



FINAL EVALUATION OF THE FISHERIES INTEGRATION OF SOCIETY AND HABITATS (FISH) ACTIVITY



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International Business & Technical Consultants, Inc. (IBTCI)
8618 Westwood Center Drive, Suite 400
Vienna, VA 22182

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Cover Photo: Fishers preparing their nets on Makawa beach in the South East Arm of Lake Malawi.

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ACRONYMS

ACARE	African Center for Aquatic Research and Education
BVC	Beach Village Committee
CA	Christian Aid
CDCS	Country Development Cooperation Strategy
CEPA	Centre for Environmental Policy and Advocacy
CISER	Community Initiative for Self-Reliance
CoP	Chief of Party
DEC	District Executive Committee
DFO	District Fisheries Officer
DoF	Department of Fisheries
DQA	Data Quality Assessment
ECRP	Enhancing Community Resilience Program
EI	Emmanuel International
ETOA	Environmental Threats and Opportunities Assessment
FA	Fisheries Association
FAO	Food and Agriculture Association
FISH	Fisheries Integration of Society and Habitats
FSTAP	Fisheries Science and Technology Advisory Panel
GoM	Government of Malawi
IUCN	International Union for Conservation of Nature
KII	Key Informant Interview
LUANAR	Lilongwe University of Agriculture and Natural Resources
MCF	Malawi College of Fisheries
M&E	Monitoring and Evaluation
NFARA	National Fisheries and Aquaculture Research Agenda
NJIRA	Pathways to Sustainable Food Security
NRM	Natural Resource Management
PFM	Participatory Fisheries Management
PMEP	Performance Monitoring and Evaluation Plan
REFRESH	Restoring Fisheries for Sustainable Livelihoods
SIRs	Sub-Intermediate Result
SOER	State of Environment Report
SOW	Scope of Work
TA	Traditional Authority
TOC	Theory of Change
UNDP	United Nations Development Program
URI	University of Rhode Island
USAID	United States Agency for International Development
VMS	Vessel Monitoring System
VNRMC	Village Natural Resource Management Committees
VSLA	Village Savings and Loans Association
WALA	Wellness in Agriculture for Livelihoods Advancements

EXECUTIVE SUMMARY

PROJECT BACKGROUND

USAID's Fisheries Integration of Society and Habitats (FISH) was a 5-year project specifically designed to align with Malawi's Growth and Development Strategy (MGDS) and to promote sustainable fisheries for improved livelihoods for communities living around Malawi's main lakes. FISH sought to address the drivers of over-fishing and degradation by improving mechanisms for local co-management of fisheries. The project had four main components:

1. Utilization of science, analysis, and information for decision making
2. Enabling environment for conservation and management of freshwater ecosystems enhanced.
3. Priority threats to freshwater ecosystem biodiversity reduced.
4. Adoption of climate change adaptation measures that support resilience of communities and freshwater ecosystems increased.

EVALUATION DESIGN, METHODS & LIMITATIONS

This FISH final evaluation covered the full period of implementation of the project. The Evaluation used a participatory mixed-method approach using both quantitative and qualitative techniques in gathering reliable primary and secondary data and valid evidence of project outcomes and impacts. The Evaluation was tasked to provide detailed answers to five questions, detailed below. Participatory methodology was applied to enable all stakeholders to actively take active roles in generating knowledge to test the fundamental assumptions underlying project design and implementation and capture lessons learned from FISH. The Evaluation consisted of four weeks in Malawi to assess the impacts of FISH's approaches under each of its four components in each of the four key ecological freshwater lake ecosystems, i.e. South-East and South-West Arms of Lake Malawi, Lake Malombe, Lake Chiuta and Lake Chilwa. FISH activities were conducted in four target districts that cover these water bodies, i.e. Mangochi, Balaka, Zomba and Machinga.

DATA COLLECTION METHODS

Document Review

The project's reports and other relevant documents, over 100 in total, were thoroughly reviewed during the Evaluation to assess the project's activities and achievements. In addition, the team accessed the voluminous amount of literature available of the fish and fisheries of the project's focus areas, plus the reports on previous projects in the focal areas that were of direct relevance to the project activities.

Key Informants Interviews and Focus Group Discussions (FGDs)

A questionnaire was used for one-on-one interviews with a variety of stakeholders including fisheries, fish processors, fish traders, the most relevant GOM ministries and agencies both at central and local levels, bi- and multilateral development partners supporting fisheries, livelihoods, and climate change adaptation activities in Malawi. The majority of the key organizations and individuals involved in the Project were interviewed. FGD with a total of 11 small groups of 6 to 11 BVC, VNRMC, RVC members were conducted at Lake Chilwa, Chiuta, Malombe, Upper Shire, South East Arm of Lake Malawi at Malindi and South West Arm at Malembo.

Expert Opinion Survey

Expert opinion was an important component of the Evaluation, with the senior Malawian scientists in DoF and Lilongwe University of Agriculture and Natural Resources (LUANAR) all consulted, as listed in Annex V. Also, in addition to the decades of practical experience of the Evaluation team itself in Malawi fisheries, the team consulted with other senior scientists with extensive experience not only in Malawi but also in

other African inland fisheries. These included, but were not restricted to, Prof OLF Weyl of the South African Institute for Aquatic Biodiversity, Prof IG Cowx of the University of Hull International Fisheries Institute, Prof GF Turner of the Department of Biological Sciences in Bangor University, North Wales, and Dr JGM Wilson, retired fisheries specialist with 45 years' experience in Malawi fisheries and natural resource management. This consultative approach was key to providing a comprehensive overview of the project's activities and achievements.

Mini Survey

The Evaluation team met and discussed the state of the fisheries informally with fishers and traders at beaches in each of the four main lake project areas.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The SOW provided five questions to be addressed during the final evaluation. These questions explored how the project had succeeded in addressing the primary objectives of FISH, which were to increase resilience to climate change and to improve biodiversity conservation through effective sustainable fisheries co-management.

EVALUATION QUESTION I

To what extent has FISH been able to increase social, ecological, and economic resilience of freshwater ecosystems and the people who depend on them. How robust was the Theory of Change (a reflection of program design) and project's objectives and components/interventions? What improvements/changes should be made to the Theory of Change to improve its design and management of future fisheries biodiversity programming in Malawi?

ANALYTICAL SUMMARY FOR QUESTION I

The FISH project built on previous projects that developed participatory management in the project area, notably MAGFAD, COMPASS and LEAD. National and local government officials, local communities and fishers are working together reasonably well to improve management of fisheries resources with co-management support from DoF, local governments, BVCs and Traditional Authorities. For some parts of the project area, the national and local government institutions together with the local communities share a realistic vision for Participatory Fishery Management (PFM) on co-management principles. This ties in with the system of Traditional Authorities and village governance together with the development of decentralization of government in the country. The FISH program built on the previous programs by greatly expanding training and capacity building activities in BVCs and VNRMCS.

In areas where the human population is extremely high, however, the pressure on natural resources is so high that the communities alone are unable at present to attain their goals. This is most notable along the shores of Lake Malombe, where illegal fishers continue to operate with impunity, fishery cpue is reported by DoF staff in Mangochi to continue to decline, and none of the brush parks set up by BVCs exist in practice. Fishers repeatedly targeted the latter at night who used them as fish aggregating devices (FADs), thereby achieving the opposite of what was intended. A similar situation exists along the western shore of the South East Arm of Lake Malawi, where intense fishing pressure is apparent and only one near-legal fishing net was observed (but numerous illegal nets) in visits to fishing beaches. Further evidence includes the photos in the aerial survey conducted by the project and the long-term direct experience of the consultants.

In contrast, in less populated areas such as the eastern side of the South East Arm, the fish sanctuaries and brush parks appear to be successful, notably in Malindi and Makanjira, and the communities are rightly proud of their activities (but see below).

In Lake Chiuta, the communities have long been successful in protecting the natural aquatic vegetation along the entire Malawi shoreline, thereby creating a very long natural brush park. Attempts by the FISH project to establish more formal sanctuaries were therefore unnecessary. The one hectare sanctuary reported at Njerwa Beach was traversed by a line of fish traps and a long gillnet when inspected by the Evaluation team and is therefore present in name only. It is also too small to have any impact on biodiversity or biomass. In Lake Chiuta, emphasis by extension workers would have been better placed on the much more meaningful importance of continuing to protect the natural vegetation along the length of the shoreline. In support of this observation, the fish biodiversity of Lake Chiuta has remained unchanged over the decades since the 1970s. Sampling by D. Tweddle for one to two days at Njerwa beach using a variety of methods in 1976, 1983, 1985, 1988, 1992 and 2013 yielded between 20 and 22 species on each occasion. The common factor for the stable biodiversity is the diverse aquatic habitat, notably the relatively stable shoreline emergent vegetation as a result of the control on beach seining by the community.

Studying the effectiveness of brush parks in conserving biodiversity and increasing fish biomass needs better methods than used to date. There is very high variability in results, with high variance of the means due to sampling errors, catchability of fish species and random distribution and movement of fish. The Evaluation Impact Report states that: “FISH research shows that there was no significant relationship ($p>0.05$) between brushpark density and two independent variables; fish biodiversity and species richness. This is somewhat surprising and differs from results of studies elsewhere. The high variability across variables within a small sample and short time period since brushpark installation may be contributing factor to this unexpected result.”

There are weaknesses in the sanctuary and brushpark monitoring, not only in the methods used, which were inadequate to fully document the fauna, but also in the identification of the species. This is evident in all the reports, e.g. the Lake Chiuta report, where use of the photographic guide and key to the species (Tweddle, 1983) would have led to improved reporting. The Chilwa and Chiuta reports group species, especially the mormyrids, cyprinids and cichlids that, if quantified separately, would give much better indications of the health of the biodiversity in the lakes.

More modern non-invasive methods of quantifying biodiversity should be used in future. One such system has been successfully trialed in Lake Malawi, i.e. the use of baited video camera footage to accurately quantify the fish species assemblages and sizes of the fish observed (OLF Weyl and A. van Wyk, pers. comm.). This method has been used in one of the sanctuaries established during the FISH project, at Nkhudzi Bay. The preliminary results (briefly presented in research seminars in SAIAB but not yet published) demonstrate the major impact of fishing on the stocks of the South East Arm in contrast to observations of the same species on the Mozambique shore of the lake.

The project's draft Evaluation Impact Report summarizes the project's progress towards achieving the project goal of increased, social, ecological, and economic resilience of freshwater ecosystems and the people who depend on them through the integration of fisheries management and biodiversity conservation with economic development objectives and improved local governance. That report highlights the successes and attempts to quantify the benefits, while this evaluation report is a separate study aiming to synthesize the results of the consultative process with all stakeholders both within and outside the project. In terms of socio-economic resilience, the impact report touches on the benefits of CSA, but not on fisheries benefits. The draft report states that “Annual revenue attributed to project intervention applying CSA technologies averaged Mk3.7m per household from 740 respondents which is 84% greater than income from agriculture in 2016 adjusting for inflation.” In total, over 8,000 were trained in CSA. The draft report also states emphasizes that “we can only indicate that success is based on a proof of concept rather than being geographically and demographically transformative.”

All components of the project fed into the Theory of Change in that the project supported the communities to develop management plans for their fisheries assets based on their shared experiences and advice from the project. The communities' activities feed into ecosystem based governance structures at Traditional Authority, District and Central government level. Reaching the goals specified by the Theory of Change It was handicapped, however, in key fishing areas such as Lake Malombe, and the South East Arm of Lake Malawi by the problems caused by the massive growth in human population and associated extreme pressure on the natural resources.

RECOMMENDATIONS FOR FUTURE PROJECT INTERVENTIONS BASED ON RESULTS FROM EVALUATION QUESTION 1

1. The outcomes from the project show a need for greater enforcement to provide support for the BVCs in the immediate future. This needs more funding support for both central and local governments, FISH played a remarkable role in directly engaging with the Parliamentary Committee on Agriculture, Irrigation and Water Development resulting in much greater understanding of the need for support by Government for the fisheries sector and for DoF activities and more of the same is needed. Future projects should continue advocacy efforts to influence fishery management policy at higher levels of central government to support the Department of Fisheries in addition to sharing revenue generated with local institutions. At local level, FISH has been active in promoting the devolution of fisheries functions to district councils. Fisheries are included in the districts' socio-economic profiles for 2017-2022, and FISH helped in inclusion of fisheries in district development plans. The councils are fully aware of and involved in the process being followed for ratification of the fisheries management plans and bylaws for the communities. In interview, the Director for Planning and Development for Zomba stressed the need for more funding support for fisheries activities at both district and departmental level.
2. FSTAP, NFARA and the Malawi Fisheries Repository need to be supported through the provision of an effective and sustainable funding mechanism. In addition, with many relatively new and inexperienced graduates employed in the fisheries sector, there is a need for mentoring by experienced fisheries scientists with extensive knowledge of African freshwater fisheries. . The composition of FSTAP needs to be revised to ensure that it contains sufficient technical expertise to influence research agendas and provide peer review for the translation of research results into sound management strategies.
3. Related to Recommendation 2, future projects should ensure that research strategies are developed to inform relevant management decisions, supported by a more active role of FSTAP in developing research plans that complement and influence the research agendas supported by the central government.

EVALUATION QUESTION 2

To what extent has increased participatory fisheries management (PFM) by artisanal and commercial fishers led to fish biodiversity conservation and livelihoods benefits, and women's empowerment? To what scale and scope have the sustainable fishing practices been adopted by the fishers and what are those practices? Are there other lessons learned from evaluating the Theory of Change, project implementation approaches that have broader applicability to fisheries biodiversity conservation for USAID Malawi and beyond?

ANALYTICAL SUMMARY FOR EVALUATION QUESTION 2

As stated in the mid-term review, the majority of stakeholders involved in the project are fully committed to implementation of PFM. They understand their respective roles in implementing PFM and their organizations coordinated responsibilities reasonably well. DoF has endorsed co-management and

community ownership of the PFM process and since the agreements to empower the BVCs to implement their bylaws, which have also been signed by the Ministry of Justice and Constitutional Affairs. Local government demonstrates its support through strengthened District Development Plans. FISH supported Fishery Associations and subFAs to represent multiple BVCs. Longer-term BVC sustainability remains uncertain, however, without FISH support. Long-term sustainability depends on legally empowered and financially secure BVCs operating in a more equitable revenue sharing environment among central and local governments. Other factors for success include prompt District Council approval and enforcement of BVC bylaws and more productive relationships with Traditional Authorities. It is evident from the field discussions that there is full recognition of these factors by Traditional Authorities (represented by village headmen in several of the BVC meetings) and in District Councils (notably in interview with the Director for Planning and Development in Zomba District). Successful co-management should continue to involve all such stakeholders in the process. Financial management training for BVCs was piloted at a late stage in the project. Illegal fishing remains a problem in the commercial trawl sector and requires major political commitment at a higher level to resolve the current critical situation.

RELEVANT RECOMMENDATIONS TO EVALUATION QUESTION 2

1. The FISH project has prepared the groundwork for future activities to rehabilitate fisheries of southern Lake Malawi and Lake Malombe. The partnership model has been successful in practice, BVCs that were established using methods developed during the project are generally successful, and therefore it is recommended that the PFM models developed during the project, including for example the 6-step process for establishing functional BVCs with their own management plans and bylaws, should be extended throughout Lake Malawi in the REFRESH project. The establishment of a network of community agreed sanctuaries is also a key component that should be implemented.
2. With commitment by Government at all levels to support PFM, the community structures established through the project should now form the focus for activities to effectively manage the fisheries. There are several steps to this approach. It is recognized that the BVCs have established their own bylaws, but these should be open to revision based on many potential factors. The viability of implementation is key, as if all fishers ignore bylaws there is little point to having them in place. Bylaws should also be subject to regular review to determine if they remain relevant. Bylaws should also be reviewed based on improved knowledge of the status of fisheries and the scientific basis for regulations. This requires close and productive relationships between the community organizations and DoF. Community structures need support also from government enforcement agencies such as the Police and the DoF when called upon to deal with issues such as recalcitrant fishers. The establishment of subFAs at district level should also be encouraged, coordination at a higher level, i.e. FAs at the ecosystem level, appears more problematic because of funding and transport issues to hold effective meetings.
3. While the project implementation approaches by FISH have broad applicability to fisheries management throughout Malawi and countries with similar management problems, the biodiversity conservation approach needs to be reviewed. Although the concept of establishing community-initiated sanctuaries and brush parks is theoretically sound, sanctuaries in the severely overfished areas where they are most needed are ineffective and ignored. This can be contrasted with the situation at Dwangwa in the central part of the lake, where the Dwangwa sugar estate creates an effective sanctuary approx. 12 km long with no beach seining allowed. As a result, chambo catches in the region are healthy and stable (JGM Wilson, per. comm.). Communities should be supported to install structures that prevent fishing rather than acting as FADs as has happened in Lake Malombe. The removal of destructive fishing gears from the fisheries, following the Lake Chiuta example of PFM, should be the highest priority for an effective PFM approach, as this would prevent the destruction of brush parks.

4. The biodiversity monitoring process in the project and the reported results are flawed. Future project interventions using PFM should link with conservation organizations, as is being done currently with the International Union for Conservation of Nature (IUCN), which has been collaborating with DoF scientists to identify Key Biodiversity Areas for implementation of conservation actions. If such a collaborative approach can be continued and extended, it will be more effective than the present efforts of individual BVCs. Improved monitoring methods are developing rapidly, and video recording has been successfully piloted in the fish sanctuary in Nkhudzi Bay (OLF Weyl and A van Wyk, pers.comm.). The initial (unpublished) results demonstrate the impact of the very high fishing pressure in the SE Arm of the lake in comparison with other parts of the lake such as the Mozambique shoreline.

EVALUATION QUESTION 3

To what extent has FISH built the capacity of the Department of Fisheries on increasing utilization of science, analysis and information for evidence based decision making in sustainable ecosystem based fisheries management? What strategic support to the Department is being appreciated and valued and would have been greatly valued and appreciated?

ANALYTICAL SUMMARY FOR QUESTION 3

The FISH project provided a great deal of support for DoF through development of teaching curricula at Malawi College of Fisheries (MCF), training workshops, and support for two postgraduate degrees. FISH also engaged in planning and participation in research programs aimed at developing fishery management plans and assessing impacts of initiatives such as establishment of fish sanctuaries and brush parks. The major achievement of URI's support to DoF was the publication of copious reports on all aspect of the project's activities. Those related to PFM will provide guidance to DoF for furtherance of PFM aims throughout the country. The project also established a vessel tracking system for the commercial fishing vessels on the lake in collaboration with DOF and the FAO/FiRM Project, The initiatives to improve access to information via the Malawi Fisheries Repository and to improve research coordination and planning through FSTAPFSTA and NFARA are noteworthy but are in need of further development and support for implementation and sustainability. Weaknesses in interpretation of research results are highlighted in this Evaluation report, as a result of over-reliance on computer models using inadequate short-term data and failure to consult extensive historical literature. Peer-review, consulting with senior fisheries scientists with extensive long-term experience in African freshwater fisheries would have resolved these issues.

RECOMMENDATIONS TO EVALUATION QUESTION 3

1. The recommendations contained in the follow-up REFRESH project document to provide additional support to DoF are endorsed by this Evaluation. This section of the REFRESH document highlights a major concern raised in this Evaluation and shows that it has been recognized by USAID/FISH: "Research also indicates that the knowledge and capacity base for decision making and sustainable fisheries management in Malawi is limited. Regular fish stock assessments are rarely undertaken, leading to a poor understanding of the effectiveness of previous participatory fisheries management approaches." Furthermore, the REFRESH document states: "...recognize that capacity building of the DoF and district councils goes beyond technical content and should include some infrastructural and/or material support depending on resource availability."
2. Support for sound fisheries research needs to be given greater recognition. The Malawi Fisheries Repository, FSTAP and NFARA need to be fully resourced. Furthermore, these resources need to be supported by an experienced panel of African freshwater fisheries experts who will provide peer review and ensure that they function effectively and address the needs of the fisheries sector. There is a potential role in this for the African Center for Aquatic Research and Education

(ACARE), under the guidance of Dr T Lawrence, although this organization is still in its infancy. The CoP for FISH is in communication with ACARE. There are many other scientists with extensive experience of African fisheries who are available for consultation, several of whom have been consulted during the course of this evaluation.

3. With Lake Malawi having the highest fish diversity of any African lake, accurate fish identification is essential to understand biodiversity conservation as well as fisheries trends. This has been neglected by DoF and attention needs to be paid towards correcting this gap in available expertise.

EVALUATION QUESTION 4

To what extent did FISH's partnership model (and the kind of FISH's partners) used in the implementation of FISH with regards to achieving the activity goals and reducing threats to wild-caught fisheries? To what extent did FISH engage the private sector and civil society in solving the challenges faced with threats to fisheries biodiversity and aquaculture?

ANALYTICAL SUMMARY FOR QUESTION 4

The project's partnership approach to PFM was successful. The different partners all brought their particular areas of expertise to the program, and in turn the training provided to the partners in fisheries issues developed their capacity to engage in broad-reaching natural resource participatory management. While there is inevitably variations in skill levels of the technicians employed by the different partners, the Evaluation team notes that all the BVCs, RVCs and VNRMCS interviewed had similar levels of knowledge and confidence in their empowerment whichever NGO was engaged in their training and support. Interviews with senior officers in all the NGOs revealed an excellent understanding of the issues and an appreciation for the concept of PFM and ecosystem based approach to fisheries provided by the project.

RELEVANT RECOMMENDATIONS TO EVALUATION QUESTION 4

1. The PFM model, with its six-step process for empowering the community committees, has been shown to work effectively and, importantly, is endorsed by all the committees interviewed. It should therefore, be extended throughout Malawi's fisheries areas.
2. The REFRESH project proposal is endorsed in its entirety by the Evaluation team. It recognizes the critical importance of strengthening capacity and resources for the Department of Fisheries and specifically notes the importance of working with the fisheries research units in Monkey Bay and Senga Bay. These research units should benefit from partnerships with recognized fisheries scientists with long experience in African inland fisheries and knowledge of the enormous changes that have taken place in those fisheries since the 1940s. There are several options for the involvement of experienced scientists. For instance, as stated above, ACARE, under the guidance of Dr. Lawrence, aims to coordinate research and fisheries restoration in African Great Lakes. Though it is still in its infancy it has the potential to draw on the expertise of skilled and experience scientists in Africa. Research undertaken in FISH demonstrated a much shorter time perspective that led to weaknesses in interpretation of research findings and resulting management recommendations.

EVALUATION QUESTION 5

To what extent did the integration of climate change and biodiversity in FISH's design and the 3C approach of co-location, collaboration and coordination with other USAID initiatives (e.g., Feed the Future): and b) other Development Partners efforts yield women's empowerment, livelihoods, (resilience) adaptation and biodiversity conservation benefits. To what extent did FISH practice adaptive program management? Were the findings, recommendations, and lessons learned from the mid-term evaluation taken into account during the remainder of the implementation period, and if so, what was the impact of any course corrections?

ANALYTICAL SUMMARY FOR QUESTION 5

The potential threats posed by global climate change to the fisheries of Lakes Chilwa and Chiuta are widely recognized, although in truth they are dwarfed by the local impacts of deforestation, flash flooding, siltation and pollution as a result of anthropogenic impacts. The rapidly burgeoning human population is putting severe stress on the aquatic ecosystems. The FISH project's 3C approach is bearing fruit and village committees (BVCs, RVCs, and VNRMCS) are active in attempting to stem and reverse the environmental devastation. With the capacity built up in the committees and in the technical staff of the partnering NGOs, and with continued support from other programs including those supported by USAID (e.g. PERFORM, ECRP, WALA, NJIRA and the Nsomba ndi Chuma project, as listed in the main body of this report), the project's activities should continue after the project, contributing to the goals of empowerment of communities and particularly women, livelihoods, and adaptation to changing environments.

The project was flexible in its approach and adapted well to changing circumstances. The recommendations of the mid-term review placed additional demands on the project. While they were sound recommendations, some were over-ambitious, notably for biodiversity surveys given the lack of taxonomic expertise available in Malawi to quantify the diversity, and in addition the absence of baseline data on the areas being studied. The time span was too short to detect any meaningful results.

RELEVANT RECOMMENDATIONS TO EVALUATION QUESTION 5

1. The project's 3C approach to coordinate and collaborate with numerous other initiatives by USAID and others working with similar community-orientated goals should be expanded to other Malawi fishery areas as proposed in the REFRESH project and endorsed here.
2. The recommendations in the mid-term review included Environmental Action Plans (EAP) that will form the basis for the respective DoF, FA and BVC fisheries management plans. A great deal of work will be needed to put such plans into practice. The mid-term review also recommended strategies to integrate management activities into a coherent, long-term plan to protect biodiversity, including a network of connected protected areas and prioritized restoration sites. Long-term conservation goals and set visions for achieving them over 5, 15, and 50 year periods were also recommended. These ideas need to be reviewed in the development of the REFRESH project as well as other projects and proposals such as the IUCN's identification of Key Biodiversity Areas for conservation. To conserve biodiversity a more pro-active and coordinated approach by all organizations, government, NGOs and private sector is needed, as the current dependence on the BVCs alone cannot work at present.

PROJECT BACKGROUND

Brief Country Context

The fisheries resources of Malawi, a landlocked country in Southern Africa, are facing severe economic and environmental threats. These threats have been recognized since the 1980s (e.g. Tweddle et al., 1995; Banda et al., 1996; Weyl et al., 2010).¹ Both forestry and fisheries resources have experienced intense

¹ Banda, M., Tomasson, T. & Tweddle, D. (1996). Assessment of the trawl fisheries of the South East Arm of Lake Malawi using exploratory surveys and commercial catch data. *In* Stock assessment in inland fisheries, edited by Cowx, I. Fishing News Books, 53-75.

Tweddle, D., Turner, G.F. & Seisay, M. (1995). Changes in species composition and abundance as a consequence of fishing pressure in Lake Malombe, Malawi. *In* The impact of species changes in African lakes, edited by Pitcher, T.J. & Hart, P.J.B. Chapman and Hall, London, 413-424.

overexploitation due to ever increasing population which currently is at 17.9 million. Fisheries is one of the important sectors for economic growth, food security, employment and improvement of people's livelihoods in Malawi. Capture fisheries prevalent in the five main water bodies of the country, including Lake Malawi (24,208 km²), Lake Malombe (390 km²), Lake Chilwa (1,800 km²), Lake Chiuta (200 km²) and lower and upper sections of Shire River (820 km²). These fishery resources are experiencing enormous pressure due to high and unsustainable exploitation rates and climate variability. The major fisheries are in Lakes Malawi, Malombe, Chilwa and Chiuta and the Lower Shire River.

The fisheries sector is one of the main sources of employment, food and income for over 1.6 million Malawians. The sector contributes about 4% to the country's Gross Domestic Product (GDP), 40% of the total protein supply for Malawians; and provides employment to over half million people (Annual Economic Report, 2016). The Malawi fisheries experienced considerable decline with catch reduction fluctuating from an average of 60,000 metric tons in in the mid-seventies to close to 49,000 by 2003. The fisheries of Lakes Malawi, Malombe, Chilwa, and Chiuta provide employment for 60,000 fishers and another 450,000 individuals involved in fish processing and domestic trade. They also contain 15% of global freshwater fish biodiversity. However, these fisheries are under considerable stress from a growing population, over-fishing, and environmental degradation, complicated by the effects of climate change.

Brief FISH Background

USAID's Fisheries Integration of Society and Habitats (FISH) was specifically designed to align with Malawi's Growth and Development Strategy (MGDS) and to promote sustainable fisheries for improved livelihoods for communities living around Malawi's main lakes. The project period was 5 years, from 9 September 2014 to 19 September 2019. FISH was one of the key activities under "Development Objective 2 (DO2): Sustainable Livelihoods Increased" of USAID Malawi's Country Development Cooperative Strategy (CDCS). USAID wishes to evaluate the overall performance of the project over its 5-year lifespan. FISH sought to address the drivers of over-fishing and degradation by improving mechanisms for local co-management of fisheries, using the following four main components:

Component A1.

Utilization of science, analysis, and information for decision-making. This component focuses on gathering information on Malawi fisheries and making it available on a wider scale through a database; research to understand the current threats faced by the industry and options to improve conservation; and obtaining a better understanding of the effects of climate change on Malawi's lakes and potential fisheries management options to increase resilience to those climate impacts.

Component B2.

Enabling environment for conservation and management of freshwater ecosystems enhanced. This component focuses on ensuring an enabling legal framework for sustainable fisheries management and biodiversity conservation; greater transparency, representation, and accountability in decision-making with regard to fisheries; and building institutional and community capacities for shared fisheries management (co-management) between local communities and local/national authorities.

Component C3.

Priority threats to freshwater ecosystem biodiversity reduced. This component is focused on addressing key threats to fisheries ecosystem biodiversity conservation by implementing best practices in the three interlinked livelihood areas listed below:

- a. Sustainable natural resources management and agriculture in the catchment.

- b. Fishery habitat management and riparian zone conservation.
- c. Sustainable fishing in targeted biodiversity ‘hotspot’ areas.

Component D4.

Adoption of climate change adaptation measures that support resilience of communities and freshwater ecosystems increased. This component focuses on developing and disseminating strategies, methods, and information that will allow vulnerable individuals and communities to become increasingly resilient in the four target lakes and associated catchment ecosystems. Under D4, FISH will provide viable, climate smart and more environmentally friendly and diversified livelihood practices by promoting the adoption of best practices in CCA identified and tried. An Intensive ecosystem approach services packages for fisheries management and climate smart agriculture will be established in six catchment areas.

EVALUATION DESIGN, METHODS & LIMITATIONS

The contractual period of performance for USAID’s Fisheries Integration of Society and Habitats (FISH) activity ran from September 9, 2014 to September 9, 2019. This FISH final evaluation covered the full period of implementation of the project. The in-country fieldwork for the evaluation was conducted through September 2019, incorporating design and field preparations in the first few days in-country, with the evaluation report prepared in October.

The evaluation team consisted of two professionals (one international consultant with extensive experience in Malawi and other African freshwater fisheries, and one local consultant with fisheries research experience). The team conducted all in-country evaluation activities, with a preliminary briefing with USAID, and a comprehensive final debriefing before departure from Malawi. The Scope of Work approved by USAID is included in **Annex I**.

The Evaluation used a participatory mixed–method approach using both quantitative and qualitative techniques in gathering reliable primary and secondary data and valid evidence of project outcomes and impacts. The participatory methodology was applied to enable all stakeholders to actively take active roles in generating knowledge to test the fundamental assumptions underlying project design and implementation and capture lessons learned from FISH.

In the first week, initial in-depth discussions were held with USAID, key FISH staff, the Department of Fisheries Headquarters senior staff, and the senior Fisheries staff of LUANAR. These meetings helped to prioritize stakeholders to be consulted and to plan the field activities to be undertaken over the following weeks in-country. This would enable the impacts of FISH’s approaches under each of its four components to be assessed in each of the four key ecological freshwater lake ecosystems, i.e. South-East and South-West Arms of Lake Malawi, Lake Malombe, Lake Chiuta and Lake Chilwa. FISH activities were conducted in four target districts that cover these water bodies, i.e. Mangochi, Balaka, Zomba and Machinga.

DATA COLLECTION METHODS

Document Review

FISH provided a comprehensive set of documents produced by the project to the evaluation team to inform the Evaluation. These were supplemented by documents from USAID and Department of Fisheries including policy documents. The documents, over 100 in total, were thoroughly reviewed during the Evaluation to assess the project’s activities and achievements. A complete list of documents that were reviewed is attached in Annex VI.

In addition, the team accessed the voluminous amount of literature available of the fish and fisheries of the project's focus areas, plus the reports on previous projects in the focal areas that were of direct relevance to the project activities. In doing so, the team noted that the project appeared to be unaware of a large number of highly relevant historical reports and papers.

Key Informants Interview

A semi-structured questionnaire (Annex IV) was developed to guide one-on-one interviews with a variety of stakeholders including fisheries, fish processors, fish traders, the most relevant GOM ministries and agencies both at central and local levels, bi- and multilateral development partners supporting fisheries, livelihoods, and climate change adaptation activities in Malawi. Using this method, the evaluation team was successful in interviewing the majority of the key organizations and individuals involved in the Project. A complete list of the 44 key informants that were interviewed is attached in Annex V.

Focus Group Discussions (FGDs)

FGD with a total of 11 small groups of 6 to 11 BVC, VNRMC, RVC members were conducted at Lake Chilwa, Chiuta, Malombe, Upper Shire, South East Arm of Lake Malawi at Malindi and South West Arm at Malembo to gather semi-structured qualitative data. The discussions encouraged free flowing of ideas about the project. A complete list of members that were engaged in the discussions is attached in Annex V. The strength of the FGD was that representation of the members from the targeted groups was good as most of them were available during the discussions. While locally kept records by the communities were difficult to obtain, as noted in the mid-term evaluation, the team was able to confirm that the communities were keeping meticulous records of, for example, the fishers registered as fishing on the beaches covered by BVCs.

Expert Opinion Survey

Expert opinion was an important component of the Evaluation. In addition to the decades of practical experience of the Evaluation team itself in Malawi fisheries, the team consulted with other senior scientists with extensive experience not only in Malawi but also in other African inland fisheries. These included, but were not restricted to, Prof OLF Weyl of the South African Institute for Aquatic Biodiversity, Prof IG Cowx of the University of Hull International Fisheries Institute, Prof GF Turner of the Department of Biological Sciences in Bangor University, North Wales, and Dr. JGM Wilson, retired fisheries specialist with 45 years' experience in Malawi fisheries and natural resource management. This consultative approach was key to providing a comprehensive overview of the project's activities and achievements.

Self-assessment

This applied in one case, one member from the National Commission for Science and Technology (NCST) responded to a self-assessment through a questionnaire put up by the evaluation team because he was not within reach during the period of data collection.

Mini Survey

Rapid mini surveys were performed in the field without a questionnaire to triangulate FGD opinions from committees. The Evaluation team met and discussed the state of the fisheries informally with fishers and traders at Mchenga beach in Lake Chilwa, Njerwa beach at Lake Chiuta, Chindamba beach at Malindi on the Eastern side of the South East Arm of Lake Malawi, Msaka beach in the South West Arm of Lake Malawi and Makawa and Mponda beaches on the Western shore of the South East Arm of Lake Malawi.

Limitations of the evaluations and how they have been mitigated

The FISH project managed to work with a total of 183 BVCs in Lake Malawi, Chilwa, Chiuta, Malombe and Upper Shire River. It was not possible for the evaluation team to reach out to all BVCs given the

limited time for data collection. Therefore, two BVCs were sampled from each water body where data was collected.

Evaluation was conducted when the project had already completed its contractual period and offices of implementing agencies had closed down, which limited access to some of the key staff that were involved in the implementation of the project. The Evaluation team, however, succeeded in interviewing PACT's key senior staff who managed the field components of the project and also partner organizations made staff available for interview even though their contracts with PACT had expired.

BIAS CONSIDERATIONS

In the mid-term review, the evaluation team reported on the types of bias encountered in their investigations. The current review for the final evaluation confirmed instances of bias of three kinds: recall bias, response bias, and selection bias.

Recall bias is inevitable given the five-year lifespan of the project plus instances of turnover in public sector counterparts. There is natural overlap in the cause and effect recall between FISH activities and previous non-USAID implementation at all levels of government and by other stakeholders.

There is also a major **response bias** by key informants. Many stakeholders, particularly at local level tend to avoid direct criticism or controversy regarding project implementation and attempted to present the project and its results in the best possible light. In doing so, interviews in some circumstances produced direct contradictions of statements made. This was not the case at higher levels, where senior officers were open and factual about the limitations of the project and public sector officials were also able to fairly assess FISH interventions. Conflicting or opposing views involving different institutional groups, personalities, and special interests also influenced the responses offered by primary sources. While such perspectives could have impacted some of the feedback offered, the evaluation team members, both of whom have long experience in the natural resources sectors in Malawi, were in a position to assess and interpret the responses offered.

Selection bias is inevitable when implementers help to facilitate contact with project beneficiaries, as they tend to select the most active, responsive or engaged beneficiaries. The team were well aware of this and through long experience negated this bias through selection of some of their own key informants and visiting additional beaches, varied interview techniques, cross-referencing comments from different stakeholder groups and local officials, direct observation of the activities on fishing beaches, and their considerable knowledge of the historical and present status of the fisheries and environment.

GENDER CONSIDERATIONS

The mid-term review presented a thorough review of the gender aspects of the project. The final evaluation team focused on the participation of women in the focus group meetings. Through active discussion with the women in the meetings the extent to which they are engaged in project and community activities and decision-making was assessed. The project's reports on gender studies were also reviewed.

OVERVIEW OF PMEP TARGETS AND DATA QUALITY

The Evaluation team approached the PMEP and Data Quality component of the project by reviewing the FISH project's draft final Project Impact Assessment, which contains a comprehensive analysis of the project's activities, performance indicators, and targets achieved. These results were then compared with field observations using the interviews with target beneficiaries and other key stakeholders supplemented by direct observation of the status of the fisheries, notably promotion of PFM, establishment and legal recognition of bylaws, and establishment of fish sanctuaries and brush parks. The team also reviewed the other project interventions, including empowerment of women, forest rehabilitation and riparian

vegetation, improved agriculture. The FISH Impact Assessment is a comprehensive report on excellent progress in the core project areas, including the areas under improved natural resource management the adoption of policies and regulations, and female empowerment. Where the Evaluation team identified weaknesses in the project outputs, these are detailed in the Findings component of this report below.

TOC ANALYSIS

FISH addressed USAID/Malawi’s Country Development and Cooperation Strategy (CDCS) goal, “to improve Malawian’s quality of life”, notably the CDCS Objective DO 2: “Sustainable Livelihoods Increased,” and Intermediate Result 2.1, “Resiliency to Climate Change Strengthened”. It targeted Sub-Intermediate Results (SIRs) “institutional capacity improved”, “policy and systems strengthened” and “positive behavior adopted”.

The FISH project focus areas were the four primary freshwater ecosystems of the South arm of Lakes Malawi, Malombe, Chilwa, and Chiuta. In these areas, previous projects by a range of NGOs and also government departments addressed similar issues of community empowerment, thus making accurate determination of attribution not fully feasible within the parameters and limitations assumed by the evaluation SOW. The Evaluation examined the theory of change adopted by FISH within the limitations of its review of the draft Fish Impact Assessment, and also looked at all the other non-project activities that influenced outputs, based on evidence available and expert opinion. The Evaluation team assessed significant contributions associated to outside factors (not directly resulting from FISH interventions) and whether these were fully taken into account in reporting.

The evaluation team reviewed the project’s extensive documented outputs and outcomes, and the causal logic that supported the FISH theory of change. It followed up this available information with in-country fieldwork. It assumed that the key assumptions documented in the FISH Impact Assessment for the project were sound, plausible, and agreed upon by the main stakeholders, with some exceptions detailed below in the Findings section of this report.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The SOW provided five questions to be addressed during the final evaluation. These questions explored how the project had succeeded in addressing the primary objectives of FISH, which were to increase resilience to climate change and to improve biodiversity conservation through effective sustainable fisheries co-management. Four outputs were developed to achieve these objectives: These were: **Output 1** (Utilization of science, analysis, and information for decision making increased), **Output 2** (Enabling environment for conservation and management of freshwater ecosystems enhanced), **Output 3** (Priority threats to freshwater ecosystem biodiversity reduced) and **Output 4** (Adoption of climate change adaptation measures that support resilience of communities and freshwater ecosystems increased). This section of the report presents the findings based on the review of all the projects’ documents together with the review of all information gathered from interviews with key informants, meetings, and site visits.

FISH THEORY OF CHANGE

If decisions around fisheries management...

(1) are based on **shared, evidence-based objectives and learning,**

(2) are grounded in **inclusive and effective ecosystem-scaled governance structures,** and

(3) strengthen the **assets of communities,**

Then Malawi’s complex and diverse freshwater lake ecosystems can be sustained

EVALUATION QUESTION I

To what extent has FISH been able to increase social, ecological, and economic resilience of freshwater ecosystems and the people who depend on them. How robust was the Theory of Change (a reflection of program design) and project's objectives and components/interventions? What improvements/changes should be made to the Theory of Change to improve its design and management of future fisheries biodiversity programming in Malawi?

Results Logic: The primary objectives of FISH were to increase resiliency to climate change and improve biodiversity conservation through effective sustainable fisheries co-management. Four project components were intended to work together to achieve the goals of the project. Under the scientific Output 1, the project produced a detailed analysis of the state of the fisheries (FISH (2015). Environmental Threats and Opportunities Assessment (ETOA) of Four Major Lakes in Malawi. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 250 pp). This information underlined the implementation of the project activities at District and community levels under the enabling Output 2. These outputs then contributed to reducing threats to freshwater ecosystem biodiversity. Output 4 (Adoption of climate change adaptation measures that support resilience of communities and freshwater ecosystems increased) depended on an ecosystem-based approach for fisheries management and climate smart agriculture through the enabling environment set up under Output 2 and utilizing the inputs from Output 1.

FINDINGS FOR EVALUATION QUESTION I

1. Significant milestones were achieved throughout the project, notably including capacity building in local communities utilizing the available information on the status of the fish stocks and fisheries. On the ground, 183 beach village committees went through the six-step process in fisheries co-management and have signed management agreements with the Director of Fisheries. Sixteen (16) sub-FAs and one FA have been registered with the Registrar General and received certificates signed by the Minister of Justice as registered trustees in fisheries management. Tree planting was a major activity in the project to restore catchments. In total, BVCs planted over 470,000 trees in forest areas and over 260,000 in VFAs, schools and homesteads. The total area reported to be restored was 1833 Ha with a further 170 Ha managed as woodlots by VFAs, schools and homesteads
2. There was good leadership from FISH and partners that created an enabling environment for conservation and management. The project revamped and/or created, and trained and capacitated BVCs, subFAs and FAs. The political will was apparent to support the PFM program at community, district, and national levels. Socio-economic profiles developed by the project were used to develop District Development Plans with strengthened fishery sections. FISH collaborated well with the Ministry of Agriculture, Irrigation and Water Development and with the Ministry of Local Government and Rural Development under which where the District Councils are seated.
3. The Fisheries Science and Technology Advisory Panel (FSTAP) has so far failed to fulfill its role as a contributor to the TOC condition of “shared, evidence-based objectives and learning”. It is planned to be a participatory clearing house mechanism for defining and prioritizing applied science needs and all proposed projects should go through it. It was” and assumed to be critical to FISH’s exit strategy. In this respect, two fundamental inputs guiding its work, the research and communications strategies are not fully in place. Hosted under the National Commission for Science and Technology (NCST), FSTAP is assumed to effectively service both information management and user needs. The panel is comprised of representatives of DoF, Chancellor College, LUANAR, FISAM and co-opted experts. While there were initial meetings, the panel could not meet thereafter due to lack of funding and therefore the panel is usually inactive. Furthermore, it does not have a base in NCST, with no physical office with equipment. In order to function effectively, FSTAPs require significant changes in the organizational cultures of participating institutions. As the National Fisheries and Research Agenda (NFARA) is coordinated by FSTAP, it follows that NFARA implementation is also weak. The only

documentation available to the Evaluation is a draft NFARA Implementation Status document that simply lists the research agendas and interests of 14 Malawian research fisheries and aquaculture institutions.

4. At the local level, FISH technicians and Fisheries/Forestry extension agents are working together in planning and implementing FISH project activities. The vast majority of FISH and Fisheries/Forestry staff interviewed agreed that collaboration was best demonstrated by their shared use of resources and collaborative training.

CONCLUSIONS FOR EVALUATION QUESTION I

- I. The FISH components were on the whole well thought out for the project goal and to support the Theory of Change. The Utilization of Science took up a large portion of the project's resources and the mid-term review suggested a change in focus towards on-the-ground implementation, with particular emphasis on biodiversity conservation and natural resource management. This was a sound recommendation and was followed by the project.

There was, in general, excellent collaboration between the projects' implementing partners. The partners are confident, well-trained and aware of their tasks and responsibilities. The focus group discussions with numerous community organizations demonstrate that they are well aware of the issues and ways of addressing their problems and keen to address their problems, though there is an almost universal opinion that they still need more support and recognition from the Department of Fisheries. Within these limitations they have made good progress towards achieving program outputs and outcomes. The collaboration between implementing partners and government at District level has been an important contributor to the visible successes of the project. The progress made by FISH technicians working alongside Fisheries and Forestry Extension workers for more effective communication and cooperation is noteworthy. The critical importance of catchment conservation for the health of fish biodiversity and fish stocks in all the project areas of activity means that the local collaboration between Fisheries, Forestry and Agriculture needs to be extended to central government ministries/departments.

There are still knowledge gaps that need to be addressed in future projects and greater efforts need to be made to establish FSTAP and NFARA as functional entities. Funding needs to be sourced so that they are able to function effectively. At present they appear to exist in name only. The online Malawi Fisheries Repository that has been championed by the project is an excellent initiative but at present it contains only a small fraction of the papers and reports that exist on Malawi's fisheries. Several key historical and recent stock assessment reports and papers that informed management recommendations and the gazetted Fisheries Regulations are not yet available in the repository, leading to weaknesses in interpretation of the current status of the fish stocks, particularly in southern Lake Malawi. The information contained in the historical reports is vital for developing meaningful management strategies that can be shared with communities and participatory management committees. A case in point is the very brief one-off trawl biomass survey of Area A in the South East Arm conducted in April 2019 and reported on in a draft Fisheries Bulletin provided in the project documentation to the evaluation team. While the report mentions the comprehensive trawl survey reports and papers of the 1970s to 1990s, they are not discussed further and the only comparison is with a similar one-off survey in 2007. With only seven hauls made, no stratification of stations by depth, and catches ranging widely from zero to 304 kg per half hour (even the highest figure being negligible in comparison with historical data), no conclusions can be drawn other than the fishery is severely overfished. This could have been emphasized in the report by comparing the data with the previous surveys (e.g. FAO, 1976; Turner et al. 1995; Banda et al. 1996) to illustrate the disastrous current stock status.

ANALYTICAL SUMMARY FOR QUESTION I

The FISH project built on previous projects that developed participatory management in the project area, notably MAGFAD, COMPASS and LEAD (e.g. Chiotha et al. (eds), 2018).² National and local government officials, local communities and fishers are working together reasonably well to improve management of fisheries resources with co-management support from DoF, local governments, BVCs and Traditional Authorities. For some parts of the project area, the national and local government institutions together with the local communities share a realistic vision for Participatory Fishery Management (PFM) on co-management principles. This ties in with the system of Traditional Authorities and village governance together with the development of decentralization of government in the country. The FISH program built on the previous programs by greatly expanding training and capacity building activities in BVCs and VNRMCs.

In areas where the human population is extremely high, however, the pressure on natural resources is so high that the communities alone are unable at present to attain their goals. This is most notable along the shores of Lake Malombe, where the BVCs interviewed reported that illegal fishers continue to operate with impunity, fishery cpue is reported by DoF staff in Mangochi to continue to decline, and none of the brush parks set up by BVCs exist in practice (as reported by BVCs, Fisheries staff, and project NGOs). Fishers repeatedly targeted the latter at night who used them as fish aggregating devices (FADs), thereby achieving the opposite of what was intended. A similar situation exists along the western shore of the South East Arm of Lake Malawi, where intense fishing pressure is apparent and only one near-legal fishing net was observed (but numerous illegal nets, e.g. 37 large mosquito net seines observed on Mponda beach alone) in visits to fishing beaches.



FIGURE I. HAULING AN ILLEGAL 38 MM MESH MONOFILAMENT GILLNET CLOSE TO BEACH IN SEARM OF LAKE MALAWI.

In contrast, in less populated areas such as the eastern side of the South East Arm, the fish sanctuaries and brush parks appear to be successful, notably in Malindi and Makanjira, and the communities are rightly proud of their activities (but see below).

² Chiotha, S., Jamu, D., Nagoli, J., Likongwe, P. & Chanyenga, T. (eds) (2018). Socio-ecological resilience to climate change in a fragile ecosystem: the case of the Lake Chilwa Basin, Malawi. Routledge, London & New York, 273 pp.

In Lake Chiuta, the communities have long been successful in protecting the natural aquatic vegetation along the entire Malawi shoreline, thereby creating a very long natural brush park. Attempts by the FISH project to establish more formal sanctuaries were therefore unnecessary. The one hectare sanctuary reported at Njerwa Beach was traversed by a line of fish traps and a long gillnet when inspected by the Evaluation team and is therefore present in name only. It is also too small to have any impact on biodiversity or biomass. In Lake Chiuta, emphasis by extension workers would have been better placed on the much more meaningful importance of continuing to protect the natural vegetation along the length of the shoreline. In support of this observation, the fish biodiversity of Lake Chiuta has remained unchanged over the decades since the 1970s (D. Tweddle, 1983 and unpublished data). Sampling for one to two days at Njerwa beach using a variety of methods in 1976, 1983, 1985, 1988, 1992 and 2013 yielded between 20 and 22 species on each occasion. The common factor for the stable biodiversity is the diverse aquatic habitat, notably the relatively stable shoreline emergent vegetation as a result of the control on beach seining by the community.

FIGURE 1. THE HEALTHY UNDISTURBED VEGETATION ALONG THE LAKE CHIUTA SHORELINE RESULTING FROM BANNING OF SEINE NETS.



Studying the effectiveness of brush parks in conserving biodiversity and increasing fish biomass needs better methods than used to date. There is very high variability in results, with high variance of the means due to sampling errors, catchability of fish species and random distribution and movement of fish. The Evaluation Impact Report states that: “FISH research shows that there was no significant relationship ($p > 0.05$) between brushpark density and two independent variables; fish biodiversity and species richness. This is somewhat surprising and differs from results of studies elsewhere. The high variability across variables within a small sample and short time period since brushpark installation may be contributing factor to this unexpected result.”

There are weaknesses in the sanctuary and brushpark monitoring, not only in the methods used, which were inadequate to fully document the fauna, but also in the identification of the species. This is evident in all the reports e.g. the Lake Chiuta report, where use of the photographic guide and key to the species

(Tweddle, 1983)³ would have led to improved reporting. The Chilwa and Chiuta reports list species that do not occur in the lakes, and they group together species such as the mormyrids, small barbs and small cichlids that, if quantified separately, would give much better indications of the health of the biodiversity in the lakes.

More modern non-invasive methods of quantifying biodiversity should be used in future. One such system has been successfully trialed in Lake Malawi, i.e. the use of baited video camera footage to accurately quantify the fish species assemblages and sizes of the fish observed (OLF Weyl and A, van Wyk, pers. comm.). This method has been used in one of the sanctuaries established during the FISH project, at Nkhudzi Bay. The preliminary results (briefly presented in research seminars in SAIAB but not yet published) demonstrate the major impact of fishing on the stocks of the South East Arm in contrast to observations of the same species on the Mozambique shore of the lake.

The project's draft Evaluation Impact Report summarizes the project's progress towards achieving the project goal of increased, social, ecological, and economic resilience of freshwater ecosystems and the people who depend on them through the integration of fisheries management and biodiversity conservation with economic development objectives and improved local governance. That report highlights the successes and attempts to quantify the benefits, while this evaluation report is a separate study aiming to synthesize the results of the consultative process with all stakeholders both within and outside the project. In terms of socio-economic resilience, the impact report touches on the benefits of CSA, but not on fisheries benefits. The draft report states that "Annual revenue attributed to project intervention applying CSA technologies averaged Mk3.7m per household from 740 respondents which is 84% greater than income from agriculture in 2016 adjusting for inflation." In total, over 8,000 were trained in CSA. The draft report also states emphasizes that "we can only indicate that success is based on a proof of concept rather than being geographically and demographically transformative."

All components of the project fed into the Theory of Change in that the project supported the communities to develop management plans for their fisheries assets based on their shared experiences and advice from the project. The communities' activities feed into ecosystem based governance structures at Traditional Authority, District and Central government level. Reaching the goals specified by the Theory of Change It was handicapped, however, in key fishing areas such as Lake Malombe, and the South East Arm of Lake Malawi by the problems caused by the massive growth in human population and associated extreme pressure on the natural resources.

RECOMMENDATIONS FOR FUTURE PROJECT INTERVENTIONS BASED ON RESULTS FROM EVALUATION QUESTION I

1. The outcomes from the project show a need for greater enforcement to provide support for the BVCs in the immediate future. This needs more funding support for both central and local governments, FISH played a major role in directly engaging with the Parliament Committee resulting in much greater understanding of the need for support by Government for the fisheries sector and DoF for Fisheries activities and more of the same is needed. Future projects should continue advocacy efforts to influence fishery management policy at higher levels of central government to support the Department of Fisheries in addition to sharing revenue generated with local institutions. At local level, FISH has been active in promoting the devolution of fisheries functions to district councils. Fisheries are included in the districts' socio-economic profiles for 2017-2022, and FISH helped in inclusion of fisheries in district development plans. The councils are fully aware of and involved in the process being followed for ratification of the fisheries management plans and bylaws for the communities. In

³ Tweddle, D. (1983). The fish and fisheries of Lake Chiuta. *LusoJ.Sci. Technol.Malawi*, 4(2):55-83.

interview, the Director for Planning and Development for Zomba stressed the need for more funding support for fisheries activities at both district and departmental level.

2. FSTAP, NFARA and the Malawi Fisheries Repository need to be supported through the provision of an effective and sustainable funding mechanism. In addition, with many relatively new and inexperienced graduates employed in the fisheries sector, there is a need for mentoring by experienced fisheries scientists with extensive knowledge of African freshwater. The composition of FSTAP needs to be revised to ensure that it contains sufficient technical expertise to influence research agendas and provide peer review for the translation of research results into sound management strategies.
3. Future projects should ensure that research strategies that are developed to inform relevant management decisions should be supported by a more active role of FSTAP in developing research plans that complement and influence the research agendas supported by the central government.

EVALUATION QUESTION 2

To what extent has increased participatory fisheries management (PFM) by artisanal and commercial fishers led to fish biodiversity conservation and livelihoods benefits, and women's empowerment? To what scale and scope have the sustainable fishing practices been adopted by the fishers and what are those practices? Are there other lessons learned from evaluating the Theory of Change, project implementation approaches that have broader applicability to fisheries biodiversity conservation for USAID Malawi and beyond?

Results Logic: The project had varied success across the different ecosystems. Major successes were the drive to improve the operational resources of BVCs, Fisheries Associations and District Councils in support of improved co-management. The PFM guide produced by FISH specified ways in which BVCs and FAs could mobilize resources to fund their participatory fisheries management operations including fines for illegal fishing, fish landing fees, fishing licenses, beach use fees for fish processors, trawlers, directly relate to parallel hosted outputs to reduce priority threats to freshwater ecosystem biodiversity. These strategies have been incorporated in the BVCs and FAs by-laws (Output 2).

FISH coordinated methods and activities across multiple target groups, involving promotion and dissemination in beach settings. It strategically used the PFM model to address a broader target audience, based on added value for actual or potential users of solar fish drying, fuel-efficient stoves, mobile smoking kilns, climate smart agriculture (intensive rice production) and high yield bee-keeping, with some success but also with some limitations.

FINDINGS FOR EVALUATION QUESTION 2

1. There is without question strong political will to support PFM among BVCs, local governments in all four target districts, and in DoF. All recognize the need to support Participatory Fisheries Management (PFM) to improve fishery management in Malawi. The majority of Traditional Authorities support PFM, although there are local exceptions where village headmen benefit from fishing and are reluctant to forgo those benefits in the interests of more sustainable management. In most discussions the six-step process to establish BVCs and management agreements is highlighted as a key component of their empowerment to manage resources. BVCs and subFAs are recognized to be effective in management, but ecosystem based FAs are not yet so effective because of the lack of financial support to enable them to meet regularly.
2. The effectiveness of participatory fisheries management (PFM) promoted through the project is inversely correlated with human population pressures, as described below. Where the lakeshore

populations are high and severe overfishing is occurring, PFM is ineffective, but in relatively less populated areas the community management committees are more able to implement agreed bylaws.

3. Lake Chiuta is an outstanding example of successful PFM, although this is a long-standing success story. Lake Chiuta has had successful community management for decades, initiated by the communities themselves and promoted by previous projects including MAGFAD in the 1990s and COMPASS from 2004-2009. The management succeeded because of strong support from traditional leaders. Invading seine net fishers from Lake Chilwa were driven out between 1992 and 1995 (JGM Wilson, pers.comm.) and since then the lake has been largely protected with healthy weeded shorelines and sustainable fishing practices. There are problems as a result of the opposite shore being Mozambican territory with an absence of management in that sector. FISH, however, has played an important supporting role by training the established BVCs in the six-step process for establishing legal rights for management, thereby endorsing and strengthening existing structures. It is evident through a focus group discussion that this support is highly appreciated by the BVC at Njerwa beach. The PFM at Lake Chiuta is successful and high biodiversity is maintained as a result of the protection of the shoreline vegetation through the prohibition of beach seines. Sampling at Njerwa beach by Tweddle (1979, 1983 & unpublished)⁴ on six separate occasions at intervals between 1976 and 2013 yielded the same set of 20-22 species in similar numbers on every visit. The fishing communities on Lake Chiuta therefore continue to benefit from the fishery. The use of improved fish processing methods promoted through FISH as well as earlier projects is another example of the success of project interventions.
4. Lake Chilwa dried out during the project and is now in the process of recovery after refilling thanks to the 2019 Cyclone Idai. The fish population is recovering rapidly although the fish being caught are still small. The catches at present are predominantly *Oreochromis shiranus chilwae* and *Clarias gariepinus*, with the usual main target species, *Enteromius paludinosus*, still present only in small numbers. The FISH project is building on the successes of previous projects including MAGFAD, COMPASS, LEAD and WorldFish for PFM. FISH has provided the training in the six-step process and the communities are confident in their abilities. In addition to two adjacent BVCs at Kachulu and Nchenga, the Evaluation team met with the River Village Committee (RVC) at Makawa, who look after deep-water refugia on the Likangala River and members from several VNRMC around Mpyupyu Hill who coordinate activities to regenerate the woodlands on the Mpyupyu Hill Village Forest Area. These community organizations are all active with encouraging results. There are unintended consequences of uncoordinated activities between BVCs and thus the activities of sub-FAs are important for long-term success. For instance, Kachulu fishing beach is currently almost deserted because the BVC enforces the agreed harmonized landing fees for fishers landing there, while the Nchenga BVC reduced the agreed landing fees. Thus all fishers from Kachulu have moved to Nchenga. The FA promised to address this issue.
5. The efforts to protect deepwater refugia on the Likangala and Naisi streams are laudable and should continue to be encouraged. Another major source of restocking Lake Chilwa during refilling after drying up is Mpoto Lagoon (Njaya et al., 2011, Chanyenga et al., 2018)⁵ so protection of that lagoon

⁴ Tweddle, D. (1979). The zoogeography of the fish fauna of the Lake Chilwa basin. In Lake Chilwa : studies of change in a tropical ecosystem, edited by Kalk, M., McLachlan, A.J. & Howard- Williams, C. W. Junk, The Hague, *Monogr. Biol.*, 35:171-181.

Tweddle, D. (1983). The fish and fisheries of Lake Chiuta. *LusoJ.Sci. Technol.Malawi*, 4(2):55-83.

⁵ Njaya, F., Snyder, K., Jamu, D., Wilson, J., Hiward-Williams, C., Allison, E. and Andrew, N. (2011). The natural history and fisheries ecology of Lake Chilwa, southern Malawi. *Journal of Great Lakes Research*, 37: 15-25.

and the Phalombe River (although outside the scope of the FISH project) should have high priority in future.

6. Lake Malombe continues to be a fisheries disaster zone despite the best efforts since the early 1990s of previous projects, the FISH project and the BVCs it has supported. The two BVCs with whom focus group discussions were held are well-trained and well-motivated but struggle to achieve tangible results on their own. Illegal fishers simply move from beaches where BVC are active and effective to operate from beaches where BVCs are weaker. Sanctuaries and brush parks have universally failed in Lake Malombe. Fishers use them at night as FADs and destroy them in the process. This was stated by both BVCs visited and confirmed in discussions with DoF staff. The use of the brush parks as FADs therefore has the opposite effect of that intended. No brush parks currently exist in the lake.
7. The measures proposed and agreed for management of the Lake Malombe fishery are inadequate to achieve any meaningful recovery of the fishery. The nkacha nets that caused the destruction of the valuable and productive chambo fishery, as well as the weeded fish habitats in the lake, continue to be accepted and BVCs show no inclination to consider phased removal of nkacha nets from the lake, without which fishery recovery is next to impossible. It is, however, reported by Dr Jamu that there is now an agreement in place (by FISH, FiRM, LFMA's and DoF) to ban nkacha nets. The BVCs interviewed made no mention of this and implementation of such a much-needed ban is likely to be exceptionally difficult to implement. It is admitted by DoF that cpue continues to decline in the lake. With protection and habitat restoration, the chambo fishery would recover naturally and fairly rapidly and this should be the goal of future project interventions.
8. On the heavily populated western shore of the South East Arm and in the South West Arm, fishers openly ignore all regulations and bylaws and do as they like. The commitment of the BVCs in these areas despite the magnitude of the challenges they face are admirable, but without major backing by government authorities and law enforcement, they are unlikely to have any impact. Mini-surveys of Mponda and Makawa beaches were conducted and fishers informally interviewed. Some fishers were unaware of the existence of BVCs and those that were aware said the BVCs were unable to do anything because "they are our brothers and sisters".
9. On the more lightly populated eastern shore of the South East Arm, the Chindamba BVC at Malindi is enthusiastic and supported by the village headman, who is a member of the BVC. The community has a well-supported fish sanctuary and successful brush parks. The team did not visit Makanjira but is reliably informed that the BVCs in that area are also effective and have successful sanctuaries in large lagoons that are maintained as breeding sanctuaries. The support by strong leadership from traditional leaders can have a major impact on success or otherwise of community participation in management of natural resources. The success of community management in Lake Chiuta for decades as a result of strong leadership is an excellent example.
10. The commercial trawl fishery is massively oversubscribed, with 62 current licenses and a large number of unlicensed vessels. The HP in the vessels is also considerably greater than in the past and thus current fishing effort is approximately ten times greater than that shown to produce the estimated

Chanyenga, T., Wilson, J., Njaya, F., Chilima, C., Mphepo, G. & Kayambazinthu, D. (2018). Biodiversity in the Lake Chilwa Basin: status, use and governance of fish, forests and birds. In Chiotha, S., Jamu, D., Nagoli, J., Likongwe, P. & Chanyenga, T. (eds) (2018). Socio-ecological resilience to climate change in a fragile ecosystem: the case of the Lake Chilwa Basin, Malawi. Routledge, London & New York, 163-180.

MSY by numerous studies (e.g. FAO, 1976; Turner, 1977; Tweddle & Magasa, 1989; Banda et al. 1996).⁶ This inevitably created conflict with the artisanal fishery, which FISH has made progress in resolving. The establishment of a tracking system by FISH with FAO/FIRM is a step in the right direction but only if all vessels have them functioning, which is not currently the case. The setting up of the Commercial Fishers Association (CFA) to act as a forum for discussion with artisanal Fishers Associations is another positive step, but in the long-term reduction in trawl fishing effort of 80-90%, e.g. through a buy-back scheme for trawlers to leave the fishery, as proposed to the Evaluation team by CFA, is the only answer. Area A is currently closed to trawling but a biomass and biodiversity survey in Area A by the DoF RV Ndunduma in 2019 still yielded virtually nothing. All trawl catches seen by the Evaluation team consisted of very small cichlids and thus biodiversity is severely impacted by this fishery.

11. Attempts to improve livelihoods were a key component of FISH, building on the efforts of numerous other community-based organizations and projects. The project focused, in partnership or cooperation with other programs, on implementing diversified livelihoods, best practices to enhance resilience to climate change impacts, forest regeneration, riverbank protection and adoption of climate smart agriculture. Activities included, with **Evaluation comments on each in italics**:
- (a) Regenerating forests in critical catchments through involvement with RVCs and VNRMCs. (*On Mpyupyu Hill near Lake Chilwa there is good evidence of regeneration of the woodland and the VNRMCs are committed to sustaining the initiative. Elsewhere, while the hillsides are still protected from agricultural encroachment into forest reserves, illegal wood cutting and charcoal production continues. Numerous bicycles laden with charcoal were observed travelling at night to avoid confiscation. In the villages it is evident that the households are now maintaining their own tree lots, and village tree nurseries are numerous*)
 - (b) Supporting beekeeping groups in beekeeping practices and finance management. (*Beekeeping has had mixed success and has not taken off as a commercial activity. It was noted by several stakeholders that the expectations of small scale village producers and those of HIVE for commercial production were incompatible.*)
 - (c) Training and encouraging shoreline farmers in climate smart agriculture and soil and water conservation. (*The project has encouraged, with some degree of success, households to practice irrigated farming along the shorelines of the lakes, while maintaining buffer zones of emergent vegetation such as reeds along the shorelines.*)
 - (d) Training households in climate smart Integrated Aquaculture Agriculture (IAA). (*The team did not visit any examples of interventions in aquaculture development and discussions.*)
 - (e) Protecting deep hole refugia (through RVCs) and apply climate smart practices to protect fish during lake recession events and drought years. (*RVCS are successful in protecting the deep hole refugia along the Likangala River and the reedbeds surrounding them. They are also planting trees along the river banks to reduce erosion and siltation, although they report resistance to this initiative and the destruction of planted tree seedlings by some farmers. The initiative should continue, and protection of Mpoto Lagoon as a fish sanctuary should also be emphasized for the long-term health of the Lake Chilwa fish stocks.*)
 - (f) Farmers to adopt adopting water-efficient rice production and wetland conservation. (*The FISH project successfully liaised with other agricultural projects and programs to promote diversified, environmentally sensitive agriculture, including, e.g. the use of the drought-resistant Nerica rice. The results are summarized in the project's 2019 annual report, which reports that the project over-achieved because BVC members switched to NERICA rice production in the Likangala Irrigation Scheme as an alternative livelihood source with the*)

⁶ FAO (1976). Promotion of Integrated Fishery Development, Malawi. An analysis of the various fisheries of Lake Malawi, based on the work of J. Turner. Rome FAO, Fl:DP/MLW/71/516, Technical Report 1, 73 pp.

Turner, J.L. (1977). Some effects of demersal trawling in Lake Malawi (Lake Nyasa) from 1968 to 1974. *Journal of Fish Biology*, 10(3): 261-271.

Tweddle, D. & Magasa, J.H. (1989). Assessment of yield in multi-species cichlid fisheries of the South East Arm of Lake Malawi, Africa. *J. Cons. int. Explor. Mer*, 45(2):209-222.

recession of Lake Chilwa. The 2019 project reports that in 2019 677 farmers in the project area were growing NERICA rice on 134 Ha of land. In addition two NERICA rice marketing groups were established around Chisokwi fish sanctuary and in Chia Irrigation Scheme. The project promoted other agricultural activities including winter cropping, inter-cropping, and integration of agriculture and aquaculture. The 2019 project annual report summarizes in Appendix I the achievements in farming activities, including over-achievement in pigeon pea production. The project also notably included the training of 14,014 farmers in soil and water conservation. This is a much needed contribution to one the most critical environmental issues throughout Malawi (No evidence of this was shown to the evaluation team).

- (g) Training to increase literacy, marketing and entrepreneurship skills of the group established using loans from the savings groups. *(This is an admirable program that should be continued into the future).*
- (h) Adopt fuel-efficient *changu-changu* domestic stoves and smoking kilns and cookers to reduce firewood consumption. *(Attempts to improve smoking kiln technology to make more efficient use of firewood have been in place since the 1960s. All previous projects had mixed success and the FISH efforts are no exception. Many examples of FISH smoking kilns were seen, but frequently misused. Notably, at Msaka beach on the South West Arm of Lake Malawi, the fire holes of a row of kilns had been enlarged and fires lit outside the holes, probably the most fuel-inefficient kilns ever observed!)*
- (i) Beach model projects to integrate sanitation, safety at sea, fish handling and processing best practices (solar driers, kilns and cookers) to enable wider adoption in beach communities; and fish processing and fish trader groups to reduce post-harvest losses. *(The project is promoting improved sanitation at fishing beaches and this appears to be working. The idea of building latrines at beaches for fishers, who will pay fees to BVCs for their use is taking root but needs continued promotion into the future. Beaches remain heavily littered though, with vast quantities of discarded single-use plastics evident throughout the beaches. Solar driers are in use but only on a limited scale).*

12. Local Development Fund Initiatives and the Lake Malawi Basin Project funded by the World Bank are examples of coordinated interventions that targeted complementary outcomes to those pursued by FISH. FISH tapped into human resources and on-the-ground experience previously developed by the Wellness in Agriculture for Livelihoods Advancements – WALA (also linked by EI) and supported the recruitment of FISH Technicians. WALA's focus on agronomic practices and grassroots work with Village Savings and loans groups added depth to the efforts of technicians recruited with this background. FISH overlapped with other development partners implementing comparable biodiversity and watershed programs, which include FAO-GEF on Lake Malombe and Lake Malawi, UNDP-GEF on climate resilience support to Mangochi and Machinga, supporting the Lake Chilwa Climate Change Adaptation Project and the Lake Malawi Basin Program.

13. Expectations that promoting alternative livelihoods would divert people from fishing into other businesses and thereby reduce fishing effort were only partly achievable. When Lake Chilwa dried out, it was reported to the evaluation team that many fishers simply moved to other fishing areas. The issue of migration of fishers is a long-standing problem and has led to conflicts in the past, most notably when Lake Chilwa fishers moved to Lake Chiuta with their nkacha nets during the Chilwa recession in 1992. This ultimately led to the mobilization of Chiuta fishers into a participatory Lake Chiuta Fisheries Association, and by 1995 the Chilwa fishers were driven out (JGM Wilson, pers.comm.). During the most recent recession, it was reported to the Evaluation team that Chilwa fishers migrated to other lakes, including to Lake Malawi at Salima rather than engaging in other activities such as farming. It is, however, reported in the 2019 FISH annual report that some BVC members from Lake Chilwa took up NERICA rice farming in Likangala Irrigation Scheme.

For several decades, alternative livelihoods have been proposed to divert people away from fishing. There has been little success and fishing continues to be the main livelihoods activity on the shores of the lakes despite their severely impoverished status. As Kolding and van Zwieten (2011) stated for

small-scale fisheries in the south in general: “Many of these fisheries are serving as a ‘social security system’ – a common good and thereby function as a ‘last resort’ for economic mishap”.

14. Aquaculture is frequently proposed as an alternative livelihood to reduce effort on the wild-caught fish stocks. This is, however, a misconception as the type of person who will engage in intensive farming such as aquaculture is very different to those engaging in capture fisheries. Thus aquaculture promotion has had little success in the FISH project. There was no implementation of fish farming by the project partners or stakeholder groups, although USAID/FISH supported the development of an aquaculture communication strategy by the Department of Fisheries and commissioned Imani Consultants to prepare a report on improving small-scale commercial fish farming technical efficiency. The latter report identified significant weaknesses including lack of education in farm and business management skills; poorly developed supply chains for key inputs; lack of sales and marketing knowledge, and limited access to credit. The study demonstrated that improvements in yield could be achieved but that to-date most farmers do not adhere to Best Management Practice (BMP). FISH made progress in promoting gender equity, though with some limitations. The project’s gender analysis document suggested that the project had an opportunity to use the BVCs as an entry point for gender mainstreaming in fisheries management. The project was successful in achieving this aim as the beach and village committees supported by the project are all gender-balanced and women hold key positions of responsibility in all. By involving these women in the BVC training programs the project supported their empowerment to have positions of responsibility in fisheries management decision making. Without exception the BVCs confirmed that the male and female members shared all tasks, including enforcement patrols on the lakes. There are still cultural issues that will take time to resolve, particularly in the Mangochi District. As reported in the midterm review, the Fish Value Chain Study undertaken by FISH, revealed that 80% of the total fish production in Malawi goes through this chain with women contributing more than 55% of the value addition through fish processing, distribution and marketing mainly to rural based markets where the majority of the population resides. Women were also fully involved in the Climate Smart Agriculture training.
15. The project also supported health programs in fishing villages, notably by supporting AIDS prevention programs. The practice of trading fish for sex was highlighted prominently in the gender analysis and mainstreaming documents. Thus, the Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe women (DREAMS) and the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR) projects were integrated with the FISH project. By addressing and involving fishermen in this intervention, the potential to spread HIV/AIDS to women and girls decreased and fishing communities adopted greater health seeking behaviors.

CONCLUSIONS FOR EVALUATION QUESTION 2

1. The in-depth discussions with the BVCs and with the DoF and other stakeholders, together with direct observation of what is actually happening on the beaches, consistently showed that PFM has had varied success across the four ecosystems, inversely related to human population pressures. Where populations are high and as a result severe overfishing is occurring, PFM is having limited success despite the best efforts of the project. Where pressure is lower, PFM is highly successful and the FISH model for developing PFM is exemplary and should form the basis for the system to be extended to all the other fishery areas in the country.
1. The coordination and partnerships with other livelihoods programs was broadly successful and future progress can be anticipated after the project because of the systems and awareness put in place.
2. The commercial demersal trawl fishery, both legal and illegal, is massively overfished, both economically with units being on the limits of viability, and environmentally, with unacceptable adverse

impacts on biodiversity and the lake ecosystem as a whole. The midwater trawl fishery conducted by Maldeco Fisheries is exempt from this criticism as it follows its mandate to fish offshore primarily for the pelagic ndunduma species. The commercial sector produces less than 3% of the total catches from the lake according to DoF annual catch statistics. The small pelagic species usipa has made up the bulk of the Lake Malawi catch in the last decade according to the statistics. If usipa is excluded from the statistics, the proportion from the commercial fishery is much higher and, as stated above, raises serious concerns about the fishery. Catches of larger species in the trawl have collapsed in the last decade, particularly for chambo and kampango, which are now listed as Critically Endangered on the IUCN Red Data List. From the start of the fishery a rapid decline in biodiversity was noted even though effort then was a small fraction of the current effort level (Turner et al. 1995) and there can be no doubt that many of the larger cichlid species are extinct in the trawling areas. Figure 3.3 vividly illustrates the current situation with a trawl fishery dependent on very small cichlid species of low economic value in comparison to the species that have been lost. DoF issues an excessive number of licenses for the commercial trawler fleet and although it is responsible for enforcement, that enforcement remains non-existent. FISH has made commendable efforts to resolve conflicts between commercial and artisanal fisheries through the establishment of the CFA as a body for communication with the artisanal sector, and through setting up a trawl tracking system in association with FAO/FiRM. Weak political will at higher levels of government hinder trawlers' compliance to license conditions. Although co-management can improve enforcement by empowering BVCs to cooperate with DoF in surveillance and monitoring activities, the enforcement mandate belongs to DoF and needs to be substantially improved and increased. FISH recognized this and through FSTAP it engaged parliamentarians to raise awareness of fisheries issues among lawmakers.

FIGURE 3. TRAWL CATCH CONSISTING OF VERY SMALL CICHLID SPECIES FROM DOF RESEARCH VESSEL.



FISH has successfully promoted PFM by strengthening political will in local governments, building capacity in local communities, and helping to develop BVC bylaws. Sustained PFM success depends on equitable revenue sharing among central and local governments and empowered BVCs to be able to co-manage their resources.

ANALYTICAL SUMMARY FOR EVALUATION QUESTION 2

As stated in the mid-term review, the majority of stakeholders involved in the project are fully committed to implementation of PFM. They understand their respective roles in implementing PFM and their organizations coordinated responsibilities reasonably well. DoF has endorsed co-management and community ownership of the PFM process and since the agreements to empower the BVCs to implement their bylaws, which have also been signed by the Ministry of Justice. Local government demonstrates its support through strengthened District Development Plans. FISH supported Fishery Associations and subFAs to represent multiple BVCs. Longer-term BVC sustainability remains uncertain, however, without FISH support. Long-term sustainability depends on legally empowered and financially secure BVCs operating in a more equitable revenue sharing environment among central and local governments. Other factors for success include prompt District Council approval and enforcement of BVC By-Laws and more productive relationships with Traditional Authorities. It is evident from the field discussions that there is full recognition of these factors by Traditional Authorities (represented by village headmen in several of the BVC meetings) and in District Councils (notably in interview with the Director for Planning and

Development in Zomba District). Successful co-management should continue to involve all such stakeholders in the process. Financial management training for BVCs was piloted at a late stage in the project. Illegal fishing remains a problem in the commercial trawl sector and requires major political commitment at a higher level to resolve the current critical situation.

RELEVANT RECOMMENDATIONS TO EVALUATION QUESTION 2

1. The FISH project has prepared the groundwork for future activities to rehabilitate fisheries of southern Lake Malawi and Lake Malombe. The partnership model has been successful in practice, BVCs that were established using methods developed during the project are generally successful, and therefore it is recommended that the PFM models developed during the project, including for example the 6-step process for establishing functional BVCs with their own management plans and bylaws, should be extended throughout Lake Malawi in the REFRESH project. The establishment of a network of community agreed sanctuaries is also a key component that should be implemented.
2. There are several steps to this approach. It is recognized that the BVCs have established their own bylaws, but these should be open to revision based on many potential factors. The viability of implementation is key, as if all fishers ignore bylaws there is little point to having them in place. Bylaws should also be subject to regular review to determine if they remain relevant. Bylaws should also be reviewed based on improved knowledge of the status of fisheries and the scientific basis for regulations. This requires close and productive relationships between the community organizations and DoF. Community structures need support also from government enforcement agencies such as the Police and the DoF when called upon to deal with issues such as recalcitrant fishers. The establishment of subFAs at district level should also be encouraged, Coordination at a higher level, i.e. FAs at the ecosystem level, appears more problematic because of funding and transport issues to hold effective meetings.
3. While the project implementation approaches by FISH have broad applicability to fisheries management throughout Malawi and countries with similar management problems, the biodiversity conservation approach needs to be reviewed. Although the concept of establishing community-initiated sanctuaries and brush parks is theoretically sound, sanctuaries in the severely overfished areas where they are most needed are insufficient. Fish reserves need to be larger than those in place to be effective. A case in point is the situation at Dwangwa in the central part of the lake, where the Dwangwa sugar estate creates an effective sanctuary approx. 12 km long with no beach seining allowed. As a result, chambo catches in the region are reported to be healthy and stable (JGM Wilson, per. comm.). There are examples elsewhere in the region of fish reserves, and fisheries management authorities could learn from such examples. For example, in the Upper Zambezi River in Namibia, two pilot fish sanctuaries have been established, both approximately 13 km long. These reserves are patrolled by community fish guards and are believed to be having some success in arresting the rapid decline in fish catches in the area. The presence of substantial community-managed protected areas has an added advantage in raising awareness in the region of the importance of managing fisheries and protecting breeding grounds. Fish sanctuaries need to be larger than those established by communities in the FISH project area to be effective. Communities should be supported to install structures that prevent fishing rather than acting as FADs as has happened in Lake Malombe. The removal of destructive fishing gears from the fisheries, following the Lake Chiuta example of PFM, should be the highest priority for an effective PFM approach, as this would prevent the destruction of brush parks.
4. The biodiversity monitoring process in the project and the reported results are flawed. Future project interventions using PFM should link with conservation organizations, as is being done currently with IUCN, which has been collaborating with DoF scientists to identify Key Biodiversity Areas for implementation of conservation actions. If such a collaborative approach can be continued and

extended, it will be more effective than the present efforts of individual BVCs. Improved monitoring methods are developing rapidly, and video recording has been successfully piloted in the fish sanctuary in Nkhudzi Bay (OLF Weyl and A van Wyk, pers.comm.). The initial (unpublished) results demonstrate the impact of the very high fishing pressure in the SE Arm of the lake in comparison with other parts of the lake such as the Mozambique shoreline.

EVALUATION QUESTION 3

To what extent has FISH built the capacity of the Department of Fisheries on increasing utilization of science, analysis and information for evidence based decision making in sustainable ecosystem based fisheries management? What strategic support to the Department is being appreciated and valued and would have been greatly valued and appreciated?

Results Logic: The University of Rhode Island (URI) provided training for the Monkey Bay Fisheries Unit in stock assessment through training courses in Malawi and participating in research programs. In addition, two Malawian researchers were enrolled on MSc courses with one of these conducted the research project for his MSc on the fish populations of weeded and open areas of Lake Chilwa. This researcher is now based in Liwonde as Fisheries Officer and is not conducting further research. URI Research programs with URI based on preliminary planning exercises on priority areas for research helped the development of management plans for the management of the usipa and chambo fisheries and this involved the second MSc student, who conducted an assessment of the species using a bio-economic model. Biodiversity surveys were supported to assess impacts of project activities such as fish sanctuaries and brush parks. FISH helped to develop training curricula for Mpwapwe Fisheries Training College to include PFM. FISH helped to develop an online Malawi Fisheries Repository to make information on the fisheries widely available. FISH, in cooperation with FAO/FiRM established a tracking system for the commercial fishing vessels on the lake. FISH played a major supporting role for DoF by engaging directly with the Parliamentary Committee for Agriculture and Natural Resources. This was an innovative and successful approach that should be replicated in future projects.

FINDINGS FOR EVALUATION QUESTION 3

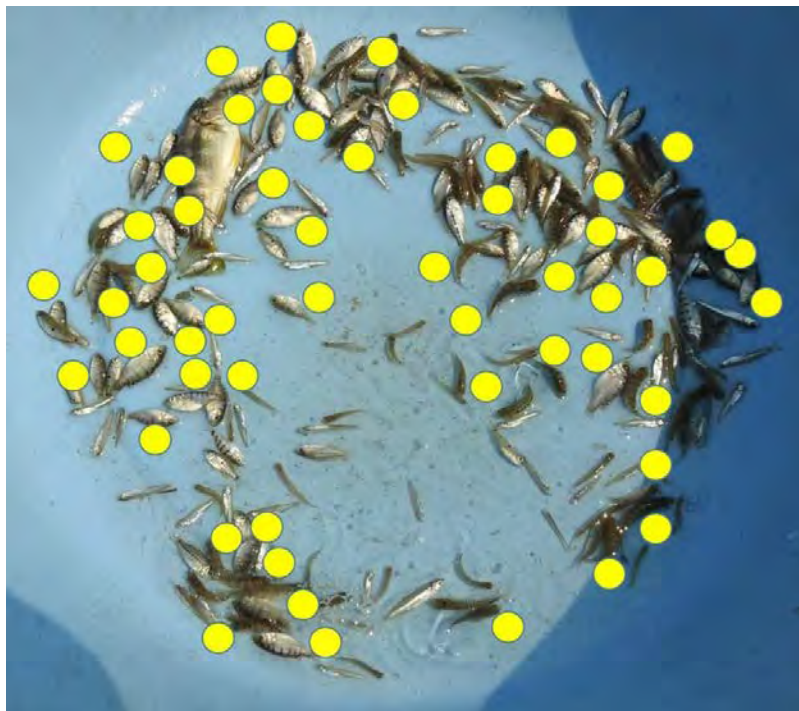
1. The FISH Project provided a considerable body of useful information to inform the DoF in its activities. To mention just two of the many examples: the reports assessing environmental threats and opportunities and the 2-volume guide to participatory fisheries management in Malawi are extremely valuable documents to inform departmental activities. The support for curriculum development at Mpwapwe Fisheries Training College was also valuable. The project was prolific in documenting its numerous activities.
2. A major contribution by FISH to support DoF was its engagement with the Parliamentary Committee for Agriculture Irrigation and Water Development, including field trips for the committee to demonstrate the issues surrounding fisheries management. There is recognition of the need for greater funding for natural resources management and the DoF received increased funding in the last financial year. Despite this the DoF remains under-funded, facilities are in a poor state of repair and there is little or no money for field activities such as extension to support the BVC activities and for law enforcement.
3. It was stated by many DoF District and field officers that the communities received support from FISH but that in comparison DoF itself received little support. FISH provided transport for the implementing partners' extension activities (including 28 motorbikes) but not for DoF field stations. The field officers suggested that they would have been in a better position to work with the partners if they had received

vehicles. It was, however, noted by FISH staff that the DoF extension officers and DFOs participated in trainings, workshops, workplan meetings, PMU meetings and field visits.

4. URI provided training courses in stock assessment for the staff of Monkey Bay Fisheries Research Unit. The training was provided by URI scientists with a marine fisheries background and limited experience of the complexities of the extraordinary complex multispecies fisheries of Lake Malawi, or of African freshwater fisheries in general and the very different circumstances found in severely overfished lakes Malawi and Malombe. As a result, while general stock assessment research techniques were well covered in the training, the complexities of the Malawi fisheries were not fully appreciated, documented below. These weaknesses were evident in the review of the research outputs by the Evaluation team and external experts consulted by the team.
5. Apart from stock assessment techniques, gaps in research capacity of DoF have been weakly addressed by FISH. FSTAP and NFARA are not yet functional despite being key components of the FISH strategy. The most senior Malawian fisheries scientists are now based in Lilongwe and the less experienced researchers in the Monkey Bay Fisheries Research Unit would benefit from guidance and mentorship from senior fisheries scientists with extensive African experience.
6. Correct identification of fish species is essential for quantification of biodiversity and assessment of success or otherwise in project interventions. As stated above, the biodiversity reports produced by the project contain many errors in fish identification, particularly for Lakes Chilwa and Chiuta, and these studies would have greatly benefitted through the participation of experts with a thorough knowledge of these faunas and the historical situation in those lakes.
7. The online Malawi Fisheries Repository is an excellent contribution supported by the project but there are weaknesses that need to be addressed. A large number of key documents to inform fisheries management in Malawi are not yet online, and URI's literature review for the project is weak as a result. For instance, the synthesis of URI's research input provided to the Evaluation team states in the first paragraph that most of the fisheries research outputs in the past were academic in nature, overlooking the volumes of applied stock assessment reports produced by the DoF and by many projects in the previous five decades. The outputs of the major FAO research projects conducted in the 1970s and 1980s guided the establishment of the government's fisheries regulations. While the fisheries and the ecology of the lake have changed dramatically for the worse since those studies were made, the present status of the fisheries cannot be properly assessed without a thorough review of the historical status. In this regard, Dr Jamu has made the following comments that should be taken into consideration. "There are two issues to the accessibility of research documents on the repository. (i) is copyright for published materials - in this case abstracts and links are inputted in the grey literature, (ii) hard copies that are not yet digitized - the project bought a scanner and software to digitize hard copies and the progress was dependent on resources (LUANAR led) and availability of hard copies. The large volumes of grey literature at Monkey Bay need to be digitized and made accessible in the repository."
8. The project produced a stock assessment report and management plan for usipa, *Engraulicypris sardella* that utilized a very limited set of newly collected data to state that the stocks were overfished and that effort needed to be reduced. The reports overlooked a considerable body of published evidence that shows usipa stock abundance is driven by environmental factors and is independent of stock size. Large cohorts can be produced from a very small brood stock dependent of food availability for the fry while, as appears to be the case this year, a large cohort can be followed by a very modest one. Discussions by the evaluation team with senior international fisheries science experts have unanimously confirmed that the management plan is flawed because the usipa stock is driven by

environmental factors and net fishing. The management plan should not be implemented in any form by DoF or through PFM. Indeed usipa fishing should be strongly encouraged in years with good recruitment as it may help to divert fishing effort from the other overfished species. The only recommendation endorsed by experts is that the chirimila nets used for usipa should not be lined by mosquito netting as they catch tiny fish fry. The other small meshed netting observed in the nets on the beaches, 6 mm or 8 mm mesh, is acceptable. Usipa fishing should be carried out pelagically using chirimila nets and shore-based seines should be prohibited.

FIGURE 4. THE CATCH FROM A SINGLE BED MOSQUITO NET OPERATED BY CHILDREN ON THE LAKESHORE. EACH YELLOW DOT MARKS A JUVENILE CHAMBO. THE LOSS TO THE CHAMBO STOCK RESULTING FROM USE OF THESE NETS AND BEACH SEINES LINED WITH MOSQUITO NETTING IS COLOSSAL.



9. The project is producing a revised management plan for chambo, though this is reportedly still not complete. The Department already has a comprehensive and largely sound chambo restoration plan that has yet to be fully implemented. The project worked closely with DoF and the recommendation to update the strategy was arrived at by Malawi DoF, project and academic scientists. It was resolved to update the strategy and develop an implementation plan which was the weakness of the 2005 CRSP. The project is therefore responsive to the needs and changing conditions of Malawi fisheries, but implementation needs to be expedited, and to include actions that are vital for the recovery, most notably the eradication of beach seines from the major chambo fishing areas
10. The biodiversity survey results in the project reflect a lack of taxonomic expertise and inadequate sampling techniques. Results in some cases, e.g. Lakes Chilwa and Chiuta contain numerous errors and greatly underestimate biodiversity.

CONCLUSIONS FOR EVALUATION QUESTION 3

- I. The FISH project's copious outputs provide an outstanding resource to guide the PFM activities of DoF in the future as the lessons learned are used for implementation of PFM throughout Malawi's fisheries.

2. The engagement of FISH with the Parliamentary committee was innovative and should be implemented in future projects to maintain high awareness of fisheries issues in government.
3. The project has supported the development of training curricula for Mpwepwe FTC for PFM for both DoF staff and partners in PFM.
4. The support for stock assessment and biodiversity research should have included the involvement of established fisheries scientists with extensive experience of African Inland Fisheries.
5. The fisheries management plans developed in FISH need revision and should not be implemented in their current form.

ANALYTICAL SUMMARY FOR QUESTION 3

The FISH project provided a great deal of support for DoF through development of teaching curricula at MFTC, training workshops, and support for two postgraduate degrees. Fish also engaged in planning and participation in research programs aimed at developing fishery management plans and assessing impacts of initiatives such as establishment of fish sanctuaries and brush parks. The major achievement of URI's support to DoF was the publication of copious reports on all aspect of the project's activities. Those related to PFM will provide guidance to DoF for furtherance of PFM aims throughout the country. The project also established a vessel tracking system for the commercial fishing vessels on the lake in collaboration with DOF and the FAO/FiRM Project, The initiatives to improve access to information via the Malawi Fisheries Repository and to improve research coordination and planning through FSTAP and NFARA are noteworthy but are in need of further development and support for implementation and sustainability. Peer-review, consulting with senior fisheries scientists with extensive long-term experience in African freshwater fisheries would have resolved these issues.

RECOMMENDATIONS TO EVALUATION QUESTION 3

1. The recommendations contained in the follow-up REFRESH project document to provide additional support to DoF are endorsed by this Evaluation. This section of the REFRESH document highlights a major concern raised in this Evaluation and shows that it has been recognized by USAID/FISH: "Research also indicates that the knowledge and capacity base for decision making and sustainable fisheries management in Malawi is limited. Regular fish stock assessments are rarely undertaken, leading to a poor understanding of the effectiveness of previous participatory fisheries management approaches." Furthermore, the REFRESH document states: "...recognize that capacity building of the DoF and district councils goes beyond technical content and should include some infrastructural and/or material support depending on resource availability."
2. Support for sound fisheries research needs to be given greater recognition. The Malawi Fisheries Repository, FSTAP and NFARA need to be fully resourced. Furthermore, these resources need to be supported by an experienced panel of African freshwater fisheries experts who will provide peer review and ensure that they function effectively and address the needs of the fisheries sector. There is a potential role in this for ACARE, under the guidance of Dr. T Lawrence. The CoP for FISH is in communication with ACARE. There are many other scientists with extensive experience of African fisheries who are available for consultation, several of whom have been consulted during the course of this evaluation.
3. With Lake Malawi having the highest fish diversity of any African lake, accurate fish identification is essential to understand biodiversity conservation as well as fisheries trends. This has been neglected by DoF and attention needs to be paid towards correcting this gap in available expertise.

EVALUATION QUESTION 4

To what extent did FISH's partnership model (and the kind of FISH's partners) used in the implementation of FISH with regards to achieving the activity goals and reducing threats to wild-caught fisheries? To what extent did FISH engage the private sector and civil society in solving the challenges faced with threats to fisheries biodiversity and aquaculture?

Results Logic: The FISH partnership model was an innovative approach that generally worked well even though it involved working through the extension services of involving a range of NGOs that initially had little or no experience of fish and fisheries. By providing training to these organizations, i.e., Christian Aid, Emmanuel International (EI), Wildlife and Environmental Society of Malawi (WESM), Centre for Environmental Policy and Advocacy (CEPA), Community Initiative for Self-Reliance (CISER), the project developed a cadre of technicians skilled in the techniques needed for community based management of natural resources and greatly increased awareness of fisheries issues in the country. These acquired skills should continue to be valued assets for the NGOs involved well beyond the end of the project.

Involving the other government departments involved in community support, most notably Forestry, was also successful, FISH worked with local university institutions, mainly LUANAR, to develop research and planning expertise. This remains a work in progress. FISH also partnered with the University of Rhode Island - Coastal Resources Center (URI-CRC) to provide the scientific expertise to support the project's activities. This was a well-conceived program that worked well for the development of the PFM focus of the project. For stock assessment and development of fishery management plans, however while the Malawian research scientists are trained in stock assessment methodology, the program would have benefitted from the involvement of experienced fisheries scientists with long experience of African Inland Fisheries in guiding the assessments and their interpretation. The project's initiative in engaging with the private commercial fisheries sector to attempt to resolve conflicts with the artisanal sector was an important contribution that needs to be extended. Engagement with the Parliamentary Committee for Agriculture and Natural Resources was an initiative that should serve as a model for all natural resource management initiatives in future.

FINDINGS FOR EVALUATION QUESTION 4

- I. The FISH project partnered with a number of national and international NGOs and universities. In general, there were, however, administrative issues as a result of the number of NGOs with different missions and levels of capacity. The number of NGOs was questioned by some stakeholders, notably in DoF HQ. There was also criticism that initial partners, notably Christian Aid, subcontracted other NGOs to carry out the assigned tasks, and this led to problems with accountability and disbursement of funds. As a result FISH adapted its management to work directly with the subcontractors involved. The program was well-planned and successfully implemented.
- I. The local NGOs involved were Christian Aid, EI, WESM, CEPA and CISER. All have proven track records in community engagement and were sound choices for implementation of the program. The project had a dynamic core team incorporating leaders from all the local partners. The partnership model was recognized as a major step forward in strengthening capacity in the village communities. This was demonstrated by the confidence in their improved capacity to function effectively that was apparent in all the village committees with whom group discussions were conducted in the Evaluation. Fish and its partners generated great awareness at all levels of stakeholder engagement. Inevitably there was some variation in the education levels and abilities of the extension officers, but it was the opinion of the MFC trainers that they were generally keen and well-capacitated to carry out their tasks following their training programs. Interviews with the BVCs visited during the evaluation revealed confidence in their capabilities as a result of their interactions with the extension workers, and demonstrated the confidence of the BVCs in the advice they received from extension officers.

2. At the village level, the project engaged with Beach Village Committees, River Village Committees and Village Natural Resources Management Committees, with tree planting and forest rehabilitation being key components of the latter. In all focus group meetings the Evaluation team found that the committees were well-trained, committed and enthusiastic, and this reflects well on the involvement of the partner organizations who provided the motivation and training.
3. Although all BVCs interviewed have been well-trained and are well-motivated, their effectiveness is varied. This has been discussed in detail above in findings for Question 2. Where human populations are high and the fisheries are severely overfished, the effectiveness of BVCs is restricted and thus there should be greater emphasis in future on supporting Fishers Associations (FAs) to address the issues on a broader ecosystem basis rather than at the beach/village level. The DoF also needs to be resourced to fill its mandate for fisheries management and enforcement in support of the communities.
4. The project also engaged with the commercial fishery sector and was successful in helping to open dialogue between the commercial fishers through the CFA and the artisanal sector through its FAs. The project successfully motivated for all commercial vessels to be fitted with tracking devices to ensure they operate according to the terms of their licenses. This was implemented in partnership with the FAO/FIRM Project. It is a step in the right direction towards management of the commercial fishery but unfortunately the issue of illegal unlicensed trawlers has still to be addressed, and this is at present beyond the capacity of the BVCs to control.
5. The project's research partnership with URI was successful in developing the PFM model. In partnerships with PACT and DoF, URI produced many valuable reports and manuals to guide PFM and these will continue to be valuable for expanding the PFM partnership model to other fisheries in Malawi and potentially other neighboring countries. Noteworthy, as stated in the findings under Question 3 above, are the reports assessing environmental threats and opportunities and the 2-volume guide to participatory fisheries management in Malawi. The partnership with URI was less successful in the field of stock assessment and fisheries management planning. The weaknesses are discussed above in findings for Question 3.
6. The project set out to improve on fisheries research and management planning with coordination between URI, the LUANAR Aquaculture and Fisheries Science department, the DoF and the National Commission for Science and Technology (NCST). For improving communication the strategy included the development of an online Malawi Fisheries Repository, the establishment of the Fisheries and Aquaculture Scientific and Technical Advisory Panel (FSTAP) and the National Fisheries and Aquaculture Research Agenda (NFARA). The aim of NFARA is to guide researchers, policy makers, program implementers, academic institutions, development partners and other stakeholders in Fisheries and Aquaculture in the implementation of all research activities. These initiatives are excellent but had not been fully implemented by the close of the project. The Malawi Fisheries Repository is functional but at present does not contain the majority of the key scientific reports and papers on which Malawi's fisheries regulations have been based in the past. A major effort is needed to bring the repository up-to-date and more reliably accessible on-line. FSTAP and NFARA need to be provided the resources to make them fully functional.
2. URI lists the following impacts of FISH project science outputs, each of which are relevant to the question about implementation and contribution to achieving goals and reducing threats to fisheries; (1) Ecosystem Threats and Opportunity Assessment (ETOA). Information from the ETOA was used to inform all aspects of management and all District Development Plans. (2) Usipa research and management plans. The management plan is flawed and has not been implemented. The consensus of

expert opinion consulted by the Evaluation team is that as the usipa stock size is determined by environmental factors and is independent of fishing effort, based on several key papers (e.g. Tweddle and Lewis, 1990; Lewis and Tweddle, 1990; Thompson, 1996; Thompson and Irvine, 1997)⁷, the management plan should not be implemented. Indeed, fishing for usipa should be encouraged as this will reduce effort on the overfished larger species in the lake. This suggestion is strongly endorsed by Kolding et al. (2019), who reviewed the fisheries for small pelagic species throughout the African lakes, including the usipa fishery in Lake Malawi, and criticized the emphasis on “management” of the fisheries. The Evaluation team agrees that the chirimila nets used for the usipa fishery should not be lined with mosquito netting. (3) Chambo fishery assessment. Various chambo management and restoration plans have been developed for southern Lake Malawi and Lake Malombe but none was effectively implemented. Nothing has changed other than the fishery continues to decline. Establishing bylaws and attempting to enforce regulations is admirable but until there is full political commitment to restoration of the habitats and removal of all the illegal gears, the BVCs on their own are not able to implement a management plan. (4) Climate variability early warning system for Lake Chiuta. No implementation has been necessary. (5) The mapping, assessment and protection of deepwater refugia in the Likangala and Domasi Rivers to aid restocking of Lake Chilwa after re-filling following recession is a successful exercise and the RVCs efforts should be encouraged, but these rivers are of relatively low importance as the major source of Chilwa fish on refilling is actually Mpototo Lagoon (Chanyenga et al., 2018). Future conservation efforts would be better directed towards establishing Mpototo Lagoon as a fish sanctuary. (6) Economic impacts of post-harvest losses. The studies on the economic value of the fisheries were used to raise awareness in Parliament of the vital importance of fish for food security and to the economy, resulting in improved budget allocation to DoF from 2018. This was an important success for the project. Better, more fuel-efficient (theoretically) fish processing kilns were promoted by the project with varying success, as has been the case for numerous such projects undertaken in Malawi since the 1960s. (7) Assessment of sanctuaries. The positive results for biodiversity suggested by the participatory research are questionable. In particular, the claimed higher biomass for chambo in the Malindi area is a reflection of the intense fishing effort on the opposite side of the lake. The sanctuaries and brush parks should continue to be encouraged and expanded, but research on their efficacy needs to be reviewed. An underwater video recording research program would be a more suitable way of assessing their impact. (8) Fishing Vessel Monitoring System on Lake Malawi. This is an excellent initiative but needs more effective implementation and must be mandatory for all vessels.

7. The project engaged with the private sector to assess the aquaculture potential, but in a limited way. This is covered under Evaluation question 2 above.
8. The FISH partnership with DoF is covered in Question 3.

⁷ FAO (1982). Fisheries Expansion Project, Malawi. Biological studies on the pelagic ecosystem of Lake Malawi. Rome, FAO, FI:DP/MLW/75/019, Technical Report 1, 182 pp.

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Thompson, A.B. & Irvine, K. (1997). Diet-shifts and food-dependent survival in *Engraulicypris sardella* (Cyprinidae) larvae from Lake Malawi, Africa. *Journal of Plankton Research*, 19(3): 287–301

CONCLUSIONS FOR EVALUATION QUESTION 4

1. The choice of local partners was very successful and undoubtedly improved the capacity of the natural resources NGO sector in Malawi, as well as allowing for effective coverage of the project area by the trained technicians.
2. The partnership model had varied success across the four ecosystems in terms of reducing threats to wild-caught fisheries. Success was inversely related to human population pressure.
3. The model was unanimously recognized as a major step forward in strengthening capacity in communities. All committees visited have confidence in their improved capacity to function effectively as a result of the project interventions.
4. FISH and its partners generated awareness at all levels of stakeholder engagement from beaches to Parliament, also including the private sector, such as commercial fishermen.
5. It must be recognized that this project's stakeholder engagement was just an early stage in a long process to fully implement PFM. It built on a PFM learning process that effectively began in the Malawi fisheries in the early 1990s with varying degrees of success. The project has created a sense of empowerment by the communities and has laid the groundwork for future efforts to reduce fishing pressure and ensure all fishers follow agreed and ratified bylaws.

ANALYTICAL SUMMARY FOR QUESTION 4

The project's partnership approach to PFM was successful. The different partners all brought their particular areas of expertise to the program, and in turn the training provided to the partners in fisheries issues developed their capacity to engage in broad-reaching natural resource participatory management. While there is inevitably variations in skill levels of technicians that were employed by the different partners, the Evaluation team notes that all the BVCs, RVCs and VNRMCs interviewed had similar levels of knowledge and confidence in their empowerment whichever NGO was engaged in their training and support. Interviews with senior officers in all the NGOs revealed an excellent understanding of the issues and an appreciation for the support provided by the project.

1. The REFRESH project proposal is endorsed in its entirety by the Evaluation team. It recognizes the critical importance of strengthening capacity and resources for the Department of Fisheries and specifically notes the importance of working with the fisheries research units in Monkey Bay and Senga Bay. These research units should benefit from partnerships with recognized fisheries scientists with long experience in African inland fisheries and knowledge of the enormous changes that have taken place in those fisheries since the 1940s. Research undertaken in FISH demonstrated a much shorter time perspective that led to weaknesses in interpretation of research findings and resulting management recommendations. There are several options for the involvement of experienced scientists. For instance, as stated above, ACARE, under the guidance of Dr. Lawrence, aims to coordinate research and fisheries restoration in African Great Lakes. Though it is still in its infancy it has the potential to draw on the expertise of skilled and experience scientists in Africa. Research undertaken in FISH demonstrated a much shorter time perspective that led to weaknesses in interpretation of research findings and resulting management recommendations.

EVALUATION QUESTION 5

To what extent did the integration of climate change and biodiversity in FISH's design and the 3 C approach of co-location, collaboration and coordination with other USAID initiatives (e.g., Feed the Future); and b) other Development Partners efforts yield women's empowerment, livelihoods, (resilience) adaptation and biodiversity

conservation benefits. To what extent did FISH practice adaptive program management? Were the findings, recommendations, and lessons learned from the mid-term evaluation taken into account during the remainder of the implementation period, and if so, what was the impact of any course corrections?

Results Logic: In terms of fisheries management, conserving biodiversity and hence ecosystem health is of vital importance. Lakes Chilwa and Chiuta because of their shallowness and, in the case of Lake Chilwa, frequent drying up, are particularly vulnerable to potential impacts of climate change. Understanding these components under Output 1 is therefore of high importance particularly in providing the enabling environment for conservation and management under Output 2 and identifying the priority threats to ecosystem biodiversity under Output 3. With many other initiatives for food security in the country and notably in the project's districts, coordination with those initiatives was an effective way to approach Output 4.

FINDINGS FOR EVALUATION QUESTION 5

1. On Lakes Chilwa and Chiuta in particular, the project's 3C approach for climate change adaptation was effective. The project built on many previous projects, some unrelated to USAID, notably the LEAD Lake Chilwa Basin Climate Change Adaptation Program, but also including the USAID COMPASS II project that ran from 2004-2009. The FISH project addressed the issues surrounding drying of the lakes by developing an early warning system for Lake Chiuta climate, and by promoting protection of pools in rivers feeding Lake Chilwa to act as refugia for fish to restock the lake after periods of desiccation.
2. There was natural overlap between FISH's goal and the contributions of other donor activities, particularly in the case of PERFORM, ECRP, WALA and TOGETHER. FISH also used capacity development supported by USAID to strengthen its on-the-ground presence, e.g. the NJIRA activity by Emmanuel International was important for work in target communities for Christian Aid contributions under FISH. Collaboration was also noted with upper catchment activities implemented by NJIRA and the IDRC-funded Nsomba ndi Chuma Project.
3. WALA's focus under EI on agronomic practices and grassroots work with Village Savings and loans groups added value to the FISH project in using technicians exposed to such programs. CEPA's partnership role on policy and advocacy as well as knowledge and information, supported mobilization of public sector support for FISH's work in the project districts, although their role in working with central government had to be taken over directly by the FISH project management. FISH overlapped with other development partners implementing biodiversity and watershed programs, notably FAO/FiRM on Lake Malombe and Lake Malawi, UNDP-GEF on climate resilience support to Mangochi and Machinga, supporting the Lake Chilwa Climate Change Adaptation Project and the Lake Malawi Basin Program.
4. Discussion with the key implementing partners demonstrated their capacity to learn and adapt as the program proceeded. Without such adaptability the project could not have achieved impressive results it obtained in empowering the fishing communities and others through their BVCs, RVCs and VNRMCs.

A major recommendation from the mid-term review, although actually implemented in advance of the review, was to switch resources into on-the-ground implementation in biodiversity conservation and natural resources management, with implementation sites linked to biodiversity hotspots and vulnerability data to prioritize best locations. The project responded to this recommendation and initiated biodiversity surveys to assess the impacts of sanctuaries. While these were a step in the right direction, they lacked baseline data and also scientific rigor in terms of assessing the validity of results.

While participatory research by communities is admirable, the results need to be informed by scientific study and this needs more emphasis in future.

In the revision of project activities, the budget for URI and for conservation agriculture was reduced, and attention was strongly focused on completing the management agreements for BVCs, developing sanctuaries, developing business models for post-harvest technologies, all to ensure overall success in PFM.

5. The project recommended that implementation of FSTAP, NFARA and the National Fisheries Communication Strategy should be given priority. These, however, are not yet fully functional.
6. The mid-term review was over-ambitious in recommending that the project prioritize habitat protection efforts based on Environmental Threats and Opportunities Assessment findings that identify critical habitats. The recommendations state that: “As best practices, these methods may be considered in district State of Environment Reports (SOER) and/or included in Environmental Action Plans (EAP) that will form the basis for the respective DoF, FA and BVC fisheries management plans.” A great deal of work will be needed to put such plans into practice. A further mid-term review recommendation is to “develop an eco-regional conservation strategy to integrate management activities into a coherent, long-term plan to protect biodiversity. Among other tasks design a network of connected protected areas and prioritize restoration sites. Identify long-term conservation goals and set visions for achieving them over 5, 15, and 50 year periods.” In this context it should be noted that IUCN has developed proposals for Key Biodiversity Areas to be recognized throughout Malawi’s lakes. These sites are based on biodiversity hotspots, species recognized as under threat in the latest Red Data Assessments published in 2018, and the potential for protection. They have been developed in close partnership with DoF. There is therefore now scope for development of a well-informed conservation strategy for such hotspots.
7. The mid-term review recommended linking stock assessment to fishery management decisions, notably for usipa and chambo management plans. The project prepared these plans but they have not been implemented, fortunately in the case of the usipa strategy, as explained earlier in this report.
8. The review recommended greater capacity development for community leadership. In response the project initiated a pilot scheme for training BVCs in financial management and particularly in self-financing. This needs to be expanded in future to all BVCs, both existing and those established in future.
9. The review emphasized the need to advocate for policy reform at higher levels of government and to develop messages to explain benefits of limited entry fisheries. It recommended assessing possible strategies to introduce limited fisheries and to enhance the sustainability of the co-management framework. These are all long-term issues that have handicapped fisheries management in Malawi for many decades and it was unrealistic to expect the project in its last two years to have any major breakthrough in developing any such strategy.

CONCLUSIONS FOR EVALUATION QUESTION 5

- I. The project was successful in its 3C approach, with impressive coordination with other projects in the area and with NGOs active in the fields of community development, also building on the results of previous projects in the areas. It addressed the issues of empowerment, livelihoods and conservation with some degree of success but these are long-term goals requiring commitment long beyond the lifespan of a single project.

2. The project was flexible in its approach and adapted well to different circumstances. It attempted to adapt to the changes recommended in the mid-term review.
3. The mid-term review recommendations were well-intentioned but most were overambitious and could not be expected to be achievable in the remaining lifespan of the project.

ANALYTICAL SUMMARY FOR QUESTION 5

The potential threats posed by global climate change to the fisheries of Lakes Chilwa and Chiuta are widely recognized, although in truth they are dwarfed by the local impacts of deforestation, flash flooding, siltation and pollution as a result of anthropogenic impacts. The rapidly burgeoning human population is putting severe stress on the aquatic ecosystems. The FISH project's 3C approach is bearing fruit and village committees (BVCs, RVCs, VNRMCs) are active in attempting to stem and reverse the environmental devastation. With the capacity built up in the committees and in the technical staff of the partnering NGOs, and with continued support from other programs including those supported by USAID, the project's activities should continue after the project, contributing to the goals of empowerment of communities and particularly women, livelihoods, and adaptation to changing environments.

The project was a flexible in its approach and adapted well to changing circumstances. The recommendations of the mid-term review placed additional demands on the project. While they were sound recommendations, they were over-ambitious, notably for biodiversity surveys given the need for improvement of taxonomic expertise available in Malawi to quantify the diversity, and in addition the absence of baseline data on the areas being studied. The time span was too short to detect any meaningful results.

RELEVANT RECOMMENDATIONS TO EVALUATION QUESTION 5

1. The project's 3C approach to coordinate and collaborate with numerous other initiatives by USAID and others working with similar community-orientated goals should be expanded to other Malawi fishery areas as proposed in the REFRESH project documents and endorsed here.
2. The recommendations in the mid-term review included Environmental Action Plans (EAP) that will form the basis for the respective DoF, FA and BVC fisheries management plans. A great deal of work will be needed to put such plans into practice. The mid-term review also recommended strategies to integrate management activities into a coherent, long-term plan to protect biodiversity, including a network of connected protected areas and prioritized restoration sites. Long-term conservation goals and set visions for achieving them over 5, 15, and 50 year periods were also recommended. These ideas need to be reviewed in the development of the REFRESH project as well as other projects and proposals such as the IUCN's identification of Key Biodiversity Areas for conservation. To conserve biodiversity a more pro-active and coordinated approach by all organizations, government, NGOs and private sector is needed, as the current dependence on the BVCs alone cannot work at present.

ANNEXES

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ANNEX I: EVALUATION STATEMENT OF WORK
Final Performance Evaluation of USAID's
Fisheries Integration of Society and Habitats (FISH) Activity

United States Agency for International Development (USAID)/Malawi,
Office of Sustainable Economic Growth (SEG)
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POINT OF CONTACT

Bruce Sosola
AOR, FISH Project
Office of Sustainable Economic Growth
USAID/Malawi

Tel: 265 (0) 177.2455 Ext. 5104

Email: bsosola@usaid.gov

Kumbukani Chirwa
COR, Monitoring, Evaluation, and Learning Support (MELS) Project
Office of Sustainable Economic Growth
USAID/Malawi

Tel: 265 (0) 177-2455, Ext. 5116

E-mail: kchirwa@usaid.gov

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Contents

I. Background

USAID's Fisheries Integration of Society and Habitats (referred to hereafter as FISH) was specifically designed to align with Malawi's Growth and Development Strategy (MGDS) and to promote sustainable fisheries for improved livelihoods for communities living around Malawi's main lakes and improve ecosystem resilience to climate change. The project period is 5 years, from 9 September 2014 to 19 September 2019. FISH is one of the key activities under "Development Objective 2 (DO2): Sustainable Livelihoods Increased" of USAID Malawi's Country Development Cooperative Strategy (CDCS). Pact in conjunction with University of Rhode Island/Coastal Research Center and Christian Aid implemented the activity in Mangochi, Balaka, Machinga and Zomba districts covering the freshwater lakes of Malawi, Malombe, Upper Shire River, Chirwa and Chiuta. The activity was essentially designed to help restore fisheries biodiversity through a wide range of interventions and increase climate change adaptation, inter alia, strengthening fisheries governance and management using ecosystem based approach to fisheries management (EAFM), science based fisheries management (stock and catch assessment and fishing effort assessment) and livelihood diversification.

USAID wishes to evaluate the performance of the project with the primary goal of this final evaluation to provide guidance to USAID/Malawi on the overall performance and what worked and what did not so as to inform future USAID programming. In this sense the evaluation will provide strategic options for future USAID/Malawi engagement in fisheries biodiversity programming, and offer lessons learned with wider applicability to other activities in Malawi and/or beyond.

II. Program Components and Description

Fish are an extremely important source (45%) of protein for Malawi's population. The fisheries of Lakes Malawi, Malombe, Chilwa, and Chiuta provide employment for over 60,000 fishers and another 450,000 individuals involved in fish processing and domestic trade. They also contain 15% of global freshwater fish biodiversity. However, these fisheries are under considerable stress from a growing population, over-fishing due to inadequate management, and environmental degradation, complicated by the effects of climate change. FISH sought to address the drivers of over-fishing and habitat degradation by improving mechanisms for local co-management of fisheries, using the following four main outputs:

1. Utilization of science, analysis, and information for decision making increased. This focused on gathering information on Malawi fisheries and making it available on a wider scale through a database; research to understand the current threats faced by the industry and options to improve conservation; and obtaining a better understanding of the effects of climate change on Malawi's lakes and potential fisheries management options to increase resilience to those climate impacts.

2. Enabling environment for conservation and management of freshwater ecosystems enhanced. This focused on ensuring an enabling legal framework for sustainable fisheries management and biodiversity conservation; greater transparency, representation, and accountability in decision-making with regard to fisheries; and building institutional and community capacities for shared fisheries management (co-management) between local communities and local/national authorities.

3. Priority threats to freshwater ecosystem biodiversity reduced. FISH focused on addressing key threats to fisheries ecosystem biodiversity conservation by implementing best practices in the three interlinked livelihood areas listed below:

- a. Sustainable natural resources management and agriculture in the catchment.
- b. Fishery habitat management and riparian zone conservation.
- c. Sustainable fishing in targeted biodiversity 'hotspot' areas.

4. Adoption of climate change adaptation measures that support resilience of communities and freshwater ecosystems increased. Component D4 focuses on developing and disseminating strategies, methods, and information that will allow vulnerable individuals and communities to become increasingly resilient in the face of changes likely to be experienced as climate change takes hold around the four target lakes and associated catchment ecosystems. Under this activity, FISH provided viable, climate smart and more environmentally friendly and diversified livelihood practices by promoting the adoption of best practices in CCA. An intensive ecosystem based approach for fisheries management and climate smart agriculture was established in six catchment areas within the project command.

FISH's link to USAID / Malawi's Country Development Cooperation Strategy

USAID's CDCS hypothesizes that if its assistance efforts are integrated across sectors, concentrated geographically, and coordinated better with other development partners (DPs), development results will be enhanced, more sustainable, and lead to achievement of its CDCS goal: Malawians' quality of life improved. The results framework for the Country Development Cooperation Strategy (CDCS) 2013-2018 contains three Development Objectives (DOs) that contribute to USAID/Malawi's overall Development Goal of "Malawians' Quality of Life Improved." FISH contributes to DO2: Sustainable Livelihoods Increased.

FISH Results Framework and Development Hypothesis

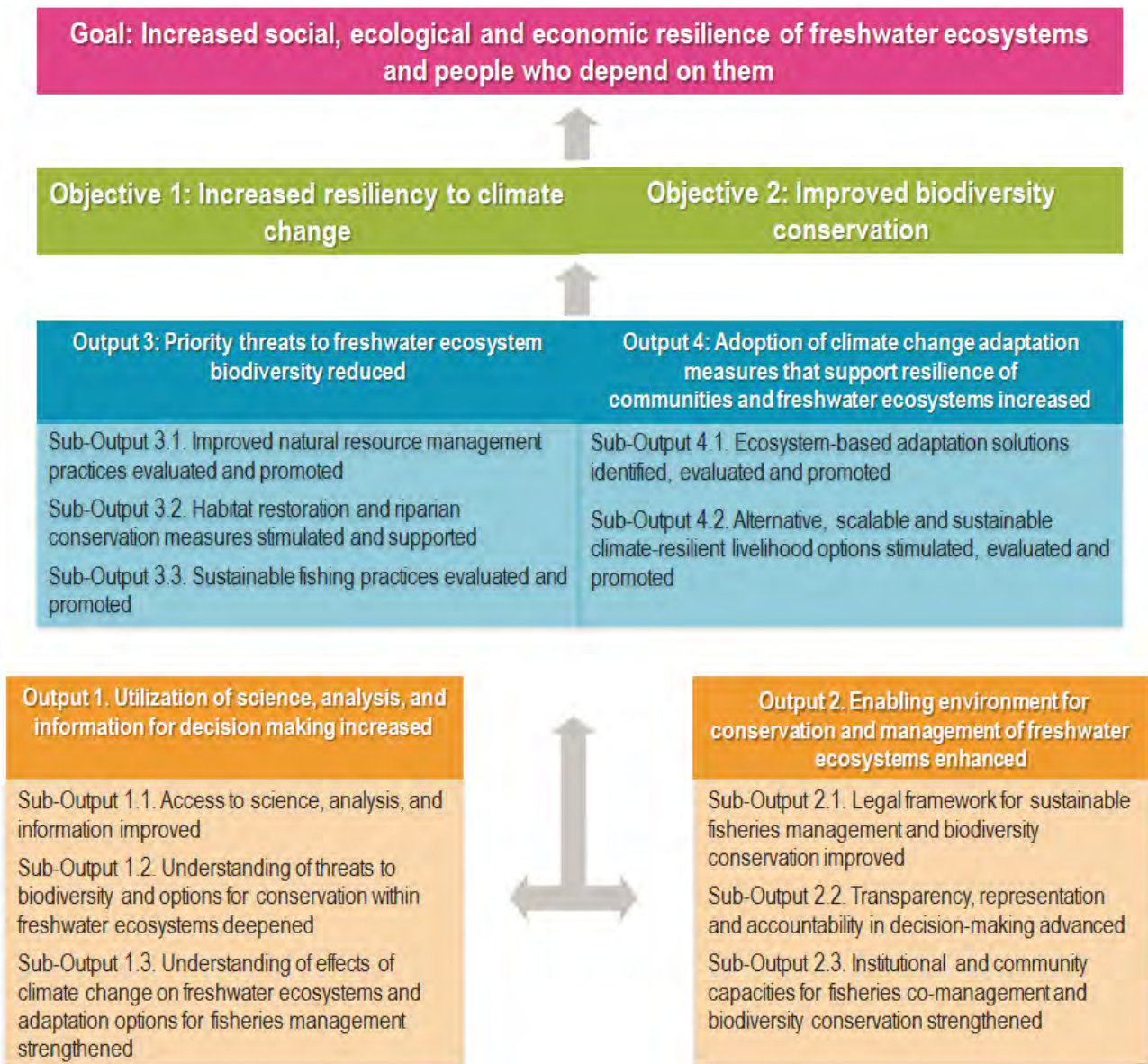
USAID has identified the development hypothesis under DO2 as: if sustainable livelihoods are increased then Malawian's Quality of life will be improved. Strengthening resiliency to climate change (IR 2.1), adding value to agricultural production (IR 2.2), better nutrition (IR 2.3), and expanding agricultural trade (IR 2.4) together are means to achieve increased sustainable livelihoods.

The FISH goal, objectives and programmatic components are linked through a theory of change that posits that *if* decisions around fisheries co-management are:

- a. Based on shared, "evidence-based" objectives and learning;
- b. Grounded in inclusive user rights and effective ecosystem-scaled governance structure, and;
- c. Strengthen the assets of communities, *then* Malawi's complex and diverse freshwater lake ecosystems can be sustained.

The FISH Results Framework is shown below in Figure 1.

Figure 1: Results Framework FISH



III. Evaluation Purpose

Consistent with USAID's 2011 Evaluation Policy and updated in October 2016, the goal of this final performance evaluation is to provide accountability, i.e. measuring project performance, effectiveness and relevance and equally important learning, i.e. generating knowledge to test the fundamental assumptions underlying project design and implementation and capture lessons learned from FISH. The evaluation should examine the activity's Theory of Change and provide the major accomplishments and weaknesses of the activity since its inception, and determine how its successes can be sustained. The evaluation should also elucidate the lessons that USAID should learn from this activity in terms of activity design and management. This evaluation will inform management strategic and programmatic options for future investments to support fisheries biodiversity conservation and climate change adaptation in Malawi.

There are four major objectives of this evaluation. They are as follows:

- 1) Based upon its Theory of Change, review, analyze, and evaluate the performance and effectiveness of the FISH activity in achieving program objectives and contributing to USAID/Malawi's efforts to reduce key threats to fisheries biodiversity and improve climate adaptation in Malawi;
- 2) Evaluate major constraints in achieving expected project results;
- 3) Determine whether the findings, recommendations, and lessons learned from the mid-term evaluation were taken into account during the remainder of the implementation period, and if so, what the impact was of any course corrections; and
- 4) Identify key lessons that can be drawn from the FISH activity to inform future programming and implementation processes.

The evaluation should include specific recommendations to USAID about how activity interventions can be sustained and scaled by other USG activities, partners, private sector firms, or by the Government of Malawi (GoM). The evaluation will identify priority areas that should be the focus of possible future programming in the fisheries sub-sector. The timing of this evaluation is important, as it will allow the lessons learned from FISH's implementation to be carried over to new USAID biodiversity programming for sustainable wild-caught fisheries.

The evaluator needs to understand the requirements for using the different funding streams, particularly biodiversity funds. Refer to the USAID Biodiversity Policy to help your understanding of USAID's threats-based approach to conservation which is important for the evaluation, capturing lessons and making future recommendations.

Audience and Intended Users

The primary users of the evaluation findings are the USAID/Malawi, other Mission colleagues, and other U. S. Government officials. Other audiences include non-USG donor organizations, the Government of Malawi, and private sector firms can use the findings to improve ecosystem based approach to fisheries management in Malawi. The evaluation report will also serve as a reference material for the future program design.

IV. Evaluation Questions

The contractor's evaluation of FISH's performance must be strategic and comprehensive. The evaluation team should ensure that data is gender disaggregated and subjected to gender analysis. The contractor shall assess FISH performance and achievements in terms of its design and against the performance indicators, targets, reporting requirements, outputs and deliverables described in the approved M&E plan, Annual Work Plans and the agreement based on the project objectives. While this evaluation is not a data quality audit, the contractor shall assess and describe the quality and use of performance monitoring data and information generated during FISH implementation. Evidence-based conclusions and recommendations on how FISH used performance

monitoring data and information in performance management are required when describing FISH effectiveness in component management.

The following questions should be addressed:

1. To what extent has FISH been able to increase social, ecological, and economic resilience of freshwater ecosystems and the people who depend on them. How robust was the Theory of Change (a reflection of program design) and project's objectives and components/interventions? What improvements/changes should be made to the Theory of Change to improve its design and management of future fisheries biodiversity programming in Malawi?
2. To what extent has increased participatory fisheries management (PFM) by artisanal and commercial fishers led to fish biodiversity conservation and livelihoods benefits, and women's empowerment? To what scale and scope have the sustainable fishing practices been adopted by the fishers and what are those practices? Are there other lessons learned from evaluating the Theory of Change, project implementation approaches that have broader applicability to fisheries biodiversity conservation for USAID Malawi and beyond?
3. To what extent has FISH built the capacity of the Department of Fisheries on increasing utilization of science, analysis and information for evidence based decision making in sustainable ecosystem based fisheries management? What strategic support to the Department is being appreciated and valued and would have been greatly valued and appreciated?
4. To what extent did FISH's partnership model (and the kind of FISH's partners) used in the implementation of FISH with regards to achieving the activity goals and reducing threats to wild-caught fisheries? To what extent did FISH engage the private sector and civil society in solving the challenges faced with threats to fisheries biodiversity and aquaculture?
5. To what extent did the integration of climate change and biodiversity in FISH's design and the 3 C approach of co-location, collaboration and coordination with other USAID initiatives (e.g., Feed the Future); and b) other Development Partners efforts yield women's empowerment, livelihoods, (resilience) adaptation and biodiversity conservation benefits. To what extent did FISH practice adaptive program management? Were the findings, recommendations, and lessons learned from the mid-term evaluation taken into account during the remainder of the implementation period, and if so, what was the impact of any course corrections?

V. Evaluation Methodology

The Contractor must propose a robust evaluation methodology to answer the key evaluation questions identified above and propose others wherever possible. The evaluation methodology must follow a mixed-method approach using both quantitative and qualitative techniques in gathering reliable primary and secondary data and valid evidence of project outcomes or impacts including review of relevant FISH, USAID, GOM, FAO, and other secondary data sources. The contractor must develop a Mixed Methods Evaluation Design Matrix that will detail the data source, data collection methods, data collection instruments and analysis of data to answer each of the evaluation questions. By using a mixed-method approach, the evaluation team is expected to gain insight on the impact of FISH project activities (mostly from quantitative data collected by the project and others) and the processes (mostly qualitative information provided by the project staff and key informants) that lead to those impacts. It should generate gender-disaggregated data and reflect attention to gender relations such as the participation of women in training. Sequential and iterative approaches should be used to integrate the mixture of methods at various stages of the evaluation.

The contractor is expected to utilize its expert judgment and evaluation best practices in selecting which methodological components to include in the evaluation design. The evaluators should utilize several different, yet complementary and inter-related forms of gathering information/data such as those described below:

Document Review

Evaluation team members will review documents throughout the evaluation process including cooperative agreement, program reports, relevant studies to ensure that comprehensive and grounded best practices will be identified.

Key Informants Interview

The team will conduct one-on-one interviews with a variety of stakeholders including fisheries, fish processors, fish traders, the most relevant GOM ministries and agencies both at central and local levels, bi- and multilateral development partners supporting fisheries, livelihoods, and climate change adaptation activities in Malawi. This will be done by administering a semi-structured or structured questionnaire.

Self-assessment

The IPs will respond to a self-assessment either through a questionnaire or standard interview checklist put together by the evaluation team and approved by USAID before use.

Expert Opinion Survey

Utilizing expert opinion is a technique used increasingly in evaluations. The evaluation team, with approval of USAID, can apply this method as well.

Focus Group Discussions (FGDs)

FGD (small group of 6 to 10 people) will be used to lead open discussions through a skilled moderator to gather semi-structured qualitative data. The preselected participants will discuss issues and concerns based on a list of key themes drawn up by the moderator. No more than 10 questions will be addressed by a group. These sessions will encourage free flowing discussion about the activity.

Mini Survey

This type of survey is small (30-40 participants) and can be performed rapidly in the field without analytical software such as SPSS or a large questionnaire. The sample size is not statistically significant; however, this type of analysis can be used to triangulate with other methods. Because of the small sample size this type of survey can be implemented quickly when time and resources are constrained.

All the methodological strengths and weaknesses should be explicitly described in the evaluation report. The report should also include any limitations of the evaluations and how they have been mitigated. Prior to the start of the evaluation, the evaluation team shall meet with EG office to refine the evaluation methodology, and address any other concerns the EG office may have.

VI. Existing Sources of Information

The evaluation team should consult a broad range of background documents apart from project documents provided by USAID/Malawi. These should include, but are not limited to, documents on freshwater fisheries management and governance efforts, and climate change adaptation, both in and outside of Malawi. The evaluation team should also review relevant GOM national strategies and policies, as well as relevant projects and strategies of other aid agencies active in Malawi. USAID Mission, MELS, and the FISH project will provide the assessment team with a package of briefing materials, including:

- The agreement for FISH activity;
- AMEL plan for FISH;
- FISH Baseline Survey;
- Project quarterly and annual reports, work plans and management reviews developed as part of routine monitoring;

- Training reports;
- Data Quality Assessment (DQA) reports;
- USAID/Malawi Country Development Cooperation Strategy 2014-19 (Public version);
- USAID Malawi DO2 Performance Management Plan (PMP);
- FISH Indicator Tracking Table (PITT);
- M&E tools;
- Training & Beneficiary database; and
- Mid-term FISH Evaluation report.

VII. Deliverables

All deliverables are internal to USAID, MELS and the Evaluation Team unless otherwise instructed by USAID. Evaluation deliverables include:

Evaluation Team Planning Meeting (Essential in organizing the team's efforts)

During the meeting, the team should review and discuss the SOW in its entirety, clarify team members' role and responsibilities, work plan, develop data collection methods, review and clarify any logistical and administrative procedures for the assignment and instruments and to prepare for the in-brief with USAID/Malawi.

Work Plan

The Contractor will prepare a detailed work plan that includes task timeline, methodology outlining approach to be used in answering each evaluation question, team responsibility, document review, key informant and stakeholder meetings, site visits, survey implementation, travel time, debriefings (for USAID, implementing partner and, if decided, the GOM), draft and final report writing. The work plan will include a data analysis plan. The work plan will be submitted to the MELS COR and FISH AOR at USAID/Malawi for approval no later than the fifth day after the Evaluation team arrives in Malawi.

In-brief Meeting with USAID/Malawi

The team will conduct an in-brief meeting within two working days of international team members' arrival in Malawi.

Evaluation Design Matrix

A table that lists each evaluation question and the corresponding information sought, information sources, data collection sources, data analysis methods, and limitations. The matrix should be finalized and shared with USAID/Malawi before evaluation field work starts. It should also be included as an annex in the evaluation report.

Data Collection Instruments

Development and submission of data collection instruments to USAID/Malawi during the design phase and after the evaluation is completed.

Regular Updates with USAID

The Evaluation Team Leader will brief the MELS COR and FISH AOR on progress with the evaluation on at least a weekly basis, in person or by electronic communication. Any delays or complications must be quickly communicated to USAID/Malawi as early as possible to allow quick resolution and to minimize any disruptions

to the evaluation. Emerging opportunities to strengthen the evaluation should also be discussed with USAID/Malawi as they arise.

Preliminary Draft Evaluation Report

The Contractor will submit a Preliminary Draft Evaluation Report to the MELS COR, FISH AOR, and MELS Project Director five working days before the Mission debriefing. Within three working days after receipt, and before the debriefing, USAID and MELS staff will provide preliminary comments.

Out-briefing with USAID and GoM

The Contractor will present the major evaluation findings to USAID/Malawi and GoM through a PowerPoint presentation before the team's departure from country. The debriefing will include a discussion of achievements and issues as well as any preliminary recommendations. The team will consider USAID and MELS comments and incorporate them in the Draft Evaluation Report.

Debriefing with Key Stakeholders

The team will present the findings from the evaluation to key stakeholders (as appropriate and as defined by USAID) through a PowerPoint presentation prior to the team's departure from the country. The debriefing will include a discussion of achievements and activities only, with no recommendations for possible modifications to project approaches, results, or activities. The team will consider key stakeholder comments and incorporate them appropriately in drafting the evaluation report.

Draft Evaluation Report

A draft report on the findings and recommendations should be submitted to USAID/Malawi with a copy to the Government of Malawi (Department of Fisheries) and MELS 10 working days after departure of international team members from Malawi. The written report should clearly describe findings, conclusions, and recommendations. The draft report must be of high quality with no grammatical errors or typos. A report is high quality when it represents a thoughtful, well-researched and well organized effort to objectively evaluate what worked in the project, what did not and why. The draft report must have well-constructed sentences that are presented in a way that clearly presents findings, conclusions and recommendations. The report should answer all the evaluation questions and the structure of the report should make it clear how the questions were answered. The draft report must meet the criteria set forth under the Final Report section below. USAID will provide comments on the draft report within 10 working days of submission.

Final Evaluation Report

The Contractor will submit two versions of the Final Evaluation Report that incorporate Mission comments and suggestions no later than ten working days after USAID/Malawi provides written comments on the Draft Evaluation Report. The format of the final reports is provided below. The report will be submitted in English, electronically. The public version of the final report which will be uploaded to the Development Experience Clearinghouse (DEC) will *not* include the annex on "Strategic Options for Future Programming" – evaluation objective 3. The USAID-only, procurement sensitive version of the final report will include the aforementioned annex on evaluation objective 3. The final report should meet the following criteria to ensure the quality of the report:

- The evaluation report should represent a thoughtful, well-researched and well organized effort to objectively evaluate what worked in the project, what did not and why.
- Evaluation report shall address all evaluation questions included in the scope of work.

- The evaluation report should include the scope of work as an annex. All modifications to the scope of work, whether in technical requirements, evaluation questions, evaluation team composition, methodology or timeline need to be agreed upon in writing by the MELS COR and FISH AOR.
- The evaluation report must include a separate annex to answer objective 3 “Specific recommendations and lessons learned on strategies and approaches USAID/Malawi should use in the remaining period of FISH’s implementation and for future fisheries and climate change adaptation activities.
- Evaluation methodology shall be explained in detail and all tools used in conducting the evaluation such as questionnaires, checklists and discussion guides will be included in an Annex in the final report.
- Limitations to the evaluation shall be disclosed in the report, with particular attention to the limitations associated with the evaluation methodology (selection bias, recall bias, etc.).
- Evaluation findings should be presented as analyzed facts, evidence and data and not based on anecdotes, hearsay or the compilation of people’s opinions. Findings should be specific, concise and supported by strong quantitative or qualitative evidence.
- Sources of information need to be properly identified and listed in an annex.
- Recommendations need to be supported by a specific set of findings.
- Recommendations should be action-oriented, practical and specific, with defined responsibility for the action.

The format of the final evaluation report should strike a balance between depth and length. The report will include a table of contents, table of figures (as appropriate), acronyms, executive summary, introduction, purpose of the evaluation, research design and methodology, findings, conclusions, lessons learned and recommendations. Where appropriate, the evaluation should utilize tables and graphs to link with data and other relevant information. The report should include, in the annex, any dissenting views by any team member or by USAID on any of the findings or recommendations. The report should not exceed 30 pages, excluding annexes. A second version of this report excluding any potentially procurement-sensitive information will be submitted (also electronically, in English) to Development Experience Clearinghouse (DEC) and for dissemination among implementing partners and other stakeholders.

All quantitative data, if gathered, should be (1) provided in an electronic file in easily readable format; (2) organized and fully documented for use by those not fully familiar with the project or the evaluation; (3) owned by USAID and made available to the public barring rare exceptions. A thumb drive with all the data could be provided to the FISH COR and FISH Project Director.

The final report will be edited and formatted by the Contractor and provided to USAID/Malawi within five working days after the Mission has reviewed the content and approved the final revised version of the report.

VIII. Evaluation Team Composition

The team will include one international and one local consultant. The former will be a specialist with the following areas of expertise: project evaluations and assessments (ideally natural resource management evaluations), fisheries, climate change adaptation, and co-governance principles. The local consultant should have a background in natural resource management, fisheries or conservation.

Team Leader/Evaluation Expert (International)

The expert will serve as Team Leader/ Evaluation Expert (EE) for the FISH evaluation. S/he should have a postgraduate degree in fisheries, environment, climate change, natural resource management, aquaculture or a related environmental science with at least 10 years of international experience leading evaluation teams, ideally

for natural resources management (NRM) and/or climate change projects. The Team Leader/EE should be experienced in preparing documents that are objective, evidence-based, and well organized. S/he should have extensive experience in conducting quantitative and qualitative evaluations. The Team Leader/EE must be familiar with USAID regulations and systems including performance monitoring, gender policies and guidance, project management, budgeting and financial analysis, and reporting. Experience in international donor development program management and overseeing multiple program areas simultaneously is preferred. Excellent oral and written skills in English are required. Relevant experience in Malawi and/or Eastern/Southern Africa preferred.

The Team Leader/EE will provide overall leadership for the team, and s/he will finalize the evaluation design, coordinate activities, arrange periodic meetings, consolidate individual input from team members, and coordinate the process of assembling the final findings and recommendations into a high quality document. S/he will lead the preparation and presentation of the key evaluation findings and recommendations to the USAID/Malawi team and other major partners.

Fisheries/Evaluation Specialist (Local)

The Local Fisheries/Evaluation Specialist will be responsible for providing guidance on local Fisheries management and practices. This person will also provide assistance in arranging appointments and maintaining the schedule, providing interpretation and translation, and assisting with the preparation of project reports, as needed. S/he will be a Malawi national with at least 5 years of field experience in natural resource management, preferably with some sectoral experience with fisheries and/or natural resource conservation. Ideally s/he will have experience evaluating development activities for donors such as DFID, USAID and the World Bank.

Conflict of Interest

All evaluation team members will provide a signed statement attesting to a lack of conflict of interest, or describing an existing conflict of interest relative to the project being evaluated. USAID will provide the conflict of interest forms. See Annex I for the Template.

IX. Level of Effort (LOE) of Study Team by Task Deliverables

Below is an estimate of the evaluation level of effort (LOE).

Level of Efforts of Team Members by Task Deliverables		
Task/Deliverable	Duration / LOE in Days	
	Team Leader/ EE	Fisheries/ Evaluation Specialist
<i>Review background documents and home-based preparation work</i>	5	5
<i>Travel to Malawi</i>	2	0
<i>Team planning meeting and meeting with USAID</i>	2	2
<i>Development of Evaluation Work Plan (concurrent with document review and initial meetings)</i>	2	2
<i>Development of data collection instruments</i>	2	2

<i>Information and data collection. Includes interviews with key informants (stakeholders and USAID staff) and site visits</i>	19	19
<i>Discussion, analysis, and preliminary draft evaluation report in country including discussion with USAID</i>	5	5
<i>Debrief meetings with USAID (preliminary draft report due to USAID)</i>	1	1
<i>Debrief meetings with key stakeholders</i>	1	1
<i>Team Leader meets with Technical Specialists and USAID to synthesize findings/discussion</i>	1	1
<i>Depart Malawi/Travel to U.S.</i>	2	0
<i>Finalization of draft and internal review (IBTCI) remote</i>	5	5
<i>USAID provides comments on draft report</i>	0	0
<i>Team revises draft report and submits final to USAID (out of country)</i>	10	4
<i>USAID completes final review</i>	0	0
<i>Editing and formatting of report</i>	5	2
Total Estimated LOE	62	49

X. Scheduling and Logistics

Funding and Logistical Support

USAID/Malawi's MELS project will be responsible for all off-shore and in-country administrative and logistical support, including identification and fielding appropriate local staff. It will take care of arranging and scheduling meetings, international and local travel, hotel bookings, working/office spaces, computers, printing, and photocopying. The Logistics Specialist will arrange field visits, local travel, hotel, and appointments with stakeholders and provide translation services.

Scheduling

Work is to be carried out over a period of approximately 8 weeks (9 weeks for the team Leader because of his dual responsibilities). At this point in time, we anticipate that the evaluation would begin in early July, field work completed by early August and the final report and close out during by early September. The anticipated start date in country provides over one month to finalize, clear the SOW, recruit and approve the consultants, and complete background research prior to arrival. See Annex I for Malawi Mission Holiday Schedule.

A six-day work week (Monday-Saturday) is authorized for the evaluation team while in Malawi, however, no overtime or premium pay is authorized. The evaluation team will submit a work plan with timeline as part of the evaluation methodology proposal and develop a GANTT chart displaying the time periods during which activities occur.

Team mobilization will include: travel approval; airline tickets; visa; lodging; work facility and vehicle transport arrangements; dates for meetings with USAID/Malawi EG staff and key contacts; in-country travel agenda; and accommodations.

ANNEX II. EVALUATION DESIGN AND METHODS

FISH EVALUATION TIMELINE

Month	September				October			
	Week one	Week two	Week three	Week four	Week one	Week two	Week three	Week four
Activity								
Travel								
Lilongwe								
Fieldwork planning phase, USAID briefings	■							
Reading project documentation	■	■	■	■				
Weekly communication with IBTCI	■	■	■	■				
Meetings: FISH <u>CoP</u> , <u>DoF HQ</u> , <u>LUANAR FD</u> & <u>FishNode</u> , etc.	■	■	■	■				
Meeting with <u>Dept of Fisheries</u>		■						
In-brief with USAID		■						
Wrap-up meeting with USAID								
Zomba (<u>Chilwa and Chiuta</u>)								
Meeting & fieldwork with <u>Dr Jamu</u> , <u>PACT</u> , <u>Dep CoP</u>		■						
DFO, <u>Zomba</u>		■						
DFO, <u>Machinga</u>			■					
Emmanuel International			■					
LEAD			■					
Local leaders/ District Councils		■	■					
BVCs <u>Chilwa</u>		■	■					
Fishers and Fish Traders, <u>Chilwa</u>		■	■					
Fishers and Fish Traders <u>Chiuta</u>		■	■					
BVCs <u>Chiuta</u>		■	■					
RVC, <u>Likangala River</u>		■	■					
VNMRCs, <u>Mpyupyu Hill Reforestation</u>		■	■					

Month	September				October			
	Week one	Week two	Week three	Week four	Week one	Week two	Week three	Week four
Activity								
Mangochi (SE Arm and Malombe)								
Meetings, PACT, EI & CISER staff								
Meetings, Mangochi DoF and FAO/FiRM								
Meeting, DoF Fisheries Research staff, Monkey Bay								
Meeting, Malawi College of Fisheries staff, Mpwepwe								
Local leaders/ District Councils								
Meetings, BVCs, Fishers & Traders, SE Arm of Lake Malawi								
Meetings, BVCs & fishers, L. Malombe								
Meetings, Maldeco Fisheries & CFA vice chair								
Skype conference call, University of Rhode Island								
Report Preparation								
Prepare draft report, with IBTCI input								
Submit draft report to IBTCI								

ANNEX III. DATA COLLECTION TOOLS

The evaluation used a suite of broad-based questions specifically targeted at the different stakeholders and focus groups. Rather than sticking rigidly to a formal question and answer session, which in the experience of the Evaluation team does not easily allow for open discussion and cross-referencing of answers, the questionnaire designed for each group was instead a set of topics that should be broadly explored during the interviews and focus group meetings. This enabled a thorough overview of the project's activities to be obtained from each key informant and from each Focus Group.

FISH FINAL EVALUATION CHECKLIST

Evaluation question 1: *To what extent has FISH been able to increase social, ecological, and economic resilience of freshwater ecosystems and the people who depend on them. How robust was the Theory of Change (a reflection of program design) and project's objectives and components/interventions? What improvements/changes should be made to the Theory of Change to improve its design and management of future fisheries biodiversity programming in Malawi?*

BVC, DFOs, DC, local leaders, fisheries association (FA)

Social resilience of freshwater ecosystems and people

- Gender relations – Who does what and why?
- Quality of life – Any changes in quality of life? – health, nutrition, income, relations
- Governance in fisheries management –How stocks are managed and who does what and why?
- Community capacity for Co-Management – Trained human capacity, legal authority, financial, equipments

Ecological resilience of freshwater ecosystems and people

- Fisheries biodiversity conservation – Any improvements in stock diversity over the years? Why?
- Climate change adaptation measures – Interventions and impact of interventions
- NRM in catchment – Interventions and any contribution to stock performance
- Habitant management - Interventions and any contribution to stock performance
- Riparian zone conservation - Interventions and any contribution to stock performance
- Fishing methods – Common methods used. Any difference before FISH project? Any use of illegal methods?

Economic resilience of freshwater ecosystems and people

- Livelihood diversity – Any livelihood involved in besides fishing? How were they introduced?
- Catch and price increase – Any improvements in catches and price of fish?

Evaluation question 2: *To what extent has increased participatory fisheries management (PFM) by artisanal and commercial fishers led to fish biodiversity conservation and livelihoods benefits, and women's empowerment? To what scale and scope have the sustainable fishing practices been adopted by the fishers and what are those practices? Are there other lessons learned from evaluating the Theory of Change, project implementation approaches that have broader applicability to fisheries biodiversity conservation for USAID Malawi and beyond?*

BVC, processors, traders, Commercial FA, DFOs

Participatory fisheries management (PFM) –

- How PFM is practiced and why?
- Fish biodiversity conservation - Any changes in stock conservation due to PFM?
- Livelihoods benefits – Any benefits from conservation and who benefits (fishing to consumption)?
- Women's empowerment – Are women part of the process? What about ability to empower them?

Sustainable fishing practices

- Practices – Fishing practices used before FISH project. What was introduced?
- Adoption/using – Which practices are in use?
- What is working well and not?
- What best practices are coming out of the practices? Lessons

Evaluation question 3: *To what extent has FISH built the capacity of the Department of Fisheries on increasing utilization of science, analysis and information for evidence based decision making in sustainable ecosystem based fisheries management? What strategic support to the Department is being appreciated and valued and would have been greatly valued and appreciated?*

Department of Fisheries - DFOs, FISH Desk Officer, FRU, MCF, FSTAP

Capacity building for Department of Fisheries

- Conducting research - which areas of research?
- Information gathering and data base – which areas of data gathering techniques. creation of database and use?
- Utilization of science, analysis and information - any evidence of utilization in sustainable EBFM
- Strategic support to Department – Any support to the keys needs of the Department? What went well and not? Has the project addressed the real challenges of the sector? What would have been done better?
- FISH should design an exit strategy that leaves behind functioning institutions, such as the FSTAP – is it functioning? What capacities are there to support its functionality?

Evaluation question 4: *To what extent did FISH's partnership model (and the kind of FISH's partners) used in the implementation of FISH with regards to achieving the activity goals and reducing threats to wild-caught fisheries? To what extent did FISH engage the private sector and civil society in solving the challenges faced with threats to fisheries biodiversity and aquaculture?*

PACT, FISH partners, USAID, LUANAR, Department of Fisheries, Private sector and Civil society

Partnership model

- FISH partners and how they were identified?
- Areas of competence and involvement in the implementation of the project?
- Transparency, accountability and representation in decision making – how decisions were made in the implementation of the project
- Did the partnership model work? What went well and not? Any areas requiring improvement?
- Has the model contributed to the projects goal () and reduced threats of wild fish capture?

Private sector and Civil society engagement

- Organizations involved and key areas of involvement
- Any contribution of private sector and civil society to reducing threats of wild fish capture?

Other aspects

- Were reporting requirements followed and adhered to?
- Were annual work plans available and followed in implementation?
- Performance monitoring data - Quality and use of data, information
- What were major constraints in achieving expected project results?
- What are the Key best practices you can recommend for upscaling and Why?
- What specific recommendations do you propose for scaling up?
- What priority areas would you propose for possible future programming?

Robustness was the Theory of Change:

- A reflection of program design and project's objectives and components/interventions

Evaluation question 5: *To what extent did the integration of climate change and biodiversity in FISH's design and the 3 C approach of co-location, collaboration and coordination with other USAID initiatives (e.g., Feed the Future): and b) other Development Partners efforts yield women's empowerment, livelihoods, (resilience) adaptation and biodiversity conservation benefits. To what extent did FISH practice adaptive program management? Were the findings, recommendations, and lessons learned from the mid-term evaluation taken into account during the remainder of the implementation period, and if so, what was the impact of any course corrections?*

BVCs, DFOs, FISH partners, women processors, VNRMC, PACT.

- Has the integration yielded any women's empowerment, livelihoods, (resilience) adaptation and biodiversity conservation benefits?
- Was there any application of adaptive program management in the project?
- Utilization of findings, recommendations, and lessons learned from the mid-term evaluation? what was the impact of any course corrections (refer to recommendations below)

ANNEX IV. FISH EVALUATION QUESTIONS MATRIX

Intervention area	Focus area	Data type	Method	Data source	Sampling /selection	Analysis
Evaluation question 1: To what extent has FISH been able to increase social, ecological, and economic resilience of freshwater ecosystems and the people who depend on them. How robust was the Theory of Change (a reflection of program design) and project's objectives and components/interventions? What improvements/changes should be made to the Theory of Change to improve its design and management of future fisheries biodiversity programming in Malawi?						
Social resilience of freshwater ecosystems and people	Gender relations	Qualitative	FGD with BVC, processors, traders	Primary data, Secondary data	8-10 members (2 FGDs in each lake)	Gender analysis
	Quality of life	Qualitative,	FGD with BVC, individual interview	Primary data Secondary data	8-10 members (2 FGDs in each lake), 5 per lake	Content analysis
	Governance in fisheries management	Qualitative	FGD with BVC KII with DFOs, DC, local leaders, fisheries association (FA)	Primary data, DFO, DC, local leaders, FA Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 DC, 2 local leaders/lake	Content analysis
	Institutional and community capacity for Co-Management	Qualitative	FGD with BVC, KII with DFO, FISH partners, FA	Primary data and institutions Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 partners	Content analysis
Ecological resilience of freshwater ecosystems and people	Fisheries biodiversity conservation	Qualitative and quantitative	FGD with BVCs, VNRMC KII with DFOs, DFOs, FA Project documents	Primary and Secondary data	All lakes	Content analysis
	Climate change adaptation measures	Qualitative	FGD with BVCs, VNRMC KII with DFOs, DFOs, FA	Primary and Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, VNRMC, FA	Content analysis

	NRM in catchment	Qualitative	FGD with BVCs, VNRMC KII with DFOs, DFOs, FA	Primary and Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, DFO, VNRMC, FA	Content analysis
	Habitant management	Qualitative	FGD with BVCs, VNRMC KII with DFOs, DFOs, FA	Primary and Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, DFO, VNRMC, FA	Content analysis
	Riparian zone conservation	Qualitative	FGD with BVCs, VNRMC KII with DFOs, DFOs, FA	Primary and Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, DFO, VNRMC, FA	Content analysis
	Fishing methods	Qualitative	FGD with BVC, KII with DFO	Primary and Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs	Content analysis
Economic resilience of freshwater ecosystems and people	Livelihood diversity	Qualitative	FGD with BVC, KII with DFO, HH interviews	Primary and Secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 5 HH per beach	Content analysis
	Catch and price increase	Quantitative	Secondary	Project reports and DFO	For all lakes	Descriptive analysis

Intervention area	Focus area	Data type	Method	Data source	Sampling /selection	Analysis
Evaluation question 2: To what extent has increased participatory fisheries management (PFM) by artisanal and commercial fishers led to fish biodiversity conservation and livelihoods benefits, and women's empowerment? To what scale and scope have the sustainable fishing practices been adopted by the fishers and what are those practices? Are there other lessons learned from evaluating the Theory of Change, project implementation approaches that have broader applicability to fisheries biodiversity conservation for USAID Malawi and beyond?						
Participatory fisheries management (PFM)	Fish biodiversity conservation	Qualitative	FGD with BVC, processors, traders, Commercial FA, KII DFO	Primary and Secondary data	8-10 members (2 FGDs/lake), processors and traders, CFA, DFO	Content analysis
	Livelihoods benefits,	Qualitative	FGD with BVC, processors, traders KII DFOs, CFA	Primary and Secondary data	8-10 members (2 FGDs/lake), processors and traders, CFA, DFO	Content analysis
	Women's empowerment	Qualitative	FGD with BVC KII women processors, traders, DFO	Primary and Secondary data	8-10 members (2 FGDs/lake), processors and traders, CFA, DFO	Gender analysis
Sustainable fishing practices	Practices	Qualitative	FGD with BVC, document review, KII DFO	Primary and Secondary data	BVCs, Project documents, 4 DFOs	Content analysis
	Adoption/using	Quantitative # of users	FGD with BVC, document review, KII DFO	Primary and Secondary data	BVCs, Project documents, DFOs	Content analysis and descriptive analysis

Intervention area	Focus area	Data type	Method	Data source	Sampling /selection	Analysis
Evaluation question 3: To what extent has FISH built the capacity of the Department of Fisheries on increasing utilization of science, analysis and information for evidence based decision making in sustainable ecosystem based fisheries management? What strategic support to the Department is being appreciated and valued and would have been greatly valued and appreciated?						
Capacity building for Department of Fisheries	Conducting research, which areas	Qualitative	Group discussion with Department of Fisheries staff, KII with DFOs, FISH Desk Officer, FRU, MCF, FSTAP Document review	Primary data from Fisheries HQs, 4 DFOs, FRU, MCF and FISH Desk Officer, FSTAP chairperson, secondary data	Headquarters, 4 Districts, FRU, MCF, FSTAP	Content analysis
	Information gathering and data base	Qualitative	Group discussion with Department of Fisheries staff, KII with DFOs, FISH Desk Officer, FRU, MCF, FSTAP Document review	Primary data from Fisheries HQs, 4 DFOs, FRU, MCF and FISH Desk Officer, FSTAP chairperson, secondary data	Headquarters, 4 Districts, FRU, MCF, FSTAP	Content analysis
	Utilization of science, analysis and information	Qualitative	Group discussion with Department of Fisheries staff, KII with DFOs, FISH Desk Officer, FRU, MCF, FSTAP Document review	Primary data from Fisheries HQs, 4 DFOs, FRU, MCF and FISH Desk Officer, FSTAP chairperson, secondary data	Headquarters, 4 Districts, FRU, MCF, FSTAP	Content analysis
	Strategic support to Department	Qualitative	Group discussion with Department of Fisheries staff, KII with DFOs, FISH Desk Officer, FRU, MCF, FSTAP Document review	Primary data from Fisheries HQs, 4 DFOs, FRU, MCF and FISH Desk Officer, FSTAP chairperson, secondary data	Headquarters, 4 Districts, FRU, MCF, FSTAP	Content analysis

Intervention area	Focus area	Data type	Method	Data source	Sampling /selection	Analysis
Evaluation question 4: To what extent did FISH's partnership model (and the kind of FISH's partners) used in the implementation of FISH with regards to achieving the activity goals and reducing threats to wild-caught fisheries? To what extent did FISH engage the private sector and civil society in solving the challenges faced with threats to fisheries biodiversity and aquaculture?						
Partnership model	FISH partners and how they were identified	Qualitative	KII with PACT, USAID, document review	Primary and secondary data	PACT, USAID	Content analysis
	Areas of competence	Qualitative	KII with PACT, partners, document review	Primary and secondary data	PACT and partners	Content analysis
	Specific role in the project	Qualitative	KII with PACT, partners, document review	Primary and secondary data	PACT and partners	Content analysis
	Transparency, accountability and representation in decision making	Qualitative	KII with PACT, partners, document review	Primary and secondary data	PACT and partners	Content analysis
Private sector and Civil society engagement	Organizations involved	Qualitative	KII with PACT, document review	Primary and secondary data	PACT	Content analysis
	Areas of engagement	Qualitative	KII with PACT, partners, document review	Primary and secondary data	PACT and partners	Content analysis

Intervention area	Focus area	Data type	Method	Data source	Sampling /selection	Analysis
Evaluation question 5: To what extent did the integration of climate change and biodiversity in FISH's design and the 3 C approach of co-location, collaboration and coordination with other USAID initiatives (e.g., Feed the Future): and b) other Development Partners efforts yield women's empowerment, livelihoods, (resilience) adaptation and biodiversity conservation benefits. To what extent did FISH practice adaptive program management? Were the findings, recommendations, and lessons learned from the mid-term evaluation taken into account during the remainder of the implementation period, and if so, what was the impact of any course corrections?						
Integration of climate change and biodiversity in FISH's design	Women's empowerment	Qualitative	FGD with BVCs, KII with DFOs, KII with FISH partners, KII with women processors	Primary and secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 local partners, women processors	Content analysis
	Livelihoods diversity	Qualitative	FGD with BVCs, KII with DFOs, KII with FISH partners	Primary and secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 local partners	Content analysis
	Adaptation and biodiversity conservation benefits	Qualitative	FGD with BVCs, KII with DFOs, KII with FISH partners, VNRMC	Primary and secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 local partners, VNRMC	Content analysis
3 C approach of co-location, collaboration and coordination with other USAID initiatives	Co-location	Qualitative	FGD with BVCs, KII with DFOs, KII with FISH partners, PACT	Primary and secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 local partners, PACT	Content analysis
	Collaboration	Qualitative	FGD with BVCs, KII with DFOs, KII with FISH partners, PACT	Primary and secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 local partners, PACT	Content analysis

	Coordination	Qualitative	FGD with BVCs, KII with DFOs, KII with FISH partners, PACT	Primary and secondary data	8-10 members (2 FGDs in each lake), 4 DFOs, 4 local partners, PACT	Content analysis
Midterm evaluation use and impact	Based on 7 evaluation questions (separate sheet)	Qualitative	KII with PACT, partners	PACT, partners	PACT and all partners	Content analysis

Other issues from SOW to be considered

Intervention area	Focus area	Data type	Method	Data source	Sampling /selection	Analysis
Robustness was the Theory of Change	A reflection of program design and project's objectives and components/interventions	Qualitative	KII with USAID, PACT, Department of Fisheries	USAID, PACT, Department of Fisheries		Content analysis
Reporting requirements	Adherence	Qualitative	KII with PACT, partners	PACT, partners	PACT and all partners	Content analysis
Annual work plans	Implementation	Qualitative	KII with PACT, partners	PACT, partners	PACT and all partners	Content analysis
Performance monitoring data	Quality and use of data, information	Qualitative	KII with PACT, partners	PACT, partners	PACT and all partners	Content analysis
Major constraints in achieving expected project results		Qualitative	KII with PACT, partners, DFOs, District Councils FGD with BVCs, VNRMC	PACT, partners, DFOs, District Councils, BVCs, VNRMC	PACT, all partners, 2 BVCs and VNRMC in each lake	Content analysis
Key lessons	Best practices	Qualitative	KII with PACT, partners, DFOs, District Councils FGD with BVCs, VNRMC	PACT, partners, DFOs, District Councils, BVCs, VNRMC	PACT, all partners, 2 BVCs and VNRMC in each lake	Content analysis

Specific recommendations for scaling up		Qualitative	FGD, KII, individual interview	Primary data from stakeholders	All stakeholders	Content analysis
Priority areas for possible future programming		Qualitative	FGD, KII, individual interview	Primary data from stakeholders	All stakeholders	Content analysis

ANNEX V. KEY INFORMANTS INTERVIEWED

I. List of people consulted

No	Name	Sex	Organization	Position
1	Dr. Alan Brooks	Male	PACT	Chief of Party
2	Dr. Dick Kachilonda	Male	PACT	Governance and Capacity Development
3	Esau Chisale	Male	PACT/URI	Research Associate
4	Dr. Daniel Jamu	Male	URI	Deputy Chief of Party
5	Stanley Mvula	Male	CEPA/PACT	Self-Financing Officer
6	Emmanuel Kanike	Male	Christian Aid	Acting Country Director
7	Mr J. Mkwakwa	Male	CISER	Executive Director
8	Gilbert Kamiyala	Male	USAID	M&E Specialist
9	Bruce Sosola	Male	USAID	AOR
10	Fenton Sands	Male	USAID	
11	Dr. Austin Mtethiwa	Male	LUANAR	Head of Department - Aquaculture
12	Professor Jeremiah Kang'ombe	Male	LUANAR	
13	Dr. Daniel Sikawa	Male	LUANAR	Dean of Faculty
14	Dr. Francis Maguza-Tembo	Male	LUANAR	Deputy Head of Department
15	Dr Wilson Jere	Male	LUANAR	FSTAP
16	Prof. Emmanuel Kaunda	Male	LUANAR	Technical Coordinator, NEPAD Fish Node
17	Dr. Friday Njaya	Male	Dept Fisheries Headquarters	Director of Fisheries
18	Geoffrey Kanyerere	Male	Dept Fisheries Headquarters	Deputy Director -Research
19	Jacqueline Kazembe	Female	Dept Fisheries Headquarters	Deputy Director - Training
20	Moffat Manase	Male	Dept Fisheries Headquarters	Chief Fisheries Officer
21	Nickson Masi	Male	Department of Fisheries	Assistant Fisheries Officer L. Chilwa
22	Lapken Chokoko	Male	Department of Fisheries	District Fisheries Officer Zomba
23	Rodney Gondwe	Male	Department of Fisheries	Assis DFO Machinga
24	Thocco Mwale	Male	Department of Fisheries	Assistant Fisheries Officer L. Chiuta
25	Eliot Lungu	Male	Department of Fisheries	District Fisheries Officer Machinga
26	Othaniel Dube	Male	Department of Fisheries	Assistant Fisheries Officer Lake Malawi -Msaka
27	Chisesa	Male	Department of Fisheries	Assistant Fisheries Officer L. Malombe

28	Fletcher Khoka	Male	Department of Fisheries	Assistant Fisheries Officer L. Malawi - Malindi
29	Neverson Msusa	Male	Department of Fisheries	District Fisheries Officer Mangochi
30	Henry Chitenjere		Department of Fisheries	Assistant Fisheries Officer L. Malawi - Malembo
31	Salimu Mbalaka	Male	Department of Fisheries	Fisheries Research Unit, Monkey- Bay
32	Mathews Chirwa	Male	Department of Fisheries	Deputy Principal, Malawi College of Fisheries
33	Alex Dazilone	Male	Department of Fisheries	Lecturer, Malawi College of Fisheries
34	Hopeful Kantonga	Male	Department of Fisheries	Lecturer, Malawi College of Fisheries
35	Philip Manduwe	Male	Commercial Fishers Association	Vice Chair
36		Male	MALDECO	Senior Management
37	Professor Sosten Chiotha	Male	LEAD	Executive Director
38	Charles Mukiwa	Male	Emmanuel International	Country Director
39	Issaquissa Mwanjawe	Male	Emmanuel International	Fish Project Officer - Mangochi
40	Dr. Niklas Mattson	Male	FAO FIRM Project	Coordinator
41	Hon Dr. Chidanti Malunga	Male	Parliamentary Committee of Agriculture	Chairperson
42	Walter Chikuni	Male	Zomba District Council	Director of Planning and Development
43	Dr Elin Torell (Skype)	Female	University of Rhode Island	Director for International Programs
44	Dr Najih Lazar (Skype)	Male	University of Rhode Island	Fisheries Scientist

2. Participants in Focus Group discussions.

No	Name	Sex	Organization	Position
1	Medson Peter	Male	Mchenga BVC Lake Chilwa	Secretary
2	Ali Kasimu	Male	Mchenga BVC Lake Chilwa	Member
3	Rashid Amidu	Male	Mchenga BVC Lake Chilwa	Chairperson
4	Bamusi Zidana	Male	Mchenga BVC Lake Chilwa	Village Headman
5	Mussa Gayo	Male	Mchenga BVC Lake Chilwa	Member

6	Moffat Nyerere	Male	Mchenga BVC Lake Chilwa	Member
7	Ayani Chibambo	Female	Mchenga BVC Lake Chilwa	Member
8	Costino Undima	Female	Mchenga BVC Lake Chilwa	Member

No	Name	Sex	Organization	Position
1	Rhoda Katimbi	Female	Kachulu BVC Lake Chilwa	Secretary
2	Cecilia Kathewera	Female	Kachulu BVC Lake Chilwa	Treasurer
3	Rose Nyambalo	Female	Kachulu BVC Lake Chilwa	Member
4	Lone Misokwe	Female	Kachulu BVC Lake Chilwa	Vice Chairperson
5	Anderson Thebwa	Male	Kachulu BVC Lake Chilwa	Chairperson BVC & FA
6	Dickson Shabani	Male	Kachulu BVC Lake Chilwa	Member

No	Name	Sex	Organization	Position
1	Lloyd Chipala	Male	Makawa RVC Lake Chilwa	Secretary
2	Enock Phuka	Male	Makawa RVC Lake Chilwa	Member
3	Binwell Matipa	Male	Makawa RVC Lake Chilwa	Treasurer
4	Christina Patrick	Female	Makawa RVC Lake Chilwa	Member
5	Lucius Bona	Male	Makawa RVC Lake Chilwa	Member

No	Name	Sex	Organization	Position
1	Dalitso Juma	Male	Mpyupyu VNRMC L. Chilwa	Chairperson
2	Belita Kayinga	Female	Mpyupyu VNRMC L. Chilwa	Member
3	Macnovas Kachepa	Male	Mpyupyu VNRMC L. Chilwa	Member
4	Twenji Mitambo	Female	Mpyupyu VNRMC L. Chilwa	Treasurer

5	Beatrice Manja	Female	Mpyupyu VNRMC L. Chilwa	Member
6	Christina Chiwanda	Female	Mpyupyu VNRMC L. Chilwa	Member
7	Witness Sambani	Female	Mpyupyu VNRMC L. Chilwa	Member
8	Ethel Time	Female	Mpyupyu VNRMC L. Chilwa	Vice Secretary

No	Name	Sex	Organization L. Chilwa	Position
1	Enoch Muthama	Male	Mwandama VNRMC	Chair VNRMC
2	Sacco Chimasula	Male	Naisi RVC	Treasurer RVC
3	Samson Alimu	Male	Naisi RVC	Vice Secretary RVC
4	Jenipher Rodgers	Female	Naisi RVC	Vice Chair RVC
5	Tereza Nongwa	Female	Mwandama VNRMC	Member
6	Melise Nkute	Female	Mwandama VNRMC	Member
7	Ester Wayile	Female	Mwandama VNRMC	Vice Chair VNRMC
8	Mary Luwembe	Female	Mwandama VNRMC	Member
9	Felister Koloko	Female	Mwandama VNRMC	Member
10	Thomsom Machika	Male	Mwandama VNRMC	Member

No	Name	Sex	Organization	Position
1	Rodgers Balakasi	Male	Njelwa BVC L. Chiuta	Chairperson
2	Lanjesi Kanyumba	Male	Njelwa BVC L. Chiuta	Member
3	Nikess Kafantaye	Female	Njelwa BVC L. Chiuta	Secretary
4	Stephan Wahera	Male	Njelwa BVC L. Chiuta	Vice Chair
5	Dyson Issa	Male	Njelwa BVC L. Chiuta	Member

No	Name	Sex	Organization	Position
1	Mariam Bwanali	Female	Chisumbi BVC –L. Malombe	Member
2	Liar Kasimu	Male	Chisumbi BVC –L. Malombe	Vice Chair
3	Amina Jasiteni	Female	Chisumbi BVC –L. Malombe	Member
4	Laston Binali	Male	Chisumbi BVC –L. Malombe	Secretary
5	Yasin Jafari	Male	Chisumbi BVC –L. Malombe	Chairperson

6	Wesa Chuma	Female	Chisumbi BVC –L. Malombe	Member
7	Ali John	Female	Chisumbi BVC –L. Malombe	Member
8	Latifa James	Female	Chisumbi BVC –L. Malombe	Member

No	Name	Sex	Organization	Position
1	Rossa Akimu	Female	Likala BVC –L.Malombe	Treasurer
2	Mary Wilson	Female	Likala BVC –L.Malombe	Member
3	Kamwana Alubi	Male	Likala BVC –L.Malombe	Member
4	Maxwell Suwedi	Male	Likala BVC –L.Malombe	Vice Secretary
5	Humphrey Imedi	Male	Likala BVC –L.Malombe	Secretary
6	Buka Fayala	Male	Likala BVC –L.Malombe	Chairperson

No	Name	Sex	Organization	Position
1	Issa Kachele	Male	Ngoyi Chipet BVC – Upper Shire	Secretary BVC & SubFA
2	Iris Mayinga	Female	Ngoyi Chipet BVC	Vice Chair
3	Angella Songole	Female	Ngoyi Chipet BVC	Member
4	Marrisen Mponda	Male	Ngoyi Chipet BVC	Member BVC & SubFA
5	Chimwala Majiga	Male	Ngoyi Chipet BVC	Member
6	Mariah Kazembe	Female	Ngoyi Chipet BVC	Vice Secretary
7	Esnart Mtewa	Female	Ngoyi Chipet BVC	Member
8	Laje Makwinja	Female	Ngoyi Chipet BVC	Member
9	Ali Jacob	Female	Ngoyi Chipet BVC	Member
10	Roseby Mpelele	Female	Ngoyi Chipet BVC	Treasurer

No	Name	Sex	Organization	Position
1	GVH Chindamba	Male	Chindamba BVC- Malindi	GVH
2	Mussa Kwilembe	Male	Chindamba BVC- Malindi	Chair BVC & SubFA
3	Malanda Nkata	Male	Chindamba BVC- Malindi	Vice Chair BVC & Sec SFA
4	Noel Bwanali	Male	Chindamba BVC- Malindi	Secretary, member SFA
5	Kaisi John	Male	Chindamba BVC- Malindi	Treasurer
6	Niya Mada	Female	Chindamba BVC- Malindi	Member

7	Rose Mailosi	Female	Chindamba BVC- Malindi	Member
8	Jennet Alick	Female	Chindamba BVC- Malindi	Vice Secretary
9	Samatu Jafali	Female	Chindamba BVC- Malindi	Member

No	Name	Sex	Organization	Position
1	Dadex Chinsinga	Male	Chilimba BVC- Malembo	Chairperson
2	Aweza Chilembwe	Female	Chilimba BVC- Malembo	Member
3	Ezekiel Kaombe	Male	Chilimba BVC- Malembo	Member
4	Laston Chipani	Male	Chilimba BVC- Malembo	Member
5	Edith Makandanje	Female	Chilimba BVC- Malembo	Secretary
6	Harold Kuwuzeni	Male	Chilimba BVC- Malembo	Member
7	Friday Black	Male	Chilimba BVC- Malembo	Vice Chair
8	Grace Maziwili	Female	Chilimba BVC- Malembo	Vice secretary
9	Harison Chipande	Male	Chilimba BVC- Malembo	Member
10	Iness Chapuma	Female	Chilimba BVC- Malembo	Treasurer

ANNEX VI. LIST OF FISH DOCUMENTS

1	FISH (2015) A Good Governance Barometer (GGB) of Fisheries Co-management in Four Major Lakes in Malawi. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 78 p.
2	FISH (2015), Applied Political Economic Analysis (APEA) of Fisheries Co-management of Four Major Lakes in Malawi. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 35p.
3	FISH (2015) A Community Performance Index (CPI) of Fisheries Co-management in Four Major Lakes in Malawi. USAID/FISH Project Publication, Lilongwe, Malawi: 52 p.
4	FISH (2015). Environmental Threats and Opportunities Assessment (ETOA) of Four Major Lakes in Malawi. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 248 pp.
5	FISH (2015). <i>Fisheries Gender and Youth Analysis in Four Major Lakes in Malawi</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 23 p.
6	FISH (2015). A Good Governance Barometer (GGB) of Fisheries Co-management in Four Major Lakes in Malawi. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 72 p.
7	FISH, (2015). An Organizational Network Analysis (ONA) of Fisheries Co-management in Lakes Malawi, Malombe and Chilwa. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 17 p.
8	FISH (2015). Participatory Vulnerability and Capacity Assessment (PVCA) of Four Major Lakes in Malawi. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 42 pg.
9	FISH (2015). Photographic Documentation of Fishing Communities in the Four Major Lakes in Malawi. USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 32 p.
10	Fisheries Integration of Society and Habitats (FISH) 2016. <i>A Guide to Climate-Smart Agriculture: Volume 1: For Extension Workers</i> . Lilongwe, Malawi, and Washington, D.C., United States: Pact.
11	Fisheries Integration of Society and Habitats (FISH) 2016. <i>A Guide to Participatory Fisheries Management in Malawi: Volume 1: Implementation Guidelines</i> . Lilongwe, Malawi, and Washington, D.C., United States: Pact.
12	Fisheries Integration of Society and Habitats (FISH) 2016. <i>A Guide to Participatory Fisheries Management in Malawi: Volume 2: Templates for Local Fisheries Management Authorities</i> . Lilongwe, Malawi, and Washington, D.C., United States: Pact.
13	FISH (2018). <i>FISH Advocacy Strategy, 2016-2019</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 8 pp.
14	FISH (2016). Gender Mainstreaming Strategy for the Fisheries Integration of Society and Habitats project. USAID/FISH Project, Pact Publication, Lilongwe, Malawi.
15	Coastal Resources Center. (2017). <i>The Fisheries Integration of Society and Habitats (FISH): An Atlas of the Fisheries Resources of Lake Chilwa in Malawi</i> . Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 19 pp.
16	Coastal Resources Center. (2017). <i>The Fisheries Integration of Society and Habitats (FISH): An Atlas of the Fisheries Resources of Lake Chiuta in Malawi</i> . Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 22 pp.
17	Coastal Resources Center. (2017). <i>The Fisheries Integration of Society and Habitats (FISH): An Atlas of the Fisheries Resources of Lake Malawi's Southeast Arm in Malawi</i> . Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 23 pp.
19	Coastal Resources Center. (2017). <i>The Fisheries Integration of Society and Habitats (FISH): An Atlas of the Fisheries Resources of Lake Malombe in Malawi</i> . Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 25 pp.

21	Coastal Resources Center. (2017). <i>The Fisheries Integration of Society and Habitats (FISH): An Atlas of the Fisheries Resources of Malawi</i> . Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 91 pp.
22	Coastal Resources Center. (2017) Baseline Assessment of Fish species diversity in the community-led Sanctuaries in the South East Arm and South West Arm of Lake Malawi, Lake Malombe, Lake Chilwa and Lake Chiuta. 29pp.
23	FISH (2017). <i>Current Status of the Usipa Stock and Fishery</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 26 pp.
24	Coastal Resources Center. (2016). <i>A Guide to the Establishment and Management of Community Based Freshwater Fish Sanctuaries</i> . Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 43pp.
25	Robadue, D., Madison, H., Long, N. (2017). <i>Key Words and Topic Map For Malawi Digital Document Collections</i> . Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. 141 pp. plus 890 page supplement
26	FISH (2016) <i>The Science Behind Closed Seasons: A Policy Brief</i> . USAID/FISH Project, Pact Publication. Lilongwe, Malawi: 18pp.
27	FISH (2017). <i>The Potential of Brush Parks for Enhancing Fisheries Production and Management in Lakes Malawi and Malombe: A Technical Brief</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 41 pp.
28	FISH (2017). <i>The Rise in Fishing with Mosquito Nets and Implications of Harvesting Juvenile Fish</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 7 pp.
29	FISH (2017). <i>The State of Knowledge of the Usipa, Engraulicyprus Sardella, Resource and Fishery of the Southeast and Southwest Arms of Lake Malawi</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 55 pp.
30	FISH (2018). <i>Bee keeping manual</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 25 pp.
31	FISH (2018). <i>Biophysical of Community-Managed Fish Sanctuaries in Malawi. Technical Report of the Field Survey, September 2017 (S01-17)</i> . USAID/FISH Project, Pact Publication, Lilongwe, Malawi: 43 pp.
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ANNEX VII. STATEMENT OF DIFFERENCES

There are no statements of differences from the evaluation team members.