of learning programmes and demonstrations				X	X	X	X														
	3.4.1.3: Implementation of programmes					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		

Outputs	Activities	Responsible entity	Year 1				Year 2				Year 3				Year 4				Year 5			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
3.4.2 Solar driers	3.4.2.1: Community-wide awareness raising on solar driers						X	X	X													
	3.4.2.2: Installation of driers								X	X	X	X										
	3.4.2.3: Demonstration and training activities										X	X	X	X	X	X	X	X	X	X		
	3.4.2.4: Follow-up support										X	X	X	X	X	X	X	X	X	X		
4.1.1: Monitoring, evaluation and reporting system established, supporting adaptive project management	4.1.1.1: Development and implementation of project M&E system		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.1.2: Mechanisms for effective management and dissemination of knowledge	4.1.2.1: Establishment of communication plan		X	X																		
	4.1.2.2: Training of project staff in communication		X	X																		
	4.1.2.3: Documentation and sharing of lessons learnt from the project				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

ANNEX 3: BUDGET BY COMPONENT, OUTCOME AND YEAR



Malawi fisheries
Outcomes based bu

ANNEX 4: STAKEHOLDER INVOLVEMENT PLAN

Key stakeholders	Location/ magnitude	Envisaged roles during project implementation	Expected impact from project
Department of Fisheries (DoF) (in the Ministry of Agriculture and Food Security) (national level)	National	<p>Executing agency</p> <p>Facilitate policy integration through sector representation at national CC coordination mechanism</p> <p>Baseline support at pilot sites</p> <p>Beneficiary of capacity building support</p> <p>Link to existing/ongoing activities such as FISH project (USAID), WorldFish Centre supported Lake Chilwa Climate change Adaptation Project , Presidential Initiative on Aquaculture Programme and Agricultural Sector Wide Approach</p> <p>Upscaling through existing DoF structures</p>	<ul style="list-style-type: none"> - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies - National food security strategies will be enhanced through increased knowledge and know-how on climate change resilience building in the fisheries and aquaculture sectors - Trainings to selected national DoF representatives will enhance central capacities - The project will support the achievement of current objectives of the MAFS and DoF strategic plans - The project will enable to replication in other districts around Lake Malawi and other relevant lake systems
DoF: Mangochi District Office	District	<p>House project team at Mangochi District Office</p> <p>Baseline support at pilot sites</p> <p>Key executing office – responsible for project activities on ground</p> <p>Liaison with district, TA and village level government structures</p>	<ul style="list-style-type: none"> - Improved capacities of staff and at district office through PMU hosting and project support - Strong rapport and relationship building through dedicated project activities with key stakeholders throughout district - The project will enhance collaborations within DoF units, but also with stakeholders such as for law enforcement (police, other) - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies - National food security strategies will be enhanced through increased knowledge and know-how on climate change resilience building in the fisheries and aquaculture sectors - Trainings to district level DoF representatives will enhance capacities - The project will support the achievement of current objectives of the DoF strategic plans
DoF: 4 sub-stations (Chimwala, Chapola, Kadewere, Upper Shire)	Sub-district	<p>Baseline support at pilot sites; staff assigned to project work; responsible to work with PMU supported field staff on project implementation</p> <p>Partners in delivering esp. component 2 of the project</p> <p>Beneficiary of capacity building support</p>	<ul style="list-style-type: none"> - Improved capacities of staff; support for outreach activities, with a special focus on supporting female staff members - Practical hands-on engagement and leadership in delivery of project activities supports capacities of fisheries field officers - Strong rapport and relationship building through dedicated project activities with key stakeholders throughout district - The project will enhance collaborations within DoF units, but also with stakeholders such as for law enforcement (police, other)

Key stakeholders	Location/ magnitude	Envisaged roles during project implementation	Expected impact from project
DoF: 2 Aquaculture research stations (Domasi & Mzuzu)	National	Research and expert knowledge support Supply of fingerlings Baseline support at pilot sites Beneficiary of capacity building support	<ul style="list-style-type: none"> - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies - Trainings to district level DoF representatives will enhance capacities - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies - Specifically, the on-the-ground learning and demonstrations of climate resilient aquaculture investments will enrich the know-how of the government centers, as well as they inject their own know-how - Code of Conduct/ guidelines on climate resilient aquaculture in Malawi will strengthen the position of the aquaculture research stations
DoF: Fisheries research stations esp. Monkey Bay, but also Senga Bay	National <i>Monkey Bay near Mangochi</i>	Responsible for component 3 EWS research Research support, ongoing monitoring info for EWS and integration into functional M&E system Baseline support at pilot sites Beneficiary of capacity building support	<ul style="list-style-type: none"> - Improved capacities of staff; support for EWS related research on Lake Malombe and development of monitoring system - The results/lessons learned from the project as well as the tools developed will support the research arm of the DoF - Practical on-the-ground implementation and learning about fisheries and climate change related research needs for sustainable fisheries builds a forward thinking cadre of research professionals within DoF - The project will enable to replication in other districts around Lake Malawi and other relevant lake systems
DoF: Fisheries college in Mangochi	National <i>Located in Mangochi</i>	Partner for “Chambo” campaign (Outcome 2.2) Location for trainings Baseline support at pilot sites Beneficiary of capacity building support	<ul style="list-style-type: none"> - Capacity support to staff and institution; esp. through collaboration on strategic communications and the Chambo campaign, but also by using the institution as location for trainings - The results/lessons learned from the project as well as the tools developed will support the college’s work and be integrated into the ongoing curriculum - Possible recruitment of trainees and trainee opportunities in conjunction of project delivery with project team
District (Mangochi) governance structures; District Development Committees (DDCs)	District	Joint project planning and implementation Identification of policy entry points and lead for resilience building Beneficiaries of capacity support local and district level planning and associated budgets Co-management partners	<ul style="list-style-type: none"> - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies - Tangible demonstrations and options for climate change resilience building in the fisheries and aquaculture sectors can be readily applied and upscaled through district plans and allocation of relevant budgets - Specific knowledge and know-how about climate change resilience building, risk to the fisheries sector and fisheries related livelihoods - Specific knowledge and know-how about rehabilitation of fisheries and lake ecosystems, sustainable fisheries management as well as aquaculture

Key stakeholders	Location/ magnitude	Envisaged roles during project implementation	Expected impact from project
		Lead in mobilizing community actions and project support	<ul style="list-style-type: none"> - Trainings to selected district level representatives and members of the DDCs will enhance central capacities - The project will enable to replication in other districts around Lake Malawi and other relevant lake systems
Village governance structures; Village Development Committees (VDCs)	Sub-district	<p>Joint project planning and implementation</p> <p>Identification of policy entry points and lead for resilience building</p> <p>Beneficiaries of capacity support local and district level planning and associated budgets</p> <p>Co-management partners</p> <p>Lead in mobilizing community actions and project support</p>	<ul style="list-style-type: none"> - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies, as well as district and sub-district level development planning and budgeting - Tangible demonstrations and options for climate change resilience building in the fisheries and aquaculture sectors can be readily applied and upscaled through village development plans and allocation of relevant budgets - Specific knowledge and know-how about climate change resilience building, risk to the fisheries sector and fisheries related livelihoods - Specific knowledge and know-how about rehabilitation of fisheries and lake ecosystems, sustainable fisheries management as well as aquaculture - Trainings to selected village level representatives and members of the VDCs will enhance central capacities - The project will enable to replication in other VDCs
3 Traditional Authorities (Chimwala, Chowe, Mponda)	Sub-district	<p>Joint project planning and implementation</p> <p>Beneficiaries of capacity support</p> <p>Co-management partners</p> <p>Identification and promotion of relevant by-laws</p> <p>Lead in mobilizing community actions and project support</p>	<ul style="list-style-type: none"> - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies, as well as district and sub-district level development planning and budgeting - Tangible demonstrations and options for climate change resilience building in the fisheries and aquaculture sectors can be readily applied and upscaled through TA and village development plans and allocation of relevant budgets - Specific knowledge and know-how about climate change resilience building, risk to the fisheries sector and fisheries related livelihoods - Specific knowledge and know-how about rehabilitation of fisheries and lake ecosystems, sustainable fisheries management as well as aquaculture - Trainings to selected TA and village level representatives and members of the TAs will enhance central capacities - The project will enable to replication in other TAs
27 BVCs	Sub-district	<p>Joint project planning and implementation</p> <p>Leads for BVC revival and “reformation”</p> <p>Identification, promotion and enforcement of relevant by-laws</p>	<ul style="list-style-type: none"> - Reestablished and functional BVCs, with relevant DoF and other institutions operational support - Functional and climate change resilience Lake Malombe – fisheries ecosystem

Key stakeholders	Location/ magnitude	Envisaged roles during project implementation	Expected impact from project
		Beneficiaries of capacity support Co-management partners	<ul style="list-style-type: none"> - The results/lessons learned from the project as well as the tools developed will support the improvement of National or District level sector related policies and strategies, as well as district and sub-district level development planning and budgeting - Tangible demonstrations and options for climate change resilience building in the fisheries and aquaculture sectors can be readily applied and upscaled through district and village development plans and allocation of relevant budgets - Specific knowledge and know-how about climate change resilience building, risk to the fisheries sector and fisheries related livelihoods - Specific knowledge and know-how about rehabilitation of fisheries and lake ecosystems, sustainable fisheries management as well as aquaculture - Trainings to 27 BVCs in project area around Lake Malombe enhance central capacities - The project will enable to replication in other BVCs
45 local fishing villages around Lake Malombe area	Sub-district	Serve as pilot activity partners for fisheries restoration, co-management and aquaculture Benefit from adaptation learning Gender sensitive planning and intervention implementation Become national champions for CC action In Malawi Beneficiaries of components 2 in particular	<ul style="list-style-type: none"> - Climate resilient and generally improved livelihoods through rehabilitated fisheries as well as aquaculture investments - Enhanced capacities of female fisheries professionals - Functional and climate change resilience Lake Malombe – fisheries ecosystem - Tangible demonstrations and options for climate change resilience building available - Specific knowledge and know-how about climate change resilience building, risk to the fisheries sector and fisheries related livelihoods - Specific knowledge and know-how about rehabilitation of fisheries and lake ecosystems, sustainable fisheries management as well as aquaculture - Trainings to selected villagers, with a dedicated gender component
District level enforcement agencies (DoF, but also police, magistrates, other)	District	Joint project planning and implementation Enforcement of relevant fisheries related laws; effective prosecution Beneficiaries of capacity support Co-management partners	<ul style="list-style-type: none"> - Improved capacities for fisheries related law enforcement and prosecution - Dedicated VMS and related law enforcement support technologies and systems tested and rolled out - Improved stakeholder collaborations, understanding of roles, and overall governance and public support of law enforcement and prosecution through overall improved co-management - Specific knowledge and know-how about fisheries related laws, law enforcement and prosecution - Overall enhanced political will, which will reinforce relevant law enforcement capacities
FISH project and other collaboration partners	National District	Joint planning and activity execution Co-financing Collaborations	<ul style="list-style-type: none"> - Sharing of results/lessons learned from the project as well as the tools developed enhanced mutually project execution - Jointly and coordinated capacity support to DoF strengthened both (and other) projects impacts; strong synergistic effects

Key stakeholders	Location/ magnitude	Envisaged roles during project implementation	Expected impact from project
			<ul style="list-style-type: none"> - Coordination of national level science and policy knowledge and advice enhanced project impacts - Enhanced strategic visibility with key target groups at all levels through joint efforts
Department of Climate Change and Meteorology Services (DCCMS)	National	Technical collaboration on weather information (Components 3) Capacity support through project (e.g. financing of weather station for Mangochi)	<ul style="list-style-type: none"> - Enhanced knowledge about climate risks to the fisheries sector, as well as on adaptation options - Dedicated knowledge contribution to future national climate change planning, with lessons from the local implementation level - The results/lessons learned from the project as well as the tools developed will support the improvement of National climate change policies and strategies - National food security strategies will be enhanced through increased knowledge and know-how on climate change resilience building in the fisheries and aquaculture sectors - The project will support the achievement of current objectives of the NAPA and other national climate change plans - The project will enable to upscaling and replication in other districts around Lake Malawi and other relevant lake systems
National Planning Department (DPP) (housing the National CC coordination mechanism)	National	Provide national CC coordination hub; facilitate sector contribution into national planning framework Support mainstreaming of CC fisheries sector needs into national planning and budgeting processes Provide/ broker relevant capacity support	<ul style="list-style-type: none"> - Enhanced knowledge about climate risks to the fisheries sector, as well as on adaptation options - Dedicated knowledge contribution to future national climate change planning, with lessons from the local implementation level - The results/lessons learned from the project as well as the tools developed will support the improvement of National climate change policies and strategies - National food security strategies will be enhanced through increased knowledge and know-how on climate change resilience building in the fisheries and aquaculture sectors - The project will support the achievement of current objectives of the NAPA and other national climate change plans - The project will enable to upscaling and replication in other districts around Lake Malawi and other relevant lake systems
Environmental Affairs Department	National	Provide technical and political leadership and support esp. in role of UNFCCC Focal Point Integration of sector findings into national CC context On-site collaborations Stakeholder of capacity building plan	<ul style="list-style-type: none"> - Enhanced knowledge about climate risks to the fisheries sector, as well as on adaptation options - Dedicated knowledge contribution to future national climate change planning, with lessons from the local implementation level - The results/lessons learned from the project as well as the tools developed will support the improvement of National climate change policies and strategies - National food security strategies will be enhanced through increased knowledge and know-how on climate change resilience building in the fisheries and aquaculture sectors

Key stakeholders	Location/ magnitude	Envisaged roles during project implementation	Expected impact from project
			<ul style="list-style-type: none"> - The project will support the achievement of current objectives of the NAPA and other national climate change plans - The project will enable to upscaling and replication in other districts around Lake Malawi and other relevant lake systems
National CC Steering Committee	National	<p>Serve as project steering committee Benefit from capacity support e.g. from support to capacity building activities, funding support for regular meetings etc. Host technical think tank and provide technical exchanges</p>	<ul style="list-style-type: none"> - Enhanced knowledge about climate risks to the fisheries sector, as well as on adaptation options - Dedicated knowledge contribution to future national climate change planning, with lessons from the local implementation level - The results/lessons learned from the project as well as the tools developed will support the improvement of National climate change policies and strategies - National food security strategies will be enhanced through increased knowledge and know-how on climate change resilience building in the fisheries and aquaculture sectors - The project will support the achievement of current objectives of the NAPA and other national climate change plans - The project will enable to upscaling and replication in other districts around Lake Malawi and other relevant lake systems
National GEF Steering Committee	National	<p>Support effective project implementation; provide and facilitate political support Benefit from adaptation learning contributions</p>	<ul style="list-style-type: none"> - Enhanced knowledge about climate risks to the fisheries sector, as well as on adaptation options - Dedicated knowledge contribution to future national climate change planning, with lessons from the local implementation level - The results/lessons learned from the project as well as the tools developed will support the improvement of National climate change policies and strategies - National food security strategies will be enhanced through increased knowledge and know-how on climate change resilience building in the fisheries and aquaculture sectors - The project will support the achievement of current objectives of the NAPA and other national climate change plans - The project will enable to upscaling and replication in other districts around Lake Malawi and other relevant lake systems
Other line ministries (e.g. Department of Marine Engineering, Department of Tourism, Ministry of Agriculture and Food)	National District	<p>Adaptation learning Joint implementation of activities as appropriate An application of an Ecosystem Approach requires multi-stakeholder and –sector engagement</p>	<ul style="list-style-type: none"> - Enhanced knowledge about climate risks to the fisheries sector, as well as on adaptation options and linkages to other sectors - Local level vulnerability assessments in 45 villages generate better understanding of climate change related issues on the ground - Platform for collaboration, joint learning and coordinated service delivery - Joint implementation of project activities enhanced work delivery for all sectoral ministries

Key stakeholders	Location/ magnitude	Envisaged roles during project implementation	Expected impact from project
Security, Department of Parks and Wildlife)			
LUANAR, Mzuzu University, other think tanks	National	Provide technical inputs Potentially joint project execution of specific activities Capacity development support	<ul style="list-style-type: none"> - Collaborations for implementation of project activities enhances overall institutional capacity as well as fosters interactions and learnings amongst staff and experts - The results/lessons learned from the project as well as the tools developed will support the work of these academic institutions - Specifically, the on-the-ground learning and demonstrations of climate resilient aquaculture investments will enrich the know-how of the aquaculture centers, as well as they inject their own know-how - Code of Conduct/ guidelines on climate resilient aquaculture in Malawi will strengthen the position of the aquaculture research stations
NGOs, CBOs	National District Sub-district	Potentially pilot activity engagement Specific expertise e.g. on gender Mobilization of local communities if appropriate Project implementation support Adaptation learning	<ul style="list-style-type: none"> - Collaborations for implementation of project activities enhances overall institutional capacity as well as fosters interactions and learnings amongst staff and experts - The results/lessons learned from the project as well as the tools developed will support the work of these academic institutions - Trainings in which staff participate or contribute to will enhance capacities
Private sector	National District Sub-district	Potentially pilot activity engagement with aquaculture and Chambo re-stocking Adaptation learning Climate risk proofing business Engagement on CC resilient sector policies Chambo campaign implementation	<ul style="list-style-type: none"> - The results/lessons learned from the project as well as the tools developed will support the work of private sector enterprises - Knowledge and know-how about climate resilience in the fisheries and aquaculture sectors will enhance and secure business interests and investments - Strengthen fisheries value chain provides new opportunities for long-term and sustainable fisheries related enterprises
International expertise e.g. FAO, World Fish Centre	International National representations	Technical support inputs Capacity support activities Adaptation learning sharing Building of collaborations	<ul style="list-style-type: none"> - Interesting new research knowledge, results/lessons learned learned from the project as well as the tools developed will influence international capacities - Project outputs such as the Code of Conduct/guidelines for climate resilient aquaculture will benefit international community

ANNEX 5: THE PROJECT RISK LOG

A. Risks

Risk No.	Risk statement	Impact ¹⁰⁶	Likelihood ¹⁰⁷	Overall ranking ¹⁰⁸	Mitigating action	Action owner (to be confirmed during inception)
1	Insufficient fisheries sector stakeholder capacities to absorb CC action needs	L	L		The support for this project in itself is an awareness raising and capacity support initiative. Careful planning of implementation arrangements and project activities address this risk. Primary and secondary stakeholders are targeted through strategically designed interventions under all project components. Primary stakeholder at the intervention site level will be actively engaged in all aspects of project interventions on site. DoF is the lead institution for the project and DoF district level staff are ultimately the drivers for the successful project execution. An awareness raising campaign on Chambo will be conducted, which will also address climate change sensitisation. A dedicated project technical support mechanism will be designed to ensure effective project execution. As indicated above, capacity building esp. within DoF is a focus of this project. Lessons learnt from this CC intervention will be unscaled to extension and research staff outside of Mangochi. Component 4 of the project specifically targets national level capacity support on a systemic level.	PMU/DoF
2	Low pilot level capacities	M	M		Dedicated local level support is firmly planned. The PPG phase entailed detailed stakeholder consultations in the project target area and with key institutions/ governance structures. Participation, fishermen/ farmers action (research) approaches are central to the project design, as is ownership building. The project support structure is elaborate and facilitates for relevant back-stopping from the PMU and associated experts.	PMU/DoF
3	Restoration failures i.e. - difficulties in regenerating water plants & habitat	M	M		During the PPG phase relevant expertise was consulted to set out a design concept that is considered feasible. By building a dual approach to habitat restoration, using experiences from elsewhere in the world to introduce artificial breeding habitat and areas for vegetation rehabilitation, while also introducing the co-management related measure of establishing "protected areas" where water vegetation could naturally re-establish itself is seen as a sensible option.	PMU/DoF

¹⁰⁶ Effect on project organization if risk were to occur: H, MH, ML, or)

¹⁰⁷ Estimate of likelihood: H, MH, ML, or L

¹⁰⁸ Red/Amber/Green

	- Fingerling supply chain problems				Special care has been put into investigating the options for establishing a fingerling supply chain of relevant chambo species for restocking. Nevertheless, as large amount of fingerlings are foreseen to be introduced into the lake, it is important to establish relevant contracts and commitments to supply at project onset. Fish feeds for the aquaculture interventions must be available (can be imported from Zambia to start, if needed), and integrated poultry-natural feeds systems are explored.	
4	Co-management failures i.e. - resistance to implement/enforce agreed to measures - criminal elements in community	M	M		The project will adopt a highly participatory approach based on extensive local consultation and fully involving local communities in all aspects of co-management, including the establishment of governance structures, the definition of norms and the formulation of management and restoration plans, all of which will be based on participatory analyses of needs. Emphasis will be placed on ensuring the continued local ownership of these elements, and also on tailoring all of the project's interventions at local level to the needs of the different socioeconomic sectors within the target communities in order to promote social acceptance, sustainability and the equitable generation of benefits, and minimize the risk of conflicts.	PMU/DoF
5	Aquaculture failures i.e. - capacity of local partner too low to implement activities successfully - negative climate impacts	M	MH		Aquaculture especially community-based has failed in Malawi many times, although there are some stories of success. The government of Malawi is committed to further invest into aquaculture development as one option for climate resilience building and achieving food security. The PPG phase invested into scoping local and international knowledge and best practices for setting out possible designs for an aquaculture component in the project, It is recognised that an intense investment into scoping and further developing the concept with the beneficiaries needs to be made at project onset. It is critical to engage the local communities in the final design concept, as well as in training and ownership building right from the beginning. A commercialised approach to supporting incubators will be tested. FAO has considerable experience in developing aquaculture projects and especially also in ensuring climate change resilience of aquaculture development.	PMU/DoF
6	Unintended environmental risks e.g. - genetic pollution - Species imbalances - Loopholes in affluent management	M	M		Both the restocking and the aquaculture components of this project bear some environmental risk, which are largely managed through a rigorous design concept. It is clear that this project will change Lake Malombe from a purely "naturally" managed system (including local people and overfishing) to an "engineered" system, into which fish species will be introduced in balances not previously recorded from the lake. A dedicated environmental monitoring programme under component 1 will be implemented to provide tracking information on all interventions. It was reported that some of the potential fingerling supplies maybe affected by "genetic pollution" and genetically modified elements. All project interventions will undergo continuous environmental screening as stipulated under the national EIA laws, and any identified risks will be addressed with the Technical Task team's inputs and where needed with international expertise through FAO. This also	PMU/DoF

					goes for any other potential aquaculture related risks, including effluent water management.	
7	Social/domestic conflict	L	L		Building climate change resilience – and changing failing systems –will come with social changes. There may be some resistance to change among actors in the communities who may feel their social and economic interests are threatened through the co-management proposals, particularly the improved enforcement of norms on damaging fishing practices. The project will address this risk by applying a fully inclusive and participatory approach to consultation and planning in relation to management strategies, organizational structures and governance, and will promote a range of technical management options (ranging from improved capture fisheries practices through integrating low-tech aquaculture into smallholder farming systems and medium-level commercial aquaculture), with the potential to generate benefits tailored to each of the stakeholder sectors, including those who fear potential marginalization..	PMU/DoF
8	Limited political will	L	L		By linking this project to the newly established national CC coordination mechanisms in the Planning Department and by addressing explicit NAPA priorities maximum alignment with national priorities is given. The participatory identification of the project focus through NAPA and engagement of key stakeholder during the PIF and PPG preparation should have laid a strong political commitment foundation for this project. Furthermore there is dedicated commitment from DoF and at the political level of MAFS to invest into food security in the light of climate risks – and fisheries is the obvious strategy for Malawi. The dedicated Chambo campaign will be designed to mobilize public and political support for the approach.	PMU/DoF
9	Climate related disasters	M	M		A severe flood event could potentially affect the intended local partners which could lead to unavailability to partner in the implementation of project activities. Aquaculture infrastructure could be destroyed, and impacts on the Lake Malombe ecosystem could be so dramatic that the invested restoration activities may seem lost. Severe droughts and heat could equally have detrimental impacts. The project will be designed to reduce vulnerability to extreme events and it is anticipated that local level project interventions would provide tangible benefits to the project stakeholders. Approaches and techniques will be tested and pioneered that may hopefully provide climate proofing beyond what we know.	PMU/DoF

B. Environmental and Social risks

ESS Standard	Risk Description	Mitigation hierarchy	Mitigation action	Responsible	Timeframe	Indicator
ESS1	None identified	n/a	n/a	n/a	n/a	n/a
ESS 2	Potential risk of use of in bred or cross bred tilapia stock for lake restocking sub-sub-component	EIA undertaken to establish the quality of stocks to be used for restocking. The risk of use of mixed stocks and risks of inbreeding in the hatcheries supplying fingerlings is evaluated	Mitigation plan would be the sourcing of indigenous stocks for use by the hatchery A broodstock management plan would be developed	FAO will undertake an EIA	During project first year/start-up	Report of EIA containing recommendations on: 1) Proceeding with stocking or not 2) The steps to take to implement the mitigation pan 3) Monitoring requirements
		If risk are substantial and cannot be mitigated, then a no-stocking policy would be adopted.	Adequate numbers of broodstock would be needed to prevent inbreeding risks	DOF to source new broodstock is necessary	Prior to the breeding programme	Reports of broodstock sourcing activity
		If risks are minor or can be mitigated, then a mitigation plan would be implemented	A monitoring plan is developed for the hatcheries producing the fingerlings for restocking	Project and DOF will undertake monitoring	During breeding and fingerling production	Documentation of breeding programme
ESS 3	None identified	n/a	n/a	n/a	n/a	n/a
ESS 4	None identified	n/a	n/a	n/a	n/a	n/a
ESS 5	None identified	n/a	n/a	n/a	n/a	n/a
ESS 6	None identified	n/a	n/a	n/a	n/a	n/a
ESS 7	None identified	n/a	n/a	n/a	n/a	n/a
ESS 8	None identified	n/a	n/a	n/a	n/a	n/a
ESS 9	None identified	n/a	n/a	n/a	n/a	n/a

ANNEX 6: RISK CLASSIFICATION CERTIFICATION FORM

After completing the E&S screening checklist, the LTO completes and certifies this certification form.

Project symbol: GCP /MLW/053/LDF
Project title: Building Climate Change Resilience in the Fisheries Sector in Malawi

A. RISK CLASSIFICATION

Low Moderate High

1. Record key risk impacts from the E&S Screening Checklist

A. Potential genetic/biodiversity risk of use of mixed tilapia strains, not pure Chambo in the hatcheries producing fingerlings for restocking.

B.

C.

D.

2. Has the project site and surrounding area been visited by the compiler of this form?

Yes No

B. STAKEHOLDER CONSULTATION/ ENGAGEMENT

Identification of stakeholder(s)	Date	Participants	Location
18 focus group discussions (FGDs) Climate change vulnerability assessment	22/02/2015 - 06/03/2015	18 groups with participants ranging from 15 to 40. Approximately 350 community members, with a special effort to include women in the conversations	Mangochi (4), Salima (4), Nkhotakota (5) and Karonga (5) 12 villages : Mankhijira, Ntiya, Katuli, Chapola, Mwalija, Malembo, Simon, Makawa, Limbundugwa, Chikuluma, Nawanga and Magamba
Individual stakeholder interviews	22/02/2015 - 06/03/2015	121 people interviewed (90 men, 28 women and 3 companies (private sector)	Mangochi, Salima and Karonga
Local govt. Consultations		District Executive Committees (DEC) and District Environmental Sub-Committees (DECS)	Mangochi & Machinga Districts
:Local Govt. Consultations	(March 6 to 9, 2015)	Local DoF entities, District Government, Private sector and selected communities	Mangochi District
Dedicated technical workshops	March 2015 to August 2015	Technical experts, various institutions incl.: DoF, LUANAR, Zomba University, FAO etc.	Lilongwe & Mangochi Districts

National level consultations		Other projects in various ministries, Donors esp. The FISH project and USAID, possible co-financiers and key players in the climate change field (DCC, DEM, UNDP, World Fish)	National Level
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1. Summarize key risks and impacts identified from the stakeholder engagement

- Illegal fishing during closed season: since most people depend on the lake as their main source of income, they are forced to continue fishing during the closed season to generate income hence it was suggested that communities should be supported to diversify their income-generating activities (IGAs).
- Habitat degradation due to siltation: this is triggered by cutting off of trees from the forest for cultivation, settlement and firewood in the catchment area and was attributed to the coming in of immigrants on government program on “*kuzigulila malo*” whereby people are being transferred from the southern region to settle in Mangochi.
- Non-functioning Beach Village Committee: Fishers perceived that the BVCs were not functional. due to high power conflicts with Fisheries Officers as they interfered with their work i.e. allowing illegal fishers to fish or tipping off illegal fishers when the enforcement routines are scheduled. There is also lack of incentives for the BVCs members and resources as well as poor selection method for BVCs ending up with unrepresentative group. As a remedy, it was proposed that power has to be devolved to the communities to be doing some of the enforcements.
- Water shortage: Water is a prerequisite success element for any aquaculture intervention. Without which no fish can be grown and hence there wouldn't be any fish supplied. Fish farmers rely mostly on rainfall to provide them with the much needed water for fish production. With the current changes in weather patterns, especially the change to low rainfall in both intensity and period, most fish farms may not be able to receive enough water to sustain their aquaculture production. Most rivers which were running throughout the year are now drying up soon after the rains stops, ground water reserves have also tremendously reduced to lower levels and hence farmers who relied much on these water sources are suffering the harm. As a solution, there is a need of coming with water harvesting techniques such as construction of water reservoirs and boreholes and aquaculture farms should utilize the Lake as source of water by pumping.
- Lack/ inexpensive quality fingerlings: Fingerlings are mostly obtained from ponds after harvest, from the wild or obtained free (or purchased) from Government stations and fellow friends. Lack of genetic management and poor hatchery procedures have significantly degraded the performance of many farmed species through inbreeding, genetic drift and uncontrolled hybridization, hence a need of upgrading some fish farmers to be fingerling producers at least one at a district level.

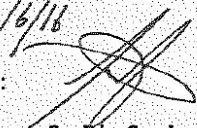
2. Have any of the stakeholders raised concerns about the project?

- Moratoria for the project should be clearly defined, whether it will be banning on illegal gears or having closed season. Previous efforts on different kinds of moratoria proved futile, it is important to come up with ways that will make this one work.
- Implementation process needs to give room for discussions with political leaders and communities to get their buy-in.
- There is need to add an economic analysis to present the opportunity cost of the moratoria. Indicative figures can be used but an extensive research is required to inform decision on policy reforms or buy-in.
- The project should look at the whole catchment area of the riparian systems in coming up with mitigation measures of climate change because what is happening in the catchment area will also affect the Lake basin. Changes in Lake are also affected by Agriculture practices in the catchment area.

- There is also a need for international involvement especially those that borders the lake as they can also impact on the Lake.

The LTO confirms the information above

Date: 10/6/16

Signature: 

Simon Funge-Smith, Senior Fishery Resources Officer, FIAF, FAO Fishery and Aquaculture Department

ANNEX 7: TERMS OF REFERENCE OF PROJECT MANAGEMENT UNIT STAFF

1) National Project Coordinator (DoF-funded, full time)

Background

The National Project Coordinator (NPC) will be a nationally recruited expert selected based on an open competitive process. He/She will be responsible for the overall management of the project, including the mobilization of all project inputs, supervision of project staff, consultants and sub-contractors. The NPC will report to the Director of Fisheries at DoF in close consultation with the FAO CTA for all of the project's substantive and administrative issues. From the strategic point of view of the project, the NPC will report on a periodic basis to the Project Steering Committee (PSC). Generally, the NPC will be responsible for meeting government obligations under the project, under the project execution modality. He/She will perform a liaison role with the Government, FAO and other UN Agencies, NGOs and project partners, and maintain close collaboration with other donor agencies providing co-financing.

Terms of Reference:

- Manage the PMU at DoF for the relevant FAO/GEF project;
- Supervise and coordinate the production of project outputs, as per the project document;
- Mobilize all project inputs in accordance with FAO procedures for nationally executed projects;
- Supervise and coordinate the work of all project staff, consultants and sub-contractors;
- Coordinate the recruitment and selection of project personnel;
- Prepare and revise project work and financial plans, as required by DoF and FAO;
- Facilitate administrative backstopping to subcontractors and training activities supported by the Project;
- Oversee and ensure timely submission of the Inception Report, Combined Project Implementation Review/Annual Project Report (PIR/APR), Technical reports, quarterly financial reports, and other reports as may be required by FAO, GEF, DoF and other oversight agencies;
- Disseminate project reports and respond to queries from concerned stakeholders;
- Report progress of project to the steering committee, and ensure the fulfilment of steering committee's directives.
- Oversee the exchange and sharing of experiences and lessons learned with relevant community based integrated conservation and development projects nationally and internationally;
- Ensures the timely and effective implementation of all components of the project;
- Assist community groups, municipalities, NGOs, staff, students and others with development of essential skills through training workshops and on the job training thereby upgrading their institutional capabilities;

Qualifications

- A university degree (MSc/MPhil or PhD) in Natural Resources Management, Conservation or Protected Areas Management, related fields, Environmental Sciences, or related fields of expertise

- At least 10 years of experience in natural resource management and/or co-management
- At least 5 years of project/program management experience;
- Ability to effectively coordinate a large, multi-stakeholder project;
- Ability to administer budgets, train and work effectively with counterpart staff at all levels and with all groups involved in the project;
- Strong drafting, presentation and reporting skills;
- Strong computer skills, in particular mastery of all applications of the MS Office package and internet search;
- Excellent command of English

Duration: 60 month fulltime, based at DoF Office in Mangochi

2) Chief Technical Advisor (LDCF-funded, full time)

Background

The Malawian Department of Fisheries, through the GEF financed Support Project to “build resilience of fishing communities to Climate Change”, benefits from FAO’s Technical Assistance Services. The project will be responsible for the implementation of important interventions in the field of fisheries development and management in the context of climate change.

Terms of Reference: The CTA will be the technical support to the National Project Coordinator on all issues relating to project implementation. In this respect, in close collaboration and discussion with the NPC, he/she will be responsible for:

- Supporting the preparation of the project’s inception meeting;
- Preparing ToR for project staff;
- Preparing Letters of Agreement and other contractual arrangements for implementation of project activities;
- Developing the project’s Monitoring and Evaluation (M&E) plan and corresponding M&E matrix, and overseeing its implementation including the timely and accurate measuring of indicators, the analysis of the resulting information and its effective use as a support to adaptive management of the project;
- Monitoring the progress of work of the entire project and supporting preparation of stipulated reports;
- Monitoring the project expenditures in close cooperation with the budget holder;
- Specifically assist with the technical formulation of key outputs, such as the Code of Conduct/ Guidelines on Climate Resilient aquaculture, development of the policy influencing strategy, and other technical aspects as appropriate;
- Coordinating the improvement of the political and legal framework for fisheries and aquaculture management (including co-management);
- Programming and supervising field development activities (co-management mechanisms, aquaculture, enhanced fisheries, research and monitoring);
- Assisting in the preparation and organization of training and specific studies on fisheries and aquaculture development and management;
- Liaising with other relevant fisheries and aquaculture projects, or fisheries and co-management components of other projects, for Lakes Malawi and Malombe;

- Together with the National Project Coordinator, representing the project at high-level meetings as well as Management Committee Meetings, and other fora if and when required;
- Preparing a final report and other reports as required by FAO, the Directorate of Fisheries and GEF Secretariat;
- Perform other duties identified in discussion with the National Project Coordinator, as required within the scope of the project.

Qualifications

- University education (MSc or PhD) with expertise in the area of Natural Resources Management, Fisheries (Co-) Management, Fisheries Science, Aquaculture Management, Environmental Sciences, or related fields of expertise;
- At least 5 years of professional experience, of which at least 3 at international level;
- Considerable professional experience in Africa, preferably in Southern Africa.
- Experience on the African Great Lakes will be a strong asset.
- Experience in the management and implementation of large (development) projects, including the design and implementation of monitoring systems,
- Previous experience with GEF projects is an added advantage;
- Ability to effectively coordinate a large, multidisciplinary team of experts and consultants;
- Demonstrated flexible cross-cultural team spirit, diplomatic and negotiation skills
- Be an effective negotiator with excellent oral and presentation skills;
- Excellent command of the English language.

Duration: 24 month fulltime, 36 month part-time, based at DoF Office in Mangochi

3) Communication and Outreach Specialist (DoF funded, full time)

Background

The overall objective of the post is to support the project to generate awareness and ensure the dissemination of information among all key stakeholders regarding the objective, principles, strategies of the project, and lessons learnt in the course of its implementation, as well as specifically raising awareness regarding the conservation and management of fisheries resources in general and Chambo in particular, taking into account the vulnerability of these communities with respect to climate change.

Terms of Reference: Specifically, the specialist will;

- Provide support to the project in preparation of a communication strategy using tools that are compatible with the needs and conditions of the different target groups;
- Participate and co-facilitate a number of workshops on communication in relation to knowledge transfer on co-management, habitat restoration, etc.;
- Preparation of presentation and facilitation materials and tools, actual facilitation and inputs to project workshops' outputs and deliverables;
- Improve public awareness and media campaigns raising awareness on lake management issues (including fisheries and aquaculture related matters) in relation to climate change;
- Draft the TORs for the Chambo Campaign consultancy (private sector), and help

- integration with the Mangochi College Communications and Outreach Unit;
- Provide support in conducting vulnerability and wealth assessment workshops at community level;
- Development of specific communication materials and knowledge products which could include brochures, radio messages, tv-spots, social media messages, posters, etc.;
- Perform other duties as required.

Qualifications:

- University degree: ideally advanced university degree (Master's or equivalent) in communication, journalism, information technology or other related field with a minimum of five years of relevant experience, preferably in environmental education/awareness or related field.
- Excellent communication skills in English at professional level (in reading, writing and communicating) as well as in Chichewa.
- Technical knowledge in journalism and production of various types of knowledge products.
- Familiarity with fisheries sector, climate change and other environmental issues.
- Additional years of professional experience in the directly related field can substitute the advanced university degree (Basic degree is a requirement.).

Duration: 60 month fulltime, based at DoF Office in Mangochi, with field-based stationing

4) Research/fisheries adviser (LDCF-funded, part time)

Background

The overall objective of the post is to coordinate and advise the project's support to information generation under Component 1, and the technical aspects of the project's support to fisheries management under Component 3.

Terms of Reference: Specifically, the specialist will;

- Advise on fisheries-related aspects of the Vulnerability and Disaster Risk Assessments (VDRAs) foreseen under Output 1.1.1
- Oversee collaboration between the project and research institutions (in Government and academia) in the generation of information resources on ecological parameters determining management and resilience options in and around Lake Malombe, including the formulation and application of an agenda for knowledge generation, under Output 1.1.2.
- Provide advisory and coordination support to the strengthening of fisheries monitoring systems under Output 1.1.4
- Advise on the development and application of mechanisms for the dissemination and input of knowledge into adaptive management, under Output 1.1.5, in support to the Communication and Outreach Specialist.
- In collaboration with the Climate Change and Natural Resource Management (CC/NRM) Specialist, advise on fisheries-related aspects in the formulation of the updated restoration plan for Lake Malombe, including risk assessment (Output 3.2.1) and its implementation (Output 3.2.2)
- In collaboration with and support of DoF, other Government and District authorities,

local communities, research institutions and private sector as appropriate, oversee the implementation of the restocking programme for healthy native chambo (Output 3.2.3)

- Provide additional advisory support as required to the DoF Aquaculture and Marketing Specialist.
- Perform other duties as required.

Qualifications:

- University degree: ideally advanced university degree (Master's or equivalent) in fisheries with a minimum of five years of relevant experience.
- Excellent communication skills in English at professional level (in reading, writing and communicating).
- Familiarity with climate change, natural resource management and livelihood issues in relation to fisheries.
- Additional years of professional experience in the directly related field can substitute the advanced university degree (Basic degree is a requirement.).

Duration: XX month [part time] spread over the full duration of the project, based at DoF Office in Mangochi, with field-based stationing

5) Tilapia aquaculture and marketing specialist (DoF funded, full time)

Background

The overall objective of this post is to coordinate the project's actions in support of Outcome 3.3, in relation to the promotion of the climate-proofing of aquaculture and of its contribution to climate-change resilience of local livelihoods.

Terms of Reference: the specialist will, in collaboration with other team members (DoF- and LDCF-funded), CSO, research institutions, private sector, cofinanced projects and other partners:

- Support the development and implementation of an aquaculture resilience plan (Output 3.3.1), in collaboration in particular with the research/fisheries adviser and the climate change/natural resource management adviser
- Provide advisory and coordination support to the formulation and implementation of action learning, knowledge generation and capacity development programmes for aquaculture (Outputs 3.3.2 and 3.3.3)
- Perform other duties as required.

Qualifications:

- University degree: ideally advanced university degree (Master's or equivalent) in aquaculture with a minimum of five years of relevant experience, including practical experience in tilapia industry.
- Excellent communication skills in English at professional level (in reading, writing and communicating).
- Familiarity with tilapia production, marketing, and livelihood issues in relation to aquaculture.
- Additional years of professional experience in the directly related field can substitute the advanced university degree (Basic degree is a requirement.).

Duration: 60 month fulltime, based at DoF Office in Mangochi, with field-based stationing

6) Climate change and natural resource management specialist (LDCF-funded, part time)

Background

The overall objective of this post is to ensure that the project incorporates climate change considerations effectively into its strategies and operations, and to advise on natural resource management issues in general of relevance to the fisheries, ecosystem management and livelihoods, with particular attention to climate change.

Terms of Reference: the specialist will:

- Collaborate with and advise other project and DoF members, particularly the fisheries and monitoring specialists, on the development of the climate and environmental monitoring and early warning (EWS) systems foreseen as Output 1.1.3.
- Advise on strategies for climate-proofing fisheries, aquaculture, water management and related farming system components among the target population, under Component 3.
- Advise on the incorporation of issues related to climate change and natural resource management into the capacity development programmes to be supported by the project at institutional and community levels, under Components 1 and 3.
- Ensure that indicators related to natural resource management are measured in an accurate and timely manner, and communicated effectively to the CTA and NPC, in accordance with the provisions of the M&E plan.

Qualifications:

- University degree: ideally advanced university degree (Master's or equivalent) in natural resource management, specific knowledge and understanding of fisheries and climate change, with a minimum of five years of relevant experience.
- Excellent communication skills in English at professional level (in reading, writing and communicating).
- Additional years of professional experience in the directly related field can substitute the advanced university degree (Basic degree is a requirement.).

Duration: XX month [part time] spread over the full duration of the project, based at DoF Office in Mangochi, with field-based stationing

7) Socioeconomic, gender and governance specialist (DoF-funded, full time)

Background

The overall objective of this post is to ensure that the project makes adequate provision in all of its operations for the consideration of aspects of livelihood sustainability, gender, governance and participation.

Terms of Reference: the specialist will:

- Facilitate the development, application and oversight of the project's stakeholder participation plan
- Facilitate the development, application and oversight of the project's gender strategy
- Advise, plan, coordinate and oversee the interactions between the project (and all of its members, consultants and contractors) and local communities in the target area in

order to ensure that these are carried out in accordance with the provisions of the stakeholder participation plan and, in general, provide for the effective participation of all relevant stakeholders as well as respecting social conditions and cultural norms and contributing the governance conditions.

- Advise on the incorporation of considerations of livelihood sustainability into the project's actions in support of technology development and transfer, and capacity development.
- Advise on the planning and implementation of the project's monitoring system, in relation to socioeconomic variables (especially those related to governance, livelihoods, participation and gender), and oversee the measurement of indicators related to these variables are measured in an accurate and timely manner, and communicated effectively to the CTA and NPC, in accordance with the provisions of the M&E plan.
- Advise on the development and application of strategies for conflict management, as necessary.

Qualifications:

- University degree: ideally advanced university degree (Master's or equivalent) in social sciences, with specific knowledge and understanding of natural resource-based livelihoods, participation, governance and gender.
- Excellent communication skills in English at professional level (in reading, writing and communicating).
- Additional years of professional experience in the directly related field can substitute the advanced university degree (Basic degree is a requirement.).

Duration: 60 month fulltime, based at DoF Office in Mangochi, with field-based stationing

8) Operational support officer (LDCF-funded, full time)

Scope

This position is part-time over the entire duration of the Project and will be based at the project office in Mangochi. Total input: 60 months

Tasks

Under the direct supervision of the NPC, the Operations and Administrative Officer will have the following responsibilities and functions:

- Ensure smooth and timely implementation of project activities in support of the results-based work plan, through operational and administrative procedures according to FAO rules and standards;
- Coordinate the project operational arrangements through contractual agreements with key project partners;
- Arrange the operations needed for signing and executing Letters of Agreement (LoA) with relevant project partners;
- Maintain inter-departmental linkages with FAO units for donor liaison, Finance, Human Resources, and other units as required;

- Day-to-day manage the project budget, including the monitoring of cash availability, budget preparation and budget revisions to be reviewed by the NPC;
- Ensure the accurate recording of all data relevant for operational, financial and results-based monitoring;
- Ensure that relevant reports on expenditures, forecasts, progress against work plans, project closure, are prepared and submitted in accordance with FAO and GEF defined procedures and reporting formats, schedules and communications channels, as required;
- Execute accurate and timely actions on all operational requirements for personnel-related matters, equipment and material procurement, and field disbursements;
- Participate and represent the project in collaborative meetings with project partners and the Project Steering Committee, as required;
- Undertake missions to monitor the outputs-based budget, and to resolve outstanding operational problems, as appropriate;
- Be responsible for results achieved within her/his area of work and ensure issues affecting project delivery and success are brought to the attention of higher level authorities through the BH in a timely manner;
- In consultation with FAO Evaluation Office, the LTU, and FAO-GEF Coordination Unit, support the organization of the mid-term and final evaluations, and provide inputs regarding project budgetary matters;
- Provide inputs and maintain the FPMIS systems up-to-date; and
- Undertake any other duties as required.

Qualifications

- University Degree in Economics, Business Administration, or related fields;
- Three years of experience in project operation and management related to natural resources management, including field experience in developing countries;
- Proven capacity to work and establish working relationships with government and non-government representatives;
- Excellent communication skills in English at professional level (in reading, writing and communicating).
- Knowledge of FAO's project management systems is an advantage.

ANNEX 8: GENDER STRATEGY COMPONENTS

Strategy	Gender considerations	Possible negative gender implications of CCA strategies	Potential positive gender implications of CCA strategies	Strategies for optimizing gender implications
CC resilient fisheries and aquaculture policy	<ul style="list-style-type: none"> - Malawi's fisheries laws reflect gender and any new policy should be mindful of gender impacts - The developed of the Aquaculture Code of Conduct should mainstream gender, considering the below outlined gender aspects 	<ul style="list-style-type: none"> - Policies and laws have profound impacts on the sector and people, without adequate inclusion of women may exacerbate power imbalances by giving men greater access to opportunities than women 	<ul style="list-style-type: none"> - Well-designed policy with a strong gender lense can significantly help improve women's situation and engagement in the fisheries sector 	<ul style="list-style-type: none"> - Conduct more formal gender assessment and monitoring as integral part of policy development process
Support to development of national, district and sub-district development plans and budgets	<ul style="list-style-type: none"> - Depends on composition of relevant Government departments – responsibilities - and powers – mostly in hands of men 	<ul style="list-style-type: none"> - Investment without adequate consideration and understanding of gender aspects may exacerbate power imbalances by giving men greater access to opportunities than women 	<ul style="list-style-type: none"> - Increasing women's engagement in policy processes will improve engendered decision-making - Mainstreaming gender into planning and budgeting can influence women empowerment 	<ul style="list-style-type: none"> - Support improved participation of communities and increased participation of women in the formulation of development plans and budget.
Strengthened technical capacities (producers, and local, provincial and national government)	<ul style="list-style-type: none"> - Men and women have the technical knowledge – efforts are made to include women in workshops and in sharing experience. 	<ul style="list-style-type: none"> - Strengthening of technical capacities without adequate inclusion of women may exacerbate power imbalances by giving men greater access to opportunities than women - Women might be used as token too engage with other women in the project, but not receive the respect and powers to become a fully empowered team member 	<ul style="list-style-type: none"> - Strengthening of women's capacities has the potential to give them access to productive options capable of increasing their economic status and of ensuring the sustainability of the activities on which they depend - Women as part of the project team will be able to engage with other women more effectively, and may be more accepted in the cultural context to work with other women 	<ul style="list-style-type: none"> - Hire women professionals as part of project team - Specifically include women in workshops and trainings Increase the role of women in decision making

Strategy	Gender considerations	Possible negative gender implications of CCA strategies	Potential positive gender implications of CCA strategies	Strategies for optimizing gender implications
			(esp. in pre-dominantly Muslim communities)	
Engagement of women in project	<ul style="list-style-type: none"> - The project area is predominantly inhabited by Muslim communities and social norms are guided by religious believes and accepted roles and behaviours - The fisheries value chain is engendered and gender specific, and in the case of the Mangochi area clearly influenced by religion guided gender roles and believes. Where elsewhere women are often more prominently included in the fisheries value chain, this seems to be lesser so in the project area 	<ul style="list-style-type: none"> - Complex gender norms need to be taken into consideration in all project activities - Certain project activities may not be acceptable for women to be carried out 	<ul style="list-style-type: none"> - Potential for specific women engagement and empowerment 	<ul style="list-style-type: none"> - Specifically include women in project team, if possible even of Muslim believe to better be able to engage meaningfully with local communities' esp. women. Weigh up and manage against risks that are associated with a Muslim women's limitations to assert themselves against male counterparts and project stakeholders.
Focus on fisheries versus integration with e.g. agriculture	<ul style="list-style-type: none"> - Women are less involved in fisheries professions, but are responsible for agriculture - They are the land owners and custodians of the land - Land-based work, i.e. agriculture, is considered labour intense and revenue/ benefits are generated only after a long period, unlike in fisheries, where you can generate income daily. This impacts on how women versus men manage their (financial) resources, and e.g. positions women needs in terms of micro-finance options differently. 	<ul style="list-style-type: none"> - Focus on fisheries and aquaculture may further disadvantage women as they are largely cut out of the fisheries value chain 	<ul style="list-style-type: none"> - Potential to work with women esp. in aquaculture context as they already have skills and behaviours stemming from their responsibilities in agriculture that make them "carers". They can understand that fish farming is a longer-term investment and likely are more perceptive to responsible fisheries and sustainability thinking 	<ul style="list-style-type: none"> - Analyse women's skills and behaviour as agriculturalists and harness for aquaculture strategy - Elevate and harness women's role as resource custodians - Elevate and harness women's role as HH lead for food and nutrition

Strategy	Gender considerations	Possible negative gender implications of CCA strategies	Potential positive gender implications of CCA strategies	Strategies for optimizing gender implications
EAFA & EBA based fisheries rehabilitation and habitat restoration Fish conservation zones	<ul style="list-style-type: none"> - Men go fishing with boats and gear (nets) on Lake Malombe - Women mostly get involved with marketing and selling fisheries product to and on the local market - Men are mostly involved in trading with further away markets such as Blantyre and Lilongwe - Women are in charge for processing the product (processing is done at HH level), but often have male labour available - Men are in charge for maintaining and repairing fishing gear 	The creation of fish conservation zones and fishing moratoria will limit men and women's access to fisheries resources temporarily and therefore decrease HH incomes and food availability	<ul style="list-style-type: none"> - Women and men can get involved in implementing EbA measures and potentially be remunerated for such labour - Improved and sustained quantities of fish could result in an improved capacity to generate income through selling and processing - The creation of fish conservation zones could result in availability of other aquatic products, which may be targeted by women 	<ul style="list-style-type: none"> - Provide alternative livelihood during the early stages of fish conservation zones to compensate for possible loss of income - Involve women in decision-making on fish conservation zones
Strengthened community-level governance	<ul style="list-style-type: none"> - Women are included in community level governance, although often in specific women's groups rather than integrated governance bodies, guided by pre-dominantly Muslim cultures - The village headmen, elders and Ta representatives are usually men. - Men have more governance power. - Women are represented on BVCs, though mostly less prominently than men 	- Strengthening of governance without gender considerations may exacerbate power imbalances, disproportionately restricting women's access to natural resources while failing adequately to control activities that negatively affect their interests	- With adequate female participation, strengthened governance can help to ensure that women's interests are protected (e.g. prevention of overexploitation of resources on which they particularly depend)	<ul style="list-style-type: none"> - Co-management of community group meetings: ensure women's participation in meetings and management decisions - Women's membership in BVCs - Specific trainings for women, and making an extra effort to meaningfully engage women in project activities at all levels
Fisheries resources co-management	<ul style="list-style-type: none"> - Women are part of decision making structures such as BVCs, however men are usually represented in greater numbers - Women are more concerned about law enforcement and regulation with 	- Women seem to find that they can be engaged in fisheries resources co-management, however power relations are still perceived to be male-dominated	- Potential for women to be involved and benefit indirectly from improved fisheries can be identified and capitalised on	- Conduct more formal gender assessment and monitoring as integral part of project design

Strategy	Gender considerations	Possible negative gender implications of CCA strategies	Potential positive gender implications of CCA strategies	Strategies for optimizing gender implications
	<p>g=regards to Fisheries laws, and complain about the “criminalisation” of the fisheries</p> <ul style="list-style-type: none"> - Women feel that “fisheries cowboys” steal their boys and make them into bad people (drugs, other) – this gives women a special motivation to change the current fisheries set-up 	<ul style="list-style-type: none"> - The project could result in increases in imbalances of power and resources between men and women - Restrictions to on Lake fishing may impact on men’s privileges such as cash incomes 		<ul style="list-style-type: none"> - Sharing of lessons learned from women’s involvement in fisheries co-management - Specific inclusion and empowerment of women as part of decision-making and governance bodies such as BVCs - Specific consideration of religious context - Training for women to take on technical and leadership roles in natural resources management and ecotourism; - Training for women on homestays; women tour guides and porters; promote organic/green tourism – organic vegetables, food preparation etc.
Aquaculture	<ul style="list-style-type: none"> - Currently few aquaculture investments along Lake Malombe - Lessons from community level aquaculture development in Malawi to be drawn 	<ul style="list-style-type: none"> - Pressure to participate in aquaculture could increase the workload for women - Gender specific role divisions in aquaculture may disadvantage women - With declining dependence on Lake derived fisheries, men may be disempowered in power relations, which may bring along conflict 	<ul style="list-style-type: none"> - Increased availability of protein for household consumption, reducing women’s workload in obtaining food from other sources - Increased opportunities to generate economic benefits for women through the sale of fish and derivatives. 	<ul style="list-style-type: none"> - Scope out in more detail if and how women can be positioned to take part in the aquaculture activities - Conduct more formal gender assessment and monitoring as integral part of project design - Involve and train women in production, design, processing and marketing of aquaculture products - Develop access and links to markets that specifically benefit women

ANNEX 9: PRELIMINARY CAPACITY NEEDS ASSESSMENT AND PLAN FOR KEY TARGET GROUPS

Key stakeholders	Location/ magnitude	Capacity needs	Capacity support approach elements
Department of Fisheries (DoF) (in the Ministry of Agriculture and Food Security) (national level)	National	<p>Knowledge: CC risks and opportunities to fisheries sector; Vulnerabilities of riparian communities; EAFA and EbA as adaption approaches</p> <p>Know-how: Planning and budgeting for long-term adaptation options; Development of climate resilient policy responses; Learning from local level demonstrations</p> <p>Resources: Investments into research and resource monitoring; Knowledge management systems; Effective outreach and extension approaches, including for law enforcement</p>	<ul style="list-style-type: none"> Professional updating events for high level managers Specific trainings for middle management and technical professionals Hands-on project implementation with national and international expert exchanges Site visits and exposure trips to project area Think tank as knowledge resource
DoF: Mangochi District Office	District	<p>Knowledge: CC risks and opportunities to fisheries sector in Mangochi District; Vulnerabilities of riparian communities in Mangochi District; EAFA and EbA as adaption approaches</p> <p>Know-how: Planning and budgeting for long-term adaptation options; Development of climate resilient policy responses; Learning from local level demonstrations; Technical know-how: restoration, aquaculture development, responsible fisheries, best practice in co-management, law enforcement; Effective outreach and extension approaches, including for law enforcement</p> <p>Resources: Infrastructure support: plant, offices, transportation, incl. for surveillance; Investments into research and resource monitoring; Knowledge management systems</p>	<ul style="list-style-type: none"> Professional updating events for high level managers Specific trainings for middle management and technical professionals Hands-on project implementation with national and international expert exchanges Responsibility delegated for project activities; oversight of site level interventions; agreed performance contract with PMU, incl. capacity development component (e.g. e-learning, other) PMU and National Think tank as knowledge resource Specific budget support for infrastructure priorities and investments
DoF: 4 sub-stations (Chimwala, Chapola, Kadewere, Upper Shire)	Sub-district	<p>Knowledge: Overview knowledge of CC risks and opportunities to fisheries sector in Mangochi District, Vulnerabilities of riparian communities in Mangochi District esp. those the individual extension officers are responsible for, EAFA and EbA as adaption approaches</p>	<ul style="list-style-type: none"> Specific trainings for field technicians Responsibility delegated for project activities; oversight of site level interventions; agreed performance contract with PMU, incl. capacity development component (e.g. e-learning, other)

Key stakeholders	Location/ magnitude	Capacity needs	Capacity support approach elements
DoF: 2 Aquaculture research stations (Domasi & Mzuzu)	National	<p>Know-how: Planning and budgeting for long-term adaptation options as part of BVC and VDCs; Participatory action research with local community members and stakeholders on issues related to the project; Technical know-how: restoration, aquaculture development, responsible fisheries, best practice in co-management, law enforcement</p> <p>Skills: Conflict management, gender approaches, facilitation of participatory processes, documentation and sharing of field results (digital/other)</p> <p>Resources: Infrastructure support: transportation, consumables Communication equipment such a mobile phones</p> <p>Knowledge & know how: CC risks and opportunities aquaculture development; Specifically identified technical issues such as on feed production; Lesson from the field: demonstrations on aquaculture, but also related to fingerling production and reinsertion into the wild Environmental safeguards</p>	<ul style="list-style-type: none"> • PMU and District level DoF staff, DoF research unit as knowledge resource
DoF: Fisheries research stations esp. Monkey Bay, but also Senga Bay	National <i>Monkey Bay near Mangochi</i>	<p>Knowledge: CC risks and opportunities to fisheries sector; Critical component research: fisheries resources and ecosystems; Effective fisheries health monitoring systems; Various other on CC: Vulnerabilities of riparian communities, EAFA and EbA as adaption approaches, CC monitoring in aquatic systems, CC impacts in aquatic systems, other TBD</p> <p>Know-how: Establishment of baseline values related to suitability of Lake Malombe for rehabilitation; Establishment of functional and effective EWS for fisheries health</p> <p>Resources: Investments into research and resource monitoring; Support to knowledge management systems; Support to research equipment and tools; Basic operational support</p>	<ul style="list-style-type: none"> • Professional updating events for high level managers • Specific trainings for middle management and technical professionals • Possibly site visits and exposure trips to project area • Think tank as knowledge resource • Specific trainings for middle management and technical professionals • Hands-on project implementation with national and international expert exchanges • Responsibility delegated for project activities; oversight of site level interventions; agreed performance contract with PMU, incl. capacity development component (e.g. e-learning, other) • PMU and National Think tank as knowledge resource
DoF: Fisheries college in Mangochi (Esp.	National <i>Located in Mangochi</i>	<p>Knowledge: General overview of CC risks and opportunities to fisheries sector, Vulnerabilities of riparian communities, EAFA and EbA as adaption approaches, overall project understanding</p>	<ul style="list-style-type: none"> • Responsibility delegated for project activities; oversight of site level interventions; agreed

Key stakeholders	Location/ magnitude	Capacity needs	Capacity support approach elements
Communications and Outreach unit)		<p>Know-how: Cutting edge outreach, communication and capacity development approaches for effective engagement of specific target groups; strategic communications, behavioural change, campaign design and implementation, social marketing</p> <p>Resources: Specific resources in relation to relevant project activities (possibly partnerships/ traineeship with relevant experts/firm responsible for campaign a.o.)</p>	<p>performance contract with PMU, incl. capacity development component (e.g. e-learning, other)</p> <ul style="list-style-type: none"> • Possible partnership/ traineeship with with relevant experts/firm responsible for campaign a.o.) • PMU and National Think tank as knowledge resource
District (Mangochi) governance structures; District Development Committees (DDCs)	District	<p>Knowledge: CC risks and opportunities to fisheries sector in Mangochi District; Vulnerabilities of riparian communities in Mangochi District and esp. around Lake Malombe; EAFA and EbA as adaption approaches; overall project understanding</p> <p>Know-how: Planning and budgeting for long-term adaptation options at district level; Development of climate resilient policy responses at district; Learning from local level demonstrations</p> <p>Resources: Special workshops, stakeholder consultations</p>	<ul style="list-style-type: none"> • Targeted policy influencing and communication plan • Specific briefings for relevant committees, individuals • Possibly technical workshops that coincide with policy processes and timelines • Policy round tables with representatives from sub-district level governance structures and individual community representatives • PMU and National Think tank as knowledge resource • Site visits and exposure trips to project area
District level enforcement agencies (DoF, but also police, magistrates, other)	District	<p>Knowledge: Overall project understanding; existing fishery laws and emerging by-laws at district and sub-district level</p> <p>Know-how: Understanding of specific roles and responsibilities of key institutions; joint planning and coordination of law enforcement and related responsibilities</p> <p>Resources: Special workshops, consultations, logical support if needed <i>A detailed capacity needs assessment to be undertaken during project implementation</i></p>	<p>- <i>A detailed capacity plan to be developed during project implementation</i></p>
Village governance structures; Village Development Committees (VDCs)	Sub-district	<p>Knowledge: CC risks and opportunities to fisheries sector relevant to aera; Vulnerabilities of riparian communities in around Lake Malombe and specific village; overall project understanding</p>	<ul style="list-style-type: none"> • Final capacity development plan to be scoped during project inception at sub-district level with relevant institutions

Key stakeholders	Location/ magnitude	Capacity needs	Capacity support approach elements
		<p>Know-how: Planning and budgeting for long-term adaptation options at village level; Development of climate resilient policy responses at village level; Learning from participatory action research, local level demonstrations, governance reforms and co-management; understanding of specific roles and responsibilities of key institutions</p> <p>Resources: Special workshops, stakeholder consultations, logical support if needed</p>	<ul style="list-style-type: none"> • Specific briefings for relevant committees, individuals • Facilitated multi-stakeholder dialogues and joint decision making • DoF and PMU as knowledge resource • Hands-on project implementation • Site visits and exchange visits to other VDCs around Lake Malombe • Gender awareness
3 Traditional Authorities (Chimwala, Chowe, Mponda)	Sub-district	<p>Knowledge: CC risks and opportunities to fisheries sector relevant to area; Vulnerabilities of riparian communities in around Lake Malombe and specific village; overall project understanding</p> <p>Know-how: Planning and budgeting for long-term adaptation options at village level; Development of climate resilient policy responses at village level; Learning from participatory action research, local level demonstrations, governance reforms and co-management; understanding of specific roles and responsibilities of key institutions</p> <p>Resources: Special workshops, stakeholder consultations, logical support if needed</p>	<ul style="list-style-type: none"> • Final capacity development plan to be scoped during project inception at sub-district level with relevant institutions • Specific briefings for relevant TA representatives • Facilitated multi-stakeholder dialogues and joint decision making • DoF and PMU as knowledge resource • Hands-on project implementation • Site visits and exchange visits to other TAs around Lake Malombe • Gender awareness
27 BVCs	Sub-district	TBD for each BVC curing project inception	<ul style="list-style-type: none"> • Final capacity development plan to be scoped during project inception at sub-district level with relevant institutions • <u>Key beneficiaries</u>
45 local fishing villages around Lake Malombe area	Sub-district	TBD for each BVC curing project inception	<ul style="list-style-type: none"> • Final capacity development plan to be scoped during project inception at sub-district level with relevant institutions • <u>Key beneficiaries</u>